

FREMONT NATIONAL FOREST

VICINITY MAP



SOIL RESOURCE INVENTORY

FREMONT NATIONAL FOREST

Pacific Northwest Region

1979

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PREFACE

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

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

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

This inventory consists of two major sections. The first section is the main body of the report which describes the landtypes and management interpretations. The second section consists of the landtype maps at a scale of one inch per mile (1:63,360).

Field mapping was conducted from April 1973 to October 1976 on about 1,452,000 acres. Small parcels of private land were included in the survey but most of the larger blocks were deleted.

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



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INTRODUCTION

SRI CONCEPT AND USE

One of the most basic and vitally needed tools for the land manager is information about the land he is attempting to manage. He needs to know the capability of the land, its sensitivity to disturbance, its suitability for management choice, its hazards for use, and its productivity potential. All this information is prerequisite to making knowledgeable land management decisions. Without it, a quality job cannot be done. This kind of information is what a soil resource inventory is all about.

The Fremont Soil Resource Inventory was done to classify the landscape into individual units which have similar soils, bedrock, landforms, and vegetation. These units are called landtypes and are the basis for landscape descriptions and interpretations in this report.

Although major emphasis was given to soil characteristics, a landtype is not the same as a soil. Rather, a landtype is based on the interaction of four landscape variables and can be viewed as follows:

LANDTYPE = Soil Characteristics + Bedrock
Characteristics + Landforms + Vegetation

A significant change in one or more of these components results in a different landtype. The major emphasis in determining these delineations was for interpretation, behavior, and use of land resources as related to land management activities. Photo interpretation, field observations, laboratory sampling and analysis, and research results were involved in developing these relationships.

The Fremont Soil Resource Inventory is a third order survey. Minimum size delineation of the mapping units is about 40 acres. The user of this information must recognize limitations of scale and information accuracy. Care must be used to avoid overextending the SRI information for use in high-intensity, small area projects. Projects of this type normally require additional intensive on-site inventories and interpretations.

The major contribution this inventory will have in managing the lands of the Fremont National Forest is for land-use planning, soil resource protection, and maintenance of production levels. Some examples of the types of plans which should utilize SRI information are: (1) Environmental Analysis Reports, (2) Transportation Planning, (3) Recreation Planning, (4) Timber Sale Action Plans, (5) Grazing Allotment Plans, (6) Wildlife Plans, (7) Land Appraisal and Exchange, and (8) Erosion Control.

The SRI report is divided into five main parts: (1) Landtype Descriptions; (2) Tables on Soil and Landtype Characteristics; (3) Tables on Management Interpretations; (4) Appendix; and (5) Landtype Maps. Information contained in each part is outlined in the Table of Contents.

The first step in utilizing this report is to identify the landtypes within the study area. First, locate the study area on the Index to Map Sheets, then turn to the appropriate maps. The mapping unit boundaries and map symbols identify the kind and extent of each unit.

When the landtypes are identified turn to the appropriate landtype description for information on soil, landform, geology, and vegetation characteristics. Additional information is presented in the Tables on Soil and Landtype Characteristics and Tables on Management Interpretations.

Interpretations for complexes, units with three-digit numbers, are determined by dividing the complex into its components. These are listed in the Legend of Complexes.



The kinds of soils which occur in any area are the result of five soil forming factors. These factors are: (1) parent material; (2) topography; (3) climate; (4) organisms (plant and animal); and (5) time. These factors interact in many ways to produce soils which are different in their physical and chemical properties and their management potentials or limitations.

Parent Material

Parent material refers to the unconsolidated mass from which the soil profile develops. It may or may not relate to the underlying bedrock itself.

Parent material is one of the most important soil forming factors. For example, it is important in determining the texture and structure of the soil. These characteristics strongly influence moisture infiltration and storage capacity. The stoniness of the soil, fertility, and rate of profile development are other examples of the influence of parent material on soil development.

Five basic kinds of parent material occur on the Fremont National Forest. The standard mapping units have been grouped according to these parent material types.

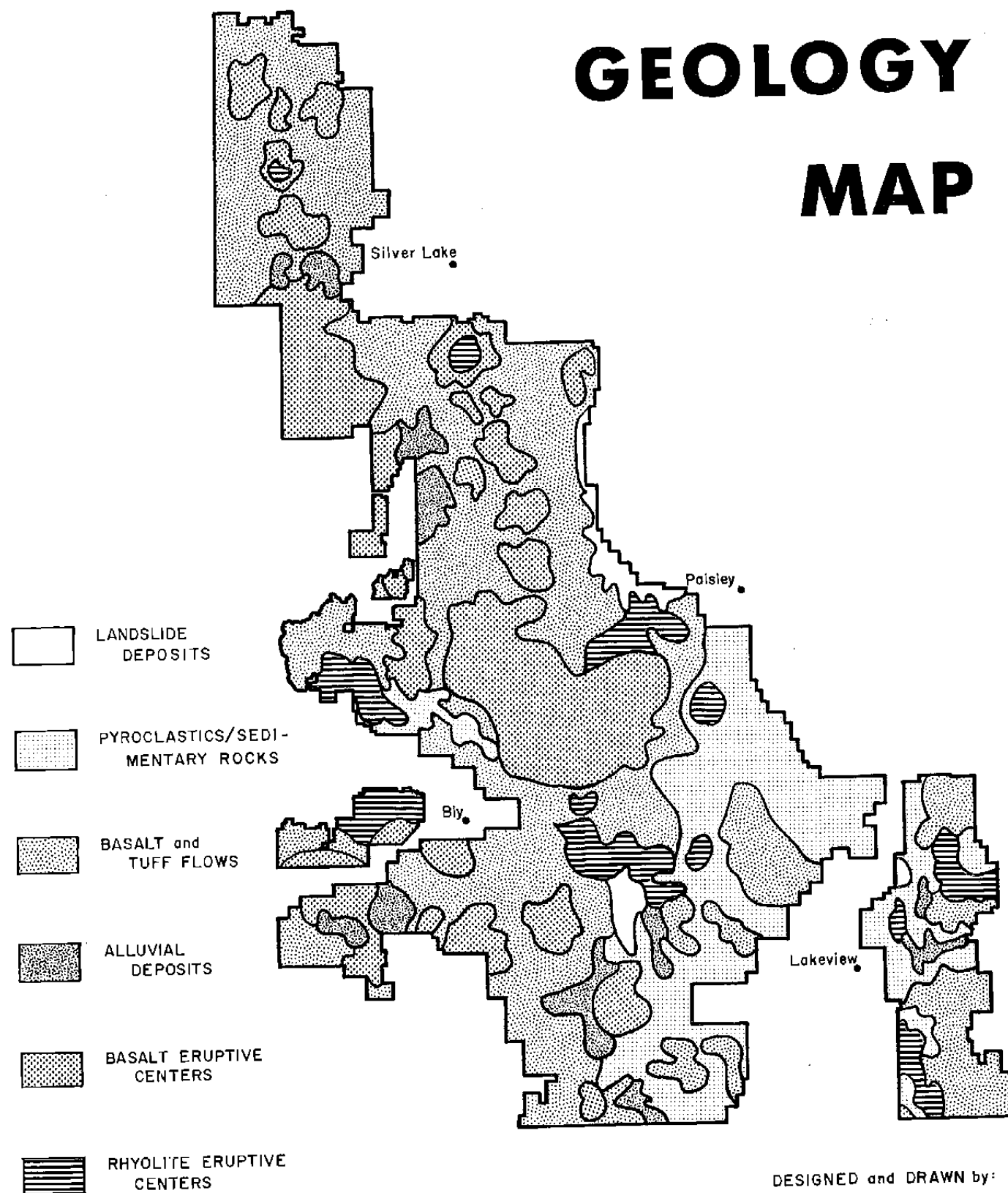
Mapping units 13 through 24 have soils derived from transported parent materials of alluvial or lacustrine origin. These materials have been weathered from a wide variety of bedrock and include basalt, andesite rhyolite, tuff, breccia, sediments, and also ash and pumice.

These soils occur along major streams, valleys, bottomlands, and old lakebeds where materials have been transported and deposited by water. Soil depth and profile characteristics vary widely according to the source and depth of these materials. Bull Prairie, Dry Prairie, Thompson Valley, and Antelope Flat are examples of areas with these soil types.

UPLAND
MEADOW
NEAR
SANDHILL
CROSSING
(MAPPING UNIT 13)



GENERALIZED GEOLOGY MAP



DESIGNED and DRAWN by:
ROBERT MUELLER

The second group of soils, units 25 through 39, are derived from interbedded basalt, andesite, and tuff parent materials. These rocks occur on rolling lava tablelands, block faults, and shield volcanoes. The tuff bedrock layers are reddish brown, soft, and massive. The lava bedrock is dark gray in color, hard, and fractured. Soils derived from these rocks are generally medium textured, stony, and reddish brown in color. Depth varies from very shallow to deep. The shallow soils are associated with "scabrock flats."



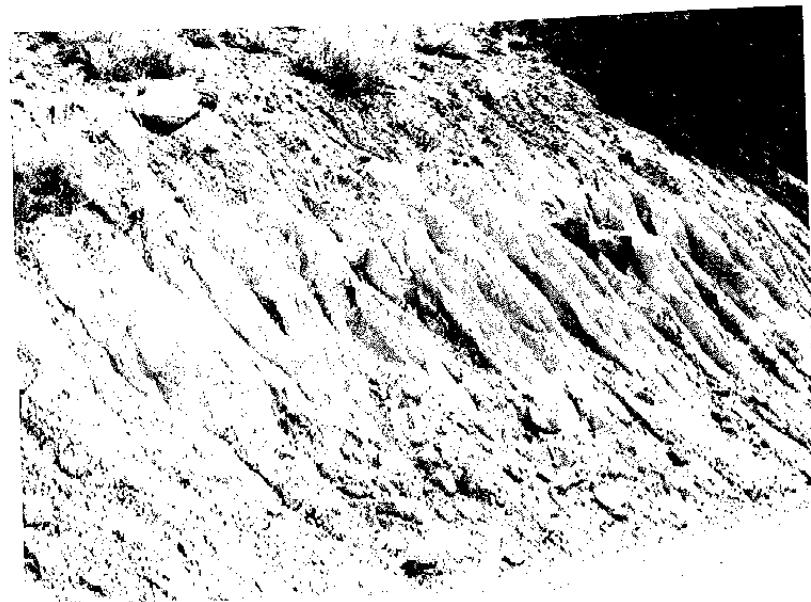
"SCABROCK
FLAT"
NEAR
MILL
CREEK
(MAPPING UNIT 28)

The third major bedrock group, units 40 through 49, consists of rhyolite. Rhyolite is a fine grained, light colored, extrusive rock. It is highly fractured, moderately hard, and high in silica content. Generally this rock is vertically jointed and associated with dome-shaped eruptive centers. Cougar Peak, McComb Butte, Light Peak, and Hager Mountain are examples. Soils derived from this parent material are deep, coarse textured, gravelly, and weakly developed.

The fourth group, units 50 through 76, is weathered from pyroclastic and sedimentary rocks. These rock types are highly variable and includes tuff, breccia, mudflows, lacustrine tuffaceous sandstone, and ashy diatomite. They range from soft to moderately hard, massive to highly fractured, and include the most unstable areas on the Forest. They tend to occur on lower elevations on the southeastern part of the Forest where exposed by geologic erosion and faulting. Generally the landscape is highly dissected.

Because of the wide variety of parent materials the soils are also highly variable. Soil depth, texture, stoniness, and structural development varies greatly and often within short distances. Consequently these lands also offer some of the most difficult management problems on the Forest.

ERODED
TUFF
BEDROCK
ON
LOWER
THOMAS
CREEK



The fifth group, 77 through 99, consists of soils formed in eolian Mazama ash and pumice deposits. Most of these deposits occur on the west and northern parts of the Forest. Thickness is variable with the thinner layers located north and west of Gearhart Mountain to Antelope Flat. The deeper desposits are north of Antelope Flat on the Silver Lake District. Depths range up to six feet north of Location Butte. Ash and pumice soils are characterized by a light yellow or gray color, an A-C profile, single-grain structure, and coarse texture.

Beneath the surface mantle is the old buried residual soil. This soil is derived from either basalt, tuff, or rhyolite and has characteristics similar to those described above.

The ash and pumice soils have been subdivided into three groups based on depth and texture of the ash or pumice layers and type of buried soil.



ASH
OVERLYING
PLATY
ANDESITE
NEAR
LEE
THOMAS
MEADOWS
(MAPPING UNIT 89A)

Topography-Landforms

Topography and landforms influence soil development through its effect on water and temperature relations and vegetation cover. For example, on steep slopes soil development tends to be restricted by reduced amounts of water entering the soil and by high geologic erosion rates. For deep, mature soils to develop the erosion rates cannot exceed the rate of soil formation. On the other hand, if the topography is gentle and encourages the collection of water, deep soils tend to develop from sediment accumulations transported from surrounding uplands.

Most of the Forest lies within the Basin and Range Physiographic Province of the United States. The Basin and Range Province is characterized by northwest trending fault block mountains and basins of internal drainage with interspersed conical or irregularly shaped volcanic piles. Most of this area lies at an elevation of more than 4,000 feet above sea level. The highest point on the Fremont is Crane Mountain, which is 8,454 feet above sea level. The drainage is mostly interior, with short streams flowing into low lakes and playas that have no outlets. The Sprague River, originating in the Gearhart Mountain Wilderness, and the Sycan River are the only major drainages which have outlets.

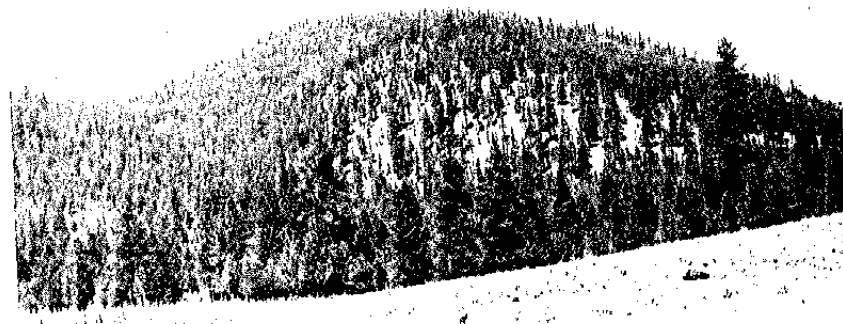
Most of the Fremont National Forest consists of gentle to moderately steep slopes (up to 40%). Only a small part of the land has slopes over 40 percent. Topography ranges from flat to gently rolling lava plateaus and tablelands to some steep, highly dissected landforms. This topography is a result of faulting, eruptive centers, lava flows, bedrock type, and geologic erosion.

Several major block faults dissect the Forest. The resulting escarpments are steep and often unstable. Winter Rim, Abert Rim, and Coleman Rim are examples of terrain formed by faulting. In addition, many minor faults also traverse the Forest.



NORTH
WARNER
MOUNTAIN
BLOCK
FAULT
ESCARPMENT

Eruptive centers are common and range in size from small cinder cones to massive volcanic piles. These landforms are dome-shaped and have radial drainage patterns. Examples are Gearhart Mountain, McComb Butte, Hager Mountain, the Black Hills, and the Drake-McDowell area. Lava from the centers flowed for many miles before cooling, forming the plateaus.



MCCOMB
BUTTE
RHYOLITIC
ERUPTIVE
CENTER
(M.U. 40B & 40C)

The type of bedrock is a major factor in determining the kind and rate of geologic erosion and the resulting landforms. Much of the flat or gently rolling terrain occurs on basalt lava and tuff plateaus. These rocks are resistant to erosion and have not been dissected by streams.

Much of the steep, highly dissected land occurs on pyroclastic rocks which are soft and highly susceptible to forces of erosion. Consequently, erosion has progressed rapidly. Uplifting has accelerated the process.

Massive landslides have had a significant effect on the shape of the land in a few areas. These lands are generally associated with uplifting, block faults, and pyroclastic bedrock. Fishhole Mountain and Winter Rim are Examples of this.

PIT LAKE
WAS
FORMED BY
A
PRESSURE
RIDGE
RELATING
TO A
ROTATIONAL
SLUMP



At least two mountains had small alpine glaciation. These are the Gearhart Mountain and Yamsay eruptive centers. Cirque basins and U-shaped valleys are evidence of past glaciation.

Climate

Climate is one of the most influential soil forming factors. Temperature and precipitation exert strong influences on the rates of physical and chemical weathering of the parent materials. Climate also indirectly affects soil development through its influence on plant and animal life. Generally soil forming processes are at a minimum in regions of low temperature and rainfall and at a maximum in humid regions having high temperatures.

The climate of the Fremont National Forest falls into the overall classification of Highland Climates. This classification is quite general, since both temperature and precipitation can vary widely over short horizontal distances and rapidly changing vertical distances. Examples of this are the Winter Rim-Summer Lake and the Abert Lake-Chewaucan Marsh interfaces.



ANDERSON
FIELD
WITH
GEARHART
MOUNTAIN
IN
THE
BACKGROUND

The Forest is located in a semiarid, rain shadow area east of the Cascade Mountains. Precipitation is light over much of the area. Most precipitation comes during the fall, winter and spring months. Although summers are dry, they are characterized by intense localized thunderstorms. On the Forest, precipitation ranges from 15 to 30 inches--depending on elevation. Prevailing winds are from the west or southwest. On the whole, summer weather is moderate, while winters are long. Annual temperatures may vary through a range of about 130°. High temperatures at the lower elevations may be in excess of 100°, while low temperatures in upper elevations may drop below -30°. Additional climatic data is given in the appendix.



CRYIC (COLD)
SOILS
OCCUR
IN
THE
DRAKE-TWELVE MILE
AREA
(M.U. 43844)

Organisms (Plant and Animal)

The development of a soil profile begins as soon as plants become anchored in weathered rock or recently deposited parent material. As plant residues decay and are mixed with mineral matter by organisms, layering begins to occur. The upper portion of the soil mass becomes darker than the deeper layers. Thereby the young soil begins to develop an A horizon.

Organic matter accelerates soil layering in other ways. Acids released from decomposition enhance the breakdown of minerals which yield nutrients and clay. These products may enrich the surface layers or they may be moved downward by percolating water. This downward movement and accumulation strongly influences subsoil horization.

Nutrient cycling, structural stability, organic matter accumulation, and profile mixing are all made possible by organisms in the soil. Nitrogen is added to the soil system by microorganisms alone or in association with some plants. A vegetative cover and litter layer reduces the natural erosion rate protecting the fertile topsoil layers from removal by surface runoff.

Eight major vegetation zones were recognized for the Soil Resource Inventory. These are:

1. Meadow Zone
2. Grass - Shrub Zone
3. Juniper - Shrub Zone
4. Ponderosa Pine Zone
5. Ponderosa Pine - Lodgepole Pine Zone
6. Lodgepole Pine Zone
7. Mixed Conifer Zone
8. Subalpine Conifer Zone

Some of these zones are further subdivided based on conifer, shrub, and ground cover species. These subdivisions are strongly influenced by elevation and/or microclimate.

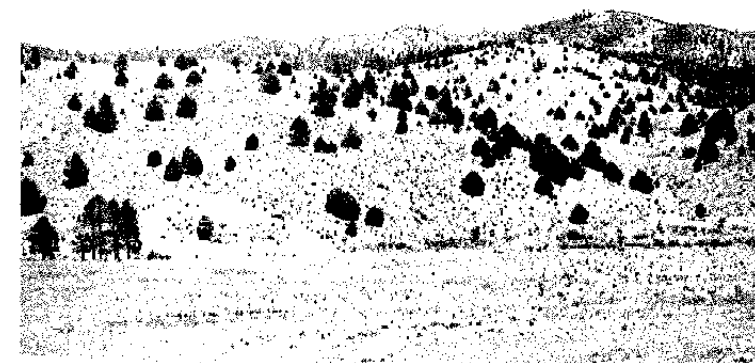
The Meadow Zone occurs over a wide range of elevations in valleys, basins, and footslopes where deep deposits of parent materials have accumulated. This zone is characterized by dark and poorly drained soils which remain saturated for much of the year. Plants associated with this zone are Kentucky bluegrass, meadow foxtail, false hellibore, rushes, and sedge.

MEADOW
SOILS
ARE
VERY
FRAGILE
DUE
TO
LOW
BEARING
CAPACITIES



The Grass-Shrub Zone generally occurs at low elevations or along the forest perimeter below the Ponderosa Pine Zone. This is the driest plant zone on the Forest in relationship to precipitation or soil moisture storage capacity. It occurs at higher elevations in some areas where moisture is limited due to shallow and droughty soils. Typical plant species are low sage, hig sage, Idaho fescue, oat grass, bottlebrush squirreltail, and rabbitbrush.

The Juniper-Shrub Zone also occurs at the lower elevations and along the Forest perimeter but soil depth is somewhat deeper and the soil moisture storage capacity is higher. Typical plant species are juniper, mountain mahogany, big sage, bitterbrush, rabbitbrush, and Idaho fescue.



EAST
OF
LOWER
CHEWAUCAN
RIVER
(MAPPING UNIT 60)

The Ponderosa Pine Zone is found primarily on low to midrange elevations below and adjacent to the mixed conifer zone. Soils are moderately deep to deep and well drained. Ponderosa pine, big sage, waxcurrant, bitterbrush, manzanita, Ross sedge, bottlebrush squirreltail, and Idaho fescue are plant species associated with this zone.



PONDEROSA PINE
ASSOCIATED
VEGETATION
(M.U. 34A)

The Ponderosa Pine-Lodgepole Pine Zone occurs in transition zone locations adjacent to the mixed conifer zone. Most of this plant zone is associated with ash and pumice soils on the west and north part of the Forest. Landforms consist mostly of gently sloping tablelands which have slopes less than 15 percent. Common plant species are ponderosa pine, lodgepole pine, bitterbrush, snowbrush, manzanita, Idaho fescue, Ross sedge, and bottlebrush squirreltail.

The Lodgepole Zone is associated with two widely separated positions in the landscape. Both positions usually contain cold ash and pumice soils. The first position is low elevation gently sloping broad basins or footslopes which act as frost pockets. Vegetation is pure lodgepole pine, bitterbrush, waxcurrant, Ross sedge, Idaho fescue, and lupine. The second position occurs on high elevations with a wide range of slopes. Vegetation is lodgepole pine, waxcurrant, pinemat, long-stolon sedge, lupine, and bottlebrush squirreltail. Some areas may contain manzanita and a dense white fir understory.



SOME
LODGEPOLE
AREAS
ARE
CHARACTERIZED
BY AN
ALMOST
COMPLETE
ABSENCE
OF
GROUND COVER
VEGETATION
(M.U. 98)

The Mixed Conifer Zone generally occurs at mid to high range elevations on cool, moist sites. It is associated with a wide range of soil types, landforms, and slope ranges. Vegetation is ponderosa pine, white fir, lodgepole pine, sugar pine, incense-cedar, western white pine, snowbrush, manzanita, waxcurrant, squawcarpet, Ross sedge, lupine, and bottlebrush squirreltail.

The Subalpine Conifer Zone occurs primarily on high elevation rhyolite eruptive centers. The soils are gravelly and coarse textured and may have an ash or pumice mantle. Vegetation is mountain hemlock, white bark pine, lodgepole pine, red fir, white fir, pinemat, waxcurrant, lupine, Ross sedge, and grouse huckleberry.

Time

The actual length of time that the parent material has been subject to weathering is very important in soil formation. Soils develop at a very slow geologic rate, and a time period of thousands of years is required for the formation of a mature soil.

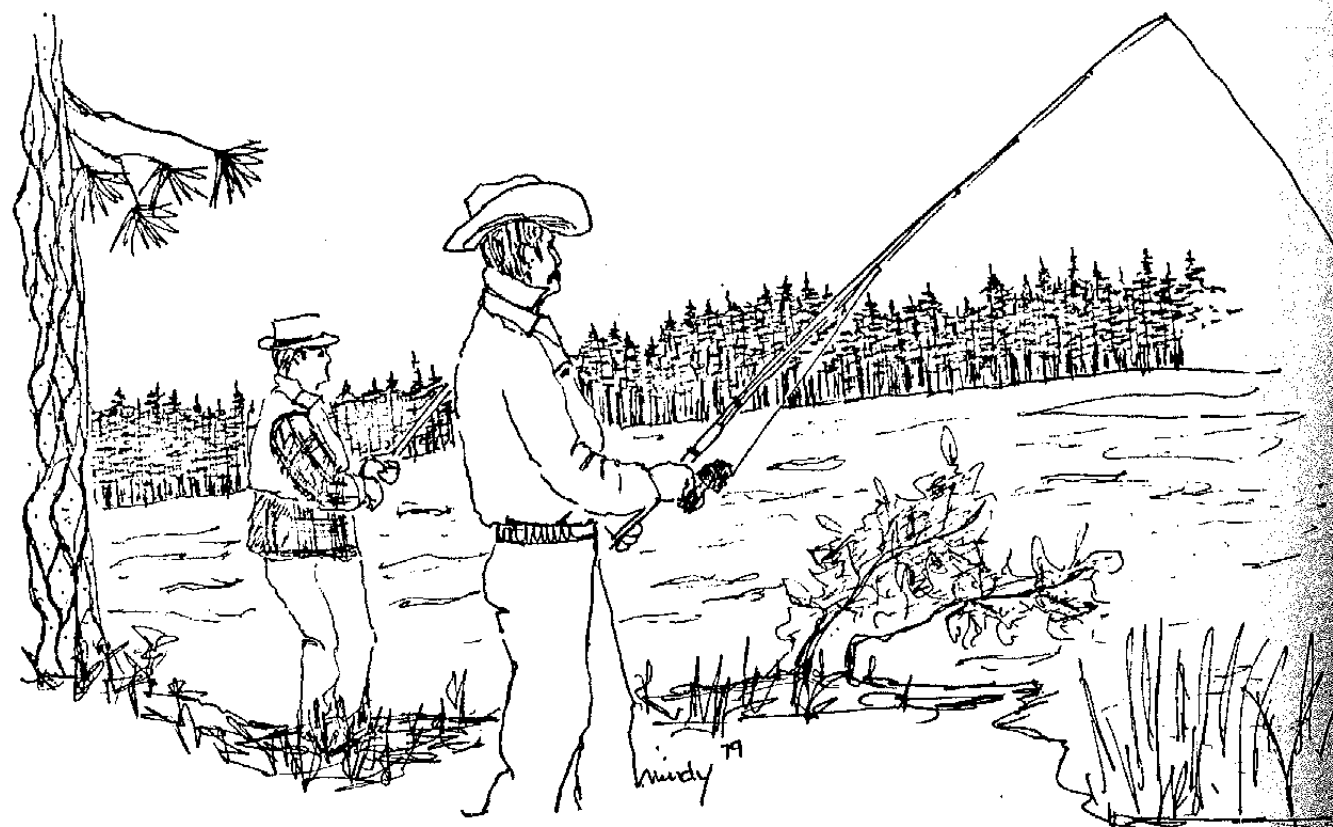
The parent materials on the Fremont National Forest have a wide range in age. For example, much of the western and northern portions of the Forest are covered with a variable thickness of ash and pumice from the Mount Mazama eruption which occurred about 6500 years ago. Very little soil has developed from this material due largely to insufficient time. These soils are very young geologically, have an A-C profile horization, and are referred to as poorly developed.

In contrast to the pumiceous soils most of the residual soils are derived from bedrock materials which are much older. These range in age from about one million years up to about 40 million years of age. Consequently the effects of weathering and soil formation has occurred over a much longer period of time. These soils are generally mature geologically, have an A-B-C profile horization, and are referred to as well developed.

In summary, the many different soils which exist today on the Fremont National Forest are the result of five factors which have influenced soil profile development in many interrelated ways. Soils have developed with wide ranges in their physical and chemical properties. Consequently, these soils also have wide differences in productivity, management potential, and susceptibility to damage by land management activities.

Mapping Unit Descriptions





DEFINITIONS OF MAPPING UNITS AND SYMBOLS SHOWN ON THE LANDTYPE MAPS

This section contains the identifying descriptions of numbers, letters, and symbols shown on the soil and landtype maps. The numbers and letters identify mapping units. The symbols represent land features which are too small to delineate but are important in land management.

Mapping unit identification is shown on the maps as numbers and letters. Most mapping units contain a dominant landtype which accounts for at least 70 percent of the mapping unit delineation.

The dominant soil of the mapping unit is described in the mapping unit description. Within the mapping unit other soils occur. Those most commonly associated with the dominant soil are listed in the descriptions as inclusions. These inclusions of other soils account for no more than 30 percent of the unit.

Three kinds of mapping units are shown on the landtype maps:

Miscellaneous Mapping Units

Some of the mapping units are considered miscellaneous mapping units or miscellaneous landtypes and are too variable to be described by a definable range of characteristics. They are described by a short narrative description. Management interpretations are generally not listed.

Mapping Unit Complexes

Mapping unit complexes are shown on the maps with three digits. These are mapping units used in areas where two or more defined mapping units are present in an arrangement too complex to separate at the one-inch per mile scale. The legend of mapping unit complexes indicates the mapping unit components of the complex and the approximate percentage of each component. Refer to each mapping unit for information desired.

Standard Mapping Units

The mapping units containing at least 70 percent of one landtype are described in detail. These landtypes have a definable range of characteristics that are represented by similar soil, geology, landform, and vegetative types. The first paragraph states the primary landtype and the most common landtype inclusions found within the mapping unit. The second paragraph gives a brief generalized description of the primary soil. The third paragraph briefly describes the bedrock occurring in the landtype. The fourth paragraph describes the landform and slope. The fifth paragraph describes the elevation and vegetation type. The sixth paragraph describes the drainage class and permeability rates. And the seventh paragraph describes the range of profile characteristics which have been established for the dominant soil. Reference should be made to the glossary for definitions of terms used in these descriptions and to the tables on soil and landtype characteristics.

Standard mapping units are shown on the map with two digits. Most of these units are also suffixed with the letters A, B, or C. This has been done to simplify the legend and make it easier to understand. It applies to lands which have similar soil, bedrock, and vegetative characteristics but highly variable slope or landform characteristics. This system enables the user to become familiar with one mapping unit instead of three for many lands on the Forest. Where the letters A, B, or C are used the slope categories are the same throughout the legend. The slope categories are: A (0-15 percent slopes), B (16-40 percent slopes), and C (slopes greater than 40 percent).

Spot Symbols

Spot symbols represent land features important to land management which are too small to delineate at the scale used for this inventory. The symbols used in this survey are shown below:

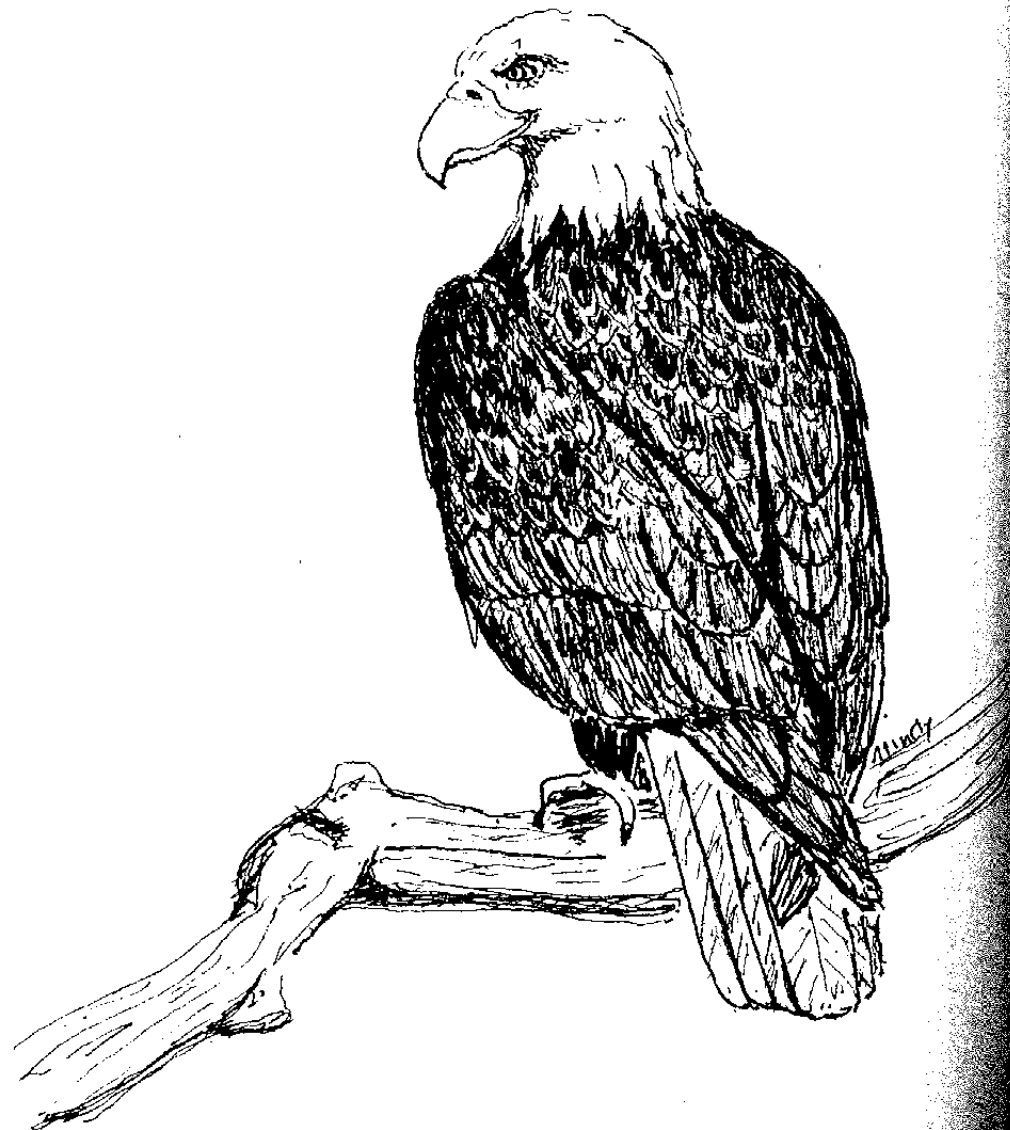
- ✓ Rock outcrop
- T Talus
- X Unstable area
- W Wet spot and small marshes
- ⌒ Slump or slide scarp
- Slump
- M Modal site location
- ✓ Avalanche or debris slide track
- w Water



LEGEND OF COMPLEXES

Mapping Unit Number	Mapping Unit Components
283	60% of unit 35 and 40% of unit 13.
301	40% of unit 30B, 40% of unit 56B, and 20% of unit 51.
342	40% of unit 34B, 30% of unit 62B, and 30% of unit 63B.
348	40% of unit 34A, 30% of unit 30A, and 30% of unit 28.
350	40% of unit 35, 40% of unit 28, and 20% of unit 30A.
368	40% of unit 37A, 30% of unit 67A, and 30% of unit 68A.
376	50% of unit 37B and 50% of unit 68B.
377	40% of unit 37B, 30% of unit 67B, and 30% of unit 68B.
378	40% of unit 37A, 30% of unit 30A, and 30% of unit 28.
417	50% of unit 41B and 50% of unit 77B.
503	60% of unit 50 and 40% of unit 53.
563	40% of unit 56B, 30% of unit 30B, and 30% of 63B.
568	30% of unit 56B, 30% of unit 68B, 20% of unit 30B, and 20% of unit 51.
601	50% of unit 60, 20% of unit 53, and 30% of unit 50.
623	50% of unit 62B and 50% of unit 63B.
632	60% of unit 62A and 40% of unit 63A.
648	50% of unit 67B and 50% of unit 68B.
675	30% of unit 63B, 30% of unit 56B, 20% of unit 60, and 20% of unit 28.
676	60% of unit 67A and 40% of unit 68A.
678	60% of unit 67C and 40% of unit 68C.
684	50% of unit 68B and 50% of units 4 or 6.
688	40% of unit 68B, 30% of unit 74B, and 30% of unit 67B.
850	30% of unit 85, 30% of unit 28, 20% of unit 30A, and 20% of unit 93A.

- 864 50% of unit 86 and 50% of unit 34A.
 882 50% of unit 88A and 50% of unit 28.
 892 50% of unit 89A and 50% of unit 28.
 987 50% of unit 88A and 50% of unit 37A.
 988 50% of unit 88B and 50% of unit 37B.



Descriptions of the miscellaneous landtypes and standard mapping units follow. The standard mapping units are categorized according to bedrock type.

<u>Mapping Unit Number</u>	<u>Description</u>
1-12	Miscellaneous mapping units.
13-24	Deep, transported soils of alluvial or lacustrine origin.
25-39	Residual and colluvial soils from basalt, andesite, and interbedded tuffs.
40-49	Residual and colluvial soils from rhyolite.
50-76	Residual and colluvial soils from pyroclastic rocks.
77-80	Shallow to moderately deep pumiceous soils over buried residual and colluvial soils derived from rhyolite.
81-92	Shallow to moderately deep pumiceous soils over buried residual, colluvial, and valley fill soils derived from basalt, andesite, and interbedded tuffs.
93-99	Moderately deep to deep pumiceous soils over buried residual, colluvial, and valley fill soils derived from basalt, andesite, and interbedded tuff.



MAPPING UNIT DESCRIPTIONS

(1-12) Miscellaneous Mapping Units

Mapping Unit 1 - Canyonlands with noncommercial timber

This mapping unit consists of steep and narrow canyon lands which are dominated by steep slopes, talus, and bedrock outcrops. Soils are very shallow to moderately deep on sideslopes. Alluvial stringer soils along drainageway are deep. Vegetation consists of juniper, mahogany, big sage, low sage, and Idaho fescue. Use is severely restricted by steep slopes, rock outcrops, and adjacent streams. Slopes range from 30 to 80 percent.

Mapping Unit 2 - Canyonlands with commercial timber

This mapping unit consists of steep and narrow canyonlands occurring along major drainageways with commercial timber types.

Soil types vary widely and includes ash and pumice. Vegetation may be lodgepole pine, ponderosa pine, and/or white fir. Use is restricted by steep slopes, rock outcrops, and adjacent streams. Slopes range from 30 to 80 percent.

Mapping Unit 3 - Rock outcrops and talus

This mapping unit consists of steep, rocky lands which are made up mostly of basalt, rhyolite and breccia outcrops and talus. Unit contains little or no soil or vegetation. It also includes a few areas involving landfills and areas disturbed by mining and tailings.

Mapping Unit 4 - Steep lands with shallow soils and rock outcrops

This mapping unit consists of lands dominated by outcrops, talus, steep slopes, shallow soils, and sparse vegetation. Soils are gravelly, stony, and loamy. Vegetation is big sage, low sage, rabbitbrush, mahogany, bitterbrush, and juniper. Bedrock consists of breccia, tuff, or basalt. Slopes range up to 80 percent.

Mapping Unit 6 - Rugged rocky landforms at higher elevations

This mapping unit consists of steep, rocky, and stony slopes and ridges at higher elevations with stringers and patches of white fir, lodgepole pine, and whitebark pine. Trees are generally sparse and manzanita and snowbrush may be present. Soils are shallow, stony, and loamy. Bedrock outcrops are common and consist of basalt, andesite, rhyolite, and breccia. Talus areas and outcrops dominate the unit. Vegetation includes sagebrush, shrubby penstemon, ocean spray, pin cherry, pine mat, and mahogany. Slopes range up to 80 percent, and elevations range from 6,400 to 8,400 feet.

Mapping Unit 7 - Alluvial-colluvial stringers

This mapping unit consists of narrow stringers of alluvial-colluvial soils occurring adjacent to stream channels. Soils are generally deep but they have a wide range of textures, drainage, gravel and stone content, and vegetation.

Mapping Unit 8 - Subalpine lands

This mapping unit consists of subalpine lands with lodgepole pine, whitebark pine, and mountain hemlock. Soils have ash or pumice mantles of varying thickness. Slopes range up to 70 percent. Buried soils are derived from andesite, basalt, rhyolite, and tuff. Elevations range from 6,400 to 8400 feet.

Mapping Unit 9 - Cinder cones with residual soils

This mapping unit consists of cinder cones with variable timber types and reddish brown residual soils derived from volcanic cinders. Soils are well drained, gravelly and cindery loams or sandy loams. Depth to reddish brown, highly fractured cinders ranges from 20 to 40 inches.

Mapping Unit 10 - Cinder cones with pumiceous soils

This mapping unit consists of cinder cones with pumiceous soils over buried cindery residual soils and variable timber types. The pumiceous soils are yellowish brown to reddish brown loamy sands to coarse gravelly sands. Buried soils are gravelly and cindery loams or sandy loams. Depth to highly fractured, reddish brown cinder bedrock ranges from 30 to 60 inches.

Mapping Unit 11 - Open, high elevation lands

This mapping unit consists of high elevation and exposed windblown lands with shallow, stony, and gravelly soils derived from basalt and rhyolite. Vegetation is low growing and consists of low sage, phlox, pussytoes, Idaho fescue, and buck wheat. Vegetation is sparse and mineral soil is exposed on about 30 percent of area. Lodgepole pine and whitebark pine occur on adjacent protected sites.

Mapping Unit 12 - Wet marshy lands

This mapping unit consists of wet, marshy lands, swampy areas, ponds, and depressions which become seasonally ponded. Vegetation consists of sedges, rushes, grasses, alder, and willow.

(13-24) Deep, Transported Soils of Alluvial or Lacustrine Origin

MAPPING UNIT 13

Mapping Unit 13 consists dominantly of Landtype 13 and minor amounts of landtypes 14, 16, and 18. Landtype 13 is similar to Landtype 14 with the exception of soil textures and internal drainage. It is similar to 16 with the exception of soil texture.

Landtype 13 has very deep to extremely deep soils drived from lake-laid deposits which have finer textured surface soils over coarse pumice. Surface soil layers are thin to moderately thick and moderately coarse to moderately fine textured. Subsurface layers are moderately thick and coarse textured but commonly contain finer textured layers. The buried soils are moderately thick to thick and moderately fine textured with occasional gravel lenses. An intermittent hardpan occurs at a depth of 20 to 45 inches.

Bedrock consists of interbedded soft, reddish brown or brown tuff or hard, gray basalt. They are competent and massive to highly fractured. Depth to bedrock is greater than 60 inches.

Typically, Landtype 13 occurs on old lakebeds in broad basins and upland meadows. Slopes are less than 5 percent.

This landtype ranges in elevation from 4700 to 6500 feet and supports big sage, Idaho fescue, bluegrass, and sedges.

The soil is moderately well to somewhat poorly drained. Permeability is moderate to very rapid in the surface soils and moderate to slow in the buried soils.

Range of Profile Characteristics of Soil 13

Litter: Leaves and stems; 0 to 0.5 inches thick.

Surface layers: Very dark gray to black clay loam to sandy loam; moderate, medium granular structure; friable; slightly plastic; pH ranges from 6.0 to 7.0; 6 to 21 inches thick.

Subsurface layers: Dark brown to yellowish brown loamy sand to loamy coarse sand with occasional finer textured lenses; weak, fine to medium subangular blocky structure; loose; nonplastic; pH ranges from 6.2 to 7.5; 20 to 32 inches thick.

Buried soil: Brown to dark brown clay loam; moderate, medium to coarse subangular blocky structure; firm; slightly plastic; intermittent hardpan is massive to platy; very firm; weakly cemented; and has loamy textures; pH ranges from 6.5 to 7.5; over 20 inches thick.

MAPPING UNIT 14

Mapping Unit 14 consists dominantly of Landtype 14 and minor amounts of landtypes 13. Landtype 14 is similar to Landtype 13 with the exception of soil texture and internal drainage.

Landtype 14 has very deep to extremely deep, coarse textured soils derived from lake-laid pumiceous materials in old lakebeds. Surface soil layers are thin to moderately thick and coarse textured. Subsoil layers are thick to very thick and coarse textured with occasional lenses of finer textured layers and weakly cemented hardpans.

Bedrock is interbedded, soft, reddish brown or brown tuff or hard, gray basalt. These rocks are competent and range from massive to highly fractured. Depth to bedrock is greater than 60 inches.

Typically, Landtype 14 occurs on broad upland basins in old lakebeds. Slopes are flat and are less than 5 percent.

This landtype ranges in elevation 4500 to 5500 feet and supports big sage, rabbitbrush, lupine, sedges, Idaho fescue, and grasses.

The soil is well to moderately well drained. Permeability is rapid in the surface soils and usually rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 14

Litter: None

Surface layers: Dark brown to dark grayish brown loamy fine sand to gravelly loamy sand; weak, medium granular structure and occasionally weak, coarse platy structure where compacted; 0 to 50 percent pumice gravel by volume; very friable; nonplastic; pH ranges from 6.5 to 7.5; 16 to 24 inches thick.

Subsoil layers: Dark grayish brown to brown gravelly loamy sand to fine loamy sand; weak, fine subangular blocky structure; 0 to 50 percent pumice gravel by volume; very friable; nonplastic; intermittent hardpan is weakly cemented and firm; pH ranges from 6.8 to 7.5; 28 to over 50 inches thick.



MAPPING UNIT 16

Mapping Unit 16 consists dominantly of Landtype 16 and minor amounts of landtypes 17 and 25. Landtype 16 is similar to Landtype 25 with the exception of internal drainage and plant community types. It is similar to unit 18 with the exception of elevation and position in the landscape.

Landtype 16 has very deep to extremely deep soils derived from alluvial and colluvial deposits on upland basins. Surface soils are thin and medium to moderately fine textured. Subsoils are thick to very thick and moderately fine textured. Lower part of subsoil is mottled, gleyed, and may have a hardpan and sand or gravel lenses locally.

Bedrock is interbedded soft, reddish brown or brown tuff and hard, gray basalt or andesite. Depth to consolidated bedrock ranges from 60 to over 144 inches.

Typically, Landtype 16 occurs on broad, gently sloping upland basins. Slopes are less than 5 percent.

This landtype ranges in elevation from 5,500 feet to 7,500 feet and supports semi-moist or moist meadow vegetation consisting of sedges, meadow foxtail, Kentucky bluegrass, rushes, tufted hairgrass, and big sage.

The soil is moderately well to somewhat poorly drained. Permeability is moderate in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 16

- Litter: Leaves and stems; 0 to 0.25 inches thick.
- Surface layers: Very dark gray to dark grayish brown silt loam or clay loam; weak to moderate, medium, granular structure; soft to hard; slightly plastic; pH ranges from 5.6 to 6.6; 5 to 10 inches thick.
- Subsoil layers: Very dark gray to black clay loam or silty clay loam; strong, fine to medium subangular blocky structure; lower subsoil is strongly mottled, gleyed, and has massive structure; very hard; plastic to very plastic; pH ranges from 6.0 to 7.0; over 40 inches thick; intermittent hardpan is hard and strongly cemented.

MAPPING UNIT 17

Mapping Unit 17 consists dominantly of Landtype 17 and minor amounts of landtypes 18, 19, and 53. Landtype 17 is similar to Landtype 18 with the exception of internal drainage and plant community types.

Landtype 17 has deep to very deep, dark soils developed from valley fill deposits on alluvial bottomlands. Surface soils are thin and medium to moderately fine textured. Subsoils are thick to very thick and moderately fine to fine textured. Subsoil may contain a hardpan or sand or gravel lenses locally.

Bedrock is soft to moderately hard, massive rhyolite-dacite ash-flow tuff, tuffaceous sedimentary rock, and occasionally hard basalt lava flows. Depth to bedrock ranges from 40 to 144 inches.

Typically, Landtype 17 occurs on gently sloping alluvial bottomlands. Slopes are less than 5 percent.

This landtype ranges in elevation from 5,000 to 6,000 feet and supports big sage, rabbitbrush, Idaho fescue, bluegrass, and bottlebrush squirrel-tail.

The soil is moderately well to well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 17

- Litter: None
- Surface layers: Dark grayish brown to black silt loam, clay loam, or silty clay loam; weak to moderate, medium granular structure; soft to slightly hard; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 6 to 13 inches thick.
- Subsoil layers: Very dark gray, grayish brown, or black clay loam, silty clay loam, or silty clay; moderate to strong, medium subangular blocky structure; lower subsoil may be weakly mottled and massive; 0 to 35 percent subround gravel by volume; very hard; plastic to very plastic; pH ranges from 6.3 to 8.0; over 40 inches thick; intermittent hardpan is massive and weakly cemented.

MAPPING UNIT 18

Mapping Unit 18 consists dominantly of Landtype 18 and minor amounts of Landtypes 17 and 19. Landtype 18 is similar to Landtype 17 with the exception of internal drainage and vegetation. It is similar to Unit 16 with the exception of elevation and position in the landscape.

Landtype 18 has deep to very deep alluvial soils which have developed in tuff, breccia, and lava sediments. Surface layers are thin and medium to moderately fine textured. Subsoil layers are thick to very thick and moderately fine textured. Sand and gravel lenses occur locally.

Bedrock is soft to moderately hard, massive rhyolite-dacite ash-flow tuff, tuffaceous sedimentary rock, and breccia. Depth to bedrock ranges from 40 to 144 inches.

Typically, Landtype 18 occurs on wide alluvial valleys adjacent to major streams and rivers. Slopes are less than 5 percent.

This landtype ranges in elevation from 5,000 to 6,000 feet and supports sedges, rushes, meadow foxtail, and bluegrass.

The soil is somewhat poorly to poorly drained. Permeability is moderate in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 18

- | | |
|-----------------|---|
| Litter: | Leaves and stems; 0 to 0.5 inches. |
| Surface layers: | Black silt loam, clay loam, or silty clay loam; moderate to strong, medium granular and subangular blocky structure; friable; plastic; pH ranges from 5.5 to 6.5; 10 to 15 inches thick. |
| Subsoil layers: | Very dark gray to black clay loam or silty clay loam becoming strongly mottled or gleyed in the lower part; moderate, medium subangular blocky structure becoming very coarse prismatic with depth; 0 to 35 percent gravel; firm; plastic; pH ranges from 6.0 to 7.8; over 30 inches thick. |



MAPPING UNIT 19

Mapping Unit 19 consists dominantly of Landtype 19 and minor amounts of Landtypes 17 and 18. Landtype 19 is similar to Landtype 17 with the exception of texture and gravel content. It is similar to Unit 18 with the exception of texture and internal drainage.

Landtype 19 has deep to very deep alluvial soils which have developed in transported materials derived from tuff, breccia, and lava. Surface soil layers are thin and moderately coarse textured. Subsoil layers are thick to very thick, gravelly to very cobbly, and moderately coarse to medium textured.

Bedrock is soft to moderately hard, massive breccia, ash-flow tuff, and tuffaceous sedimentary rock. Depth to bedrock ranges from 40 to 144 inches.

Typically, Landtype 19 occurs on gently sloping alluvial bottomlands adjacent to major streams at lower elevations. Slopes are less than 5 percent. Overflow channels are common.

This landtype ranges in elevation from 4,900 to 6,000 feet and supports big sage, Idaho fescue, sedge, and scattered willow and lodgepole pine.

The soil is well drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 19

- | | |
|-----------------|--|
| Litter: | None |
| Surface layers: | Dark brown to dark grayish brown sandy loam; weak, fine granular structure; very friable; slightly plastic; pH ranges from 6.0 to 7.0; 5 to 10 inches thick. |
| Subsoil layers: | Dark grayish brown to dark reddish brown gravelly to very cobbly loam or sandy loam; weak, fine subangular blocky structure or single grain; 10 to 75 percent subround gravels and cobbles by volume; soft; slightly plastic; pH ranges from 6.0 to 7.5; over 36 inches thick. |

MAPPING UNIT 20

Mapping Unit 20 consists dominantly of Landtype 20 and minor amounts of Landtypes 12 and 24. Landtype 20 is similar to Landtype 24 with the exception of soil texture and internal drainage.

Landtype 20 has deep to very deep lacustrine soils which have developed in fine textured lake deposits. Surface soil layers are thin and moderately fine textured. Subsoils are moderately thick to thick and fine or moderately fine textured. Soil cracks deeply to three feet in summer as the soil dries out.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt. These rocks are competent and range from massive to highly fractured. Depth to bedrock is greater than 40 inches.

Typically, Landtype 20 occurs in old lakebeds on lava tablelands and occasionally along alluvial-colluvial meadows. Periodic flooding is common on some units during spring runoff. Slopes are less than 5 percent.

This landtype ranges in elevation from 4,900 to 6,500 feet and supports low sage, big sage, bluegrass, sedge, and bottlebrush squirreltail. Vegetative cover is often sparse due to high shrink-swell.

The soil is somewhat poorly drained. Permeability is moderate to slow in the surface soils and very slow in the subsoils.

Range of Profile Characteristics of Soil 20

Litter:	None
Surface layer:	Dark grayish brown, dark brown, or black clay loam, silty clay loam, or silty clay; moderate to strong and fine to medium granular and subangular blocky structure; very hard; very plastic; pH ranges from 6.0 to 7.0; 5 to 14 inches thick.
Subsoil layers:	Dark brown, yellowish brown, reddish brown, or occasionally black clay, silty clay, or silty clay loam; moderate, very coarse prismatic parting to moderate to strong, coarse platy or subangular blocky structure; extremely hard; very plastic; pH ranges from 6.2 to 8.0; over 18 inches thick.

MAPPING UNIT 22

Mapping Unit 22 consists dominantly of Landtype 22 and minor amounts of Landtypes 17 and 23. Landtype 22 is similar to Landtype 23 with the exception of effective rooting depth and vegetative type.

Landtype 22 has shallow to moderately deep valley terrace soils. Surface soils are very thin to thin and medium textured. Subsoil layers are thin to moderately thick and medium to moderately-fine textured. Lower subsoil contains a hard, silica cemented duripan at a depth of 12 to 25 inches. Where exposed, the surface 2 to 4 inches of mineral soil commonly consists of a vesicular crust.

Bedrock is soft to moderately hard breccia, tuffaceous sedimentary rock, and rhyolite-dacite ash-flow tuff. Depth to bedrock ranges from 15 to 40 inches.

Typically, Landtype 22 occurs on valley terraces adjacent to major streams or in broad basins. Slopes are less than 5 percent.

This landtype ranges in elevation from 4,800 to 5,500 feet and supports low sage, big sage, crested wheatgrass, and bottlebrush squirreltail.

The soil is moderately well drained. Permeability is moderate in the surface soils and moderate to very slow in the subsoils.

Range of Profile Characteristics of Soil 22

Litter:	None
Surface layers:	Dark brown or dark grayish brown loam or sandy loam; weak, medium granular structure; 0 to 20 percent subround gravel content by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 2 to 10 inches thick.
Subsoil layers:	Dark brown to dark yellowish brown loam, clay loam, or sandy loam; weak, medium granular or subangular blocky structure becoming platy or massive in the lower part; 5 to 25 percent subround gravel content by volume; slightly hard or hard; duripan is strongly cemented, massive, and extremely hard; pH ranges from 6.5 to 7.5; 8 to 30 inches thick.

MAPPING UNIT 23

Mapping Unit 23 consists dominantly of Landtype 23 and minor amounts of Landtypes 17 and 22. Landtype 23 is similar to Landtype 22 with the exception of vegetative type and effective rooting depth.

Landtype 23 has moderately deep valley terrace soils. Surface soils are thin, gravelly, and medium textured. Subsoils are thin to moderately thick, gravelly to very cobbly, and medium textured. Unit may contain a thin pumice cap and/or a hardpan locally.

Bedrock is soft to moderately hard breccia, rhyolite-dacite ash-flow tuff, or tuffaceous sedimentary rock. Depth to bedrock ranges from 22 to 50 inches.

Typically, Landtype 23 occurs on wide valley terrace positions adjacent to major streams or in broad basins. Slopes are less than 5 percent.

This landtype ranges in elevation from 4,800 to 5,800 feet and supports ponderosa pine, lodgepole pine, Idaho fescue, rabbitbrush, big sage, cheat grass, Ross sedge, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid in the surface soils and moderate to rapid in the subsoils.

Range of Profile Characteristics of Soil 23

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|-----------------|---|
| Litter: | Needles, leaves, twigs and decomposing organic matter; 0.5 to 1 inch thick. |
| Surface layers: | Dark brown to brown, gravelly loam or sandy loam; weak, fine and medium granular and subangular blocky structure; 30 to 50 percent subround and irregular gravels and cobbles by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 6 to 12 inches thick. |
| Subsoil layers: | Dark brown to brown, gravelly to very cobbly loam or sandy loam; weak, fine and medium granular and subangular blocky structure; 40 to 80 percent subround and irregular gravels and cobbles by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 16 to 28 inches thick. |

MAPPING UNIT 24

Mapping Unit 24 consists dominantly of Landtype 24 and minor amounts of Landtypes 12 and 20. Landtype 24 is similar to Landtype 20 with the exception of soil texture and internal drainage.

Landtype 24 has deep to very deep lake-laid soils which have a duripan in the subsoil. Surface soils are thin to very thin and medium to moderately fine textured. Subsoils are moderately thick to thick and moderately fine to fine textured. A hard, silica cemented duripan occurs within a depth of 18 to 26 inches. A vesicular crust may occupy the surface 2 to 4 inches of exposed mineral soil.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt lava. These rocks are competent and range from massive to highly fractured. Depth to bedrock is over 40 inches.

Typically, Landtype 24 occurs in old lakebeds on gently sloping lava plateaus. Slopes are less than 5 percent.

This landtype ranges in elevation from 4,900 to 5,700 feet and supports low sage, Idaho fescue, bottlebrush squirreltail, crested wheatgrass, phlox, and bluegrass.

The soil is moderately well drained. Permeability is moderate in the surface soils and moderate to very slow in the subsoils.

Range of Profile Characteristics of Soil 24

- | | |
|-----------------|---|
| Litter: | None |
| Surface layers: | Dark brown or dark grayish brown silt loam, clay loam, or silty clay loam; moderate, fine granular structure; 0 to 5 percent gravel by volume; soft to hard; plastic; pH ranges from 6.2 to 7.0; 4 to 12 inches thick. |
| Subsoil layers: | Dark reddish brown, dark brown, or dark grayish brown clay loam, silty clay loam or silty clay; weak, coarse prismatic structure parting to moderate, medium subangular blocky structure; 0 to 40 percent subround gravel by volume; hard; plastic; duripan horizon is very hard and has moderate, coarse platy structure; pH ranges from 6.5 to 8.5; over 18 inches thick. |

(25-39) Residual and Colluvial Soils from Basalt,
Andesite, and Interbedded Tuffs

MAPPING UNIT 25

Mapping Unit 25 consists dominantly of Landtype 25 and minor amounts of Landtypes 16 and 26. Landtype 25 is similar to Landtype 16 with the exception of internal drainage, vegetative types, and landform.

Landtype 25 has very deep to extremely deep, dark colluvial soils derived from basalt and tuff. Surface soils are thin and medium to moderately-fine textured and occasionally may be very gravelly. Subsoils are thick to very thick and medium to moderately-fine textured which also may be gravelly. A weak hardpan often occurs in the lower subsoil at a depth of about four feet.

Bedrock is interbedded, hard, highly fractured, gray basalt, and andesite or soft, reddish brown and massive tuff. They are competent. Depth to bedrock is over 60 inches.

Typically, Landtype 25 occurs on higher elevation valleys along drainages and footslopes on slopes up to 20 percent. Springs and seeps are common.

This landtype ranges in elevation from 6,000 to 8,000 feet and supports groves and scattered aspen, lodgepole pine, ponderosa pine, and big sage, snowberry, false helibore, bottlebrush squirreltail, mules ear, and sedges.

The soil is moderately well to somewhat poorly drained. Permeability is moderate in the surface soils and moderate or slow in the subsoils.

Range of Profile Characteristics of Soil 25

Litter:	None
Surface layers:	Dark brown or dark grayish brown loam, clay loam, or gravelly loam; weak to moderate, fine subangular blocky structure; 0 to 50 percent gravel by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 8 to 18 inches thick.
Subsoil layers:	Dark brown or dark reddish brown loam or clay loam; medium, fine, subangular blocky structure; 0 to 60 percent gravel by volume; friable; slightly plastic or plastic; lower subsoil may contain a weakly cemented hardpan layer which is brittle and mottled with moderate, coarse platy structure; pH ranges from 6.0 to 7.0; over 50 inches thick.

MAPPING UNIT 26

Mapping Unit 26 consists dominantly of Landtype 26 and minor amounts of Landtypes 25 and 37B. Landtype 26 is similar to Landtype 37A with the exception of soil depth, landform, and internal drainage.

Landtype 26 has deep to very deep gravelly and cobbly forested colluvial soils. Surface soil layers are thin and medium or moderately fine textured. Subsoils are thick to very thick and moderately fine textured. The subsoil usually contains a hardpan at a depth of about two feet.

Bedrock is interbedded, soft reddish brown tuff or hard gray basalt or andesite. They are competent and range from massive to highly fractured. Depth to bedrock is over 40 inches.

Typically, Landtype 26 occurs on benches, toe slopes and valleys where soil materials have accumulated by colluvial action. Slopes range up to 20 percent.

This landtype ranges in elevation from 5,800 to 7,200 feet and supports ponderosa pine, lodgepole pine, white fir, mules ear, wax currant, lupine, bottlebrush squirreltail, Ross sedge, and squawcarpet.

The soil is moderately well drained. Permeability is moderate in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 26

Litter:	Needles, twigs, and decomposing organic matter; 0.5 to 1.5 inches thick.
Surface layers:	Dark brown, dark gray, or dark reddish brown loam or clay loam; weak, fine and medium granular structure; 5 to 30 percent gravel by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 6 to 14 inches thick.
Subsoil layers:	Dark brown or reddish brown gravelly or cobbly clay loam or silty clay loam; moderate, fine subangular blocky structure; 10 to 60 per coarse fragments by volume; friable; plastic; hardpan horizon is weakly cemented, firm, and is either massive or has moderate, coarse platy structure; pH ranges from 6.0 to 7.0; over 40 inches thick.

MAPPING UNIT 27

Mapping Unit 27 consists dominantly of Landtype 27 and minor amounts of Landtypes 37B, 37C, 67B, and 68B. Landtype 27 is similar to Landtype 37B and 37C with the exception of vegetative type.

Landtype 27 has moderately deep to deep, gravelly and cobbly residual soils located on higher elevations. Surface soil layers are thin and moderately fine or medium textured. Subsoil layers are thin to moderately thick and moderately fine textured.

Bedrock is interbedded soft tuff or hard basalt or andesite. They are massive to highly fractured and competent. Depth to bedrock ranges from 20 to 50 inches.

Typically, Landtype 27 occurs on high elevation upland slopes. It is characterized by being open with little timber. Slopes range from 15 to 50 percent.

This landtype ranges in elevation from 5,800 to 7,000 feet and supports big sage, rabbitbrush, mules ear, snowberry, mountain brome, bottlebrush squirreltail, Ross sedge, phlox, scattered ponderosa pine and white fir, and clumps of willow and aspen.

The soil is well drained. Permeability is moderate to rapid in the surface soils and moderate in the subsoils.

Range of Profile Characteristics of Soil 27

- Litter: Leaves and twigs; 0 to 0.5 inches thick.
- Surface layers: Dark brown and dark grayish brown clay loam or loam; weak, fine granular and subangular blocky structure; 5 to 20 percent gravel by volume; very friable; slightly plastic; pH ranges from 5.5 to 7.0; 5 to 10 inches thick.
- Subsoil layers: Dark brown and dark grayish brown gravelly clay loam; moderate, fine subangular blocky structure; 10 to 60 percent coarse fragments by volume; friable; plastic; pH ranges from 6.0 to 7.0; 15 to 40 inches thick.

MAPPING UNIT 28

Mapping Unit 28 consists dominantly of Landtype 28 and minor amounts of Landtypes 18, 30A, 34A, and 37A. Landtype 28 is similar to Landtype 30A with the exception of soil depth and vegetation types.

Landtype 28 has very shallow or shallow, very stony residual soils associated with "scabrock flats." Surface soils are very thin to thin and moderately fine textured. Subsoils are thin and fine or moderately fine textured. Lower subsoil commonly contains a white, silica cemented duripan. Surface, vesicular basalt stones cover up to 90 percent of the landtype. In some areas the bedrock is exposed.

Bedrock is hard, gray basalt or andesite and interbedded brown or reddish brown tuff. They are massive to highly fractured and competent. Depth to bedrock usually ranges from 8 to 20 inches.

Typically, Landtype 28 occurs on gently rolling lava tablelands on slopes less than 5 percent. This unit is characterized by being open with no coniferous vegetation.

This landtype ranges in elevation from 4,500 to 7,000 feet and supports low sage, Idaho fescue, cheatgrass, mountain mahogany, bottlebrush squirreltail, bluegrass, sedge, and widely scattered juniper and ponderosa pine.

The soil is well drained. Permeability is slow in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 28

- Litter: None.
- Surface layers: Dark brown very stony clay loam or silty clay loam; weak, fine granular or subangular blocky structure; 10 to 60 percent cobbles and stones by volume; hard; plastic; pH ranges from 6.0 to 6.8; 4 to 10 inches thick.
- Subsoil layers: Dark reddish brown or strong brown stony clay, silty clay, or silty clay loam; strong, coarse prismatic parting to moderate or strong, coarse subangular blocky structure; 30 to 60 percent cobbles and stones by volume; very hard; very plastic; duripan layer in lower subsoil is weakly cemented, hard, and massive; pH ranges from 6.2 to 7.5; 6 to 15 inches thick.

MAPPING UNIT 29

Mapping Unit 29 consists dominantly of Landtype 29 and minor amounts of Landtypes 25, 89A, and 91. Landtype 29 is similar to Landtype 25 with the exception of soil depth and internal drainage.

Landtype 29 has moderately deep stony residual soils and is characterized by open grown and poorly stocked timber stands. Surface soil layers are thin and medium or moderately coarse textured. Subsoil layers are thin and moderately fine or fine textured. Unit may contain a thin ash cap locally.

Bedrock is interbedded hard gray basalt or reddish brown soft tuff. They are massive to highly fractured and competent. Depth to bedrock ranges from 20 to 40 inches.

Typically, Landtype 29 occurs on lands west of Winter Rim which are uplifted tablelands that slope gently to the west. Slopes range from 2 to 12 percent.

This landtype ranges in elevation from 6,600 to 7,200 feet and supports scattered and open grown ponderosa pine, white fir, lodgepole pine, aspen, and a dense ground cover consisting of big sage, low sage, snowberry, bluegrass, bottlebrush squirreltail, wax currant, sweet pea, buckwheat, and smooth brome.

The soil is moderately well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 29

Litter:	Needles, leaves, and twigs; 0.25 to 0.5 inches thick.
Surface layers:	Dark reddish brown loam or sandy loam; weak, fine granular and subangular blocky structure; 10 to 30 percent coarse fragments by volume; soft; slightly plastic; pH ranges from 6.4 to 7.0; 8 to 15 inches thick.
Subsoil layers:	Dark reddish brown gravelly, cobbly, or stony clay loam, silty clay loam, or silty clay; moderate, medium, subangular blocky structure; 30 to 60 percent coarse fragments by volume; hard; plastic to very plastic; pH ranges from 6.0 to 7.0; 12 to 25 inches thick.

MAPPING UNIT 30A

Mapping Unit 30A consists dominantly of Landtype 30A and minor amounts of Landtypes 28, 30B, 56A, and 34A. Landtype 30A is similar to Landtype 28 with the exception of soil depth and vegetative type. It is similar to land type 30B with the exception of slope range and position in the landscape.

Landtype 30A has shallow to moderately deep, stony residual soils located primarily on lower elevations. Surface soils are thin and medium to moderately fine textured. Subsoils are thin and moderately fine or fine textured. Surface vesicular basalt boulders commonly cover up to 50 percent of the surface. Lower subsoil commonly contains a white, silica cemented duripan. Rock outcrops and boulder patches are common within some areas.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt or andesite. Depth to bedrock ranges from 15 to 25 inches.

Typically, Landtype 30A occurs on gently rolling basalt lava and tuff tablelands on slopes from 0 to 15 percent slopes. It occurs on a wide range of elevations but primarily on lower elevations or forest fringe areas.

This landtype ranges in elevation from 4,500 to 7,000 feet and supports scattered juniper, ponderosa pine and big sage, low sage, bitterbrush, phlox, bottlebrush squirreltail, Idaho fescue, and mountain mahogany.

The soil is well drained. Permeability is moderate to slow in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 30A

Litter:	None
Surface layers:	Dark brown or dark grayish brown loam or clay loam; weak, fine granular structure; 10 to 30 percent coarse fragments by volume; soft; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 6 to 16 inches thick.
Subsoil layers:	Dark reddish brown to dark brown stony clay loam, silty clay loam or silty clay; moderate, fine to medium subangular blocky structure with occasional moderate, coarse prismatic structure; 5 to 50 percent coarse fragments by volume; very hard; very plastic; duripan layer in lower subsoil is weakly cemented, hard, and massive; pH ranges from 6.5 to 7.5; 6 to 15 inches thick.

MAPPING UNIT 30B

Mapping Unit 30B consists dominantly of Landtype 30B and minor amounts of Landtypes 28, 30A, and 34B. Landtype 30B is similar to Landtype 30A with the exception of slope range and position in the landscape.

Landtype 30B has shallow to moderately deep, stony residual soils derived from basalt and tuff. Surface soil layers are thin and medium to moderately fine textured. Subsoils are thin and moderately fine or fine textured. Surface vesicular basalt boulders cover up to 60 percent of the surface. Basalt rock outcroppings and talus patches are common.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt or andesite. These rocks are massive to highly fractured and competent. Depth to bedrock ranges from 10 to 25 inches.

Typically, Landtype 30B occurs along the perimeter of rolling tablelands or along fault block uplifts. Slopes range from 16 to 40 percent. This unit occurs primarily at lower elevations or along forest fringe areas.

This landtype ranges in elevation from 4,500 to 6,300 feet and supports scattered juniper, ponderosa pine, mountain mahogany, big sage, low sage, bitterbrush, phlox, bottlebrush squirreltail, and Idaho fescue.

The soil is well drained. Permeability is moderate to slow in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 30B

Litter:	None
Surface layers:	Dark brown or dark grayish brown loam or clay loam; weak, fine granular structure; 10 to 50 percent gravel, cobbles, and stone by volume, soft; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 6 to 16 inches thick.
Subsoil layers:	Dark reddish brown to dark brown stony clay loam, silty clay loam, or silty clay; moderate, fine to medium subangular blocky structure, 20 to 60 percent gravel, cobbles, and stones by volume; very hard; very plastic; pH ranges from 6.5 to 7.5; 6 to 15 inches thick.

MAPPING UNIT 34A

Mapping Unit 34A consists dominantly of Landtype 34A and minor amounts of Landtypes 28, 30A, 34B, and 35. Landtype 34A is similar to Landtype 34B with the exception of slope range and position in the landscape. It is different from unit 35 in vegetative type.

Landtype 34A has moderately deep to deep, stony and residual reddish brown soils with ponderosa pine timber types. Surface soils are very thin or thin and medium textured. Subsoils are moderately thick and moderately fine textured. These soils often contain large vesicular basalt boulders from 1 to 3 feet long.

Bedrock is gray, hard basalt or interbedded, soft, reddish brown tuff. They are massive to highly fractured and competent. Depth to bedrock ranges from 25 to 48 inches.

Typically, Landtype 34A occurs on gently sloping lava tablelands and plateaus on slopes from 0 to 15 percent. The unit occurs primarily on lower elevations but includes some units at higher elevations.

This landtype ranges in elevation from 4,800 to 7,000 feet and supports ponderosa pine, big sage, wax currant, mules ear, bottlebrush squirreltail, squawcarpet, Ross sedge, serviceberry, Idaho fescue, lupine, bluegrass, phlox, and Oregon grape. Some units also contain manzanita.

The soil is well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 34A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 4 inches thick.
Surface layers:	Dark reddish brown or dark brown loam; weak, fine granular structure; 5 to 30 percent gravel, cobbles, and stones by volume; soft; slightly plastic; pH ranges from 6.0 to 6.8; 4 to 12 inches thick.
Subsoil layers:	Dark reddish brown or dark brown stony clay loam or silty clay loam; moderate, fine subangular blocky structure; 10 to 50 percent gravel, cobbles, and stone by volume; hard; plastic; pH ranges from 6.0 to 7.0; 20 to 36 inches thick.

MAPPING UNIT 34B

Mapping Unit 34B consists dominantly of Landtype 34B and minor amounts of Landtypes 34A, 34C, and 37B. Landtype 34B is similar to Landtype 34A with the exception of landforms, slope range, and position in the landscape. It is similar to unit 34C with the exception of slope range. Unit 37B differs by vegetative type.

Landtype 34B has moderately deep to deep, stony residual and colluvial reddish brown soils with ponderosa pine timber types. Surface soils are very thin or thin and medium or moderately fine textured. Subsoil layers are moderately thick and moderately fine textured. Large vesicular basalt boulders up to 3 feet long are common.

Bedrock is interbedded soft, reddish brown tuff or hard gray basalt. They are massive to highly fractured and competent. Depth to bedrock ranges from 25 to 48 inches.

Typically, Landtype 34B occurs on basaltic eruptive centers, shield volcanoes, and block fault scarps on slopes from 16 to 40 percent. It occurs on a wide range of elevations but is most typically found on lower elevations.

This landtype ranges in elevation from 4,800 to 7,000 feet and supports ponderosa pine, Oregon grape, mules ear, Ross sedge, Idaho fescue, mountain mahogany, big sage, wax currant, squawcarpet, serviceberry, lupine, and occasionally manzanita.

The soil is well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 34B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 4 inches thick.
Surface layers:	Dark reddish brown or dark brown loam or clay loam; weak to moderate, fine granular structure; 10 to 40 percent gravel, cobbles, and stone by volume; soft; slightly plastic; pH ranges from 6.0 to 6.8; 4 to 12 inches thick.
Subsoil layers:	Dark reddish brown or dark brown stony clay loam or silty clay loam; moderate, fine subangular blocky structure; 20 to 60 percent gravel, cobbles, and stones by volume; hard; plastic; pH ranges from 6.0 to 7.0; 20 to 36 inches thick.

MAPPING UNIT 34C

Mapping Unit 34C consists dominantly of landtype 34C and minor amounts of Landtypes 34B and 37C. Landtype 34C is similar to Landtype 34B with the exception of slope, and is similar to 37C with the exception of timber type.

Landtype 34C has moderately deep to deep, stony residual and colluvial reddish brown soils with ponderosa pine timber types. Surface soils are very thin or thin and medium textured. Subsoils are moderately thick and moderately fine textured. The soil commonly contains large vesicular basalt boulders up to three feet in length.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt. These rocks are massive to highly fractured and competent. Depth to bedrock ranges from 20 to 48 inches.

Typically, Landtype 34C occurs on basaltic eruptive centers, block fault scarps, and shield volcanoes on slopes over 40 percent. Most units occur on lower elevations.

This landtype ranges in elevation from 5,000 to 7,000 feet and supports ponderosa pine, big sage, wax currant, Oregon grape, mules ear, Ross sedge, Idaho fescue, squawcarpet, serviceberry, lupine, and occasionally manzanita.

The soil is well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 34C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 4 inches thick.
Surface layers:	Dark reddish brown or dark brown loam; weak, fine granular structure; 10 to 40 percent gravel, cobbles, and stone by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 4 to 12 inches thick.
Subsoil layers:	Dark reddish brown or dark brown stony clay loam or silty clay loam; moderate, fine subangular blocky structure; 20 to 60 percent gravel, cobbles, and stones by volume; hard; plastic; pH ranges from 6.0 to 7.0; 20 to 36 inches thick.

MAPPING UNIT 35

Mapping Unit 35 consists dominantly of Landtype 35 and minor amounts of Landtypes 28, 30A, and 38. Landtype 35 is similar to Landtype 34A and 38 with the exception of vegetative type.

Landtype 35 has moderately deep to deep, stony residual soils with ponderosa pine and bitterbrush associated vegetation. Surface soil layers are very thin to thin and medium to moderately fine textured. Subsoil layers are moderately thick to thick and moderately fine textured. Large basalt boulders up to 4 feet in length occur in some areas.

Bedrock is interbedded reddish brown tuff or hard, gray basalt or andesite. These rocks are massive to highly fractured and competent. Depth to bedrock ranges from 25 to 48 inches.

Typically, Landtype 35 occurs on lower elevations on gently rolling lava tablelands and plateaus on slopes from 0 to 15 percent.

This landtype ranges in elevation from 5,000 to 6,200 feet and supports ponderosa pine, bitterbrush, Idaho fescue, and Ross sedge.

The soil is well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 35

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| Litter: | Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick. |
| Surface layers: | Dark reddish brown or dark brown loam or clay loam; weak, fine granular structure; 0 to 20 per gravel, cobbles, and stones by volume; soft; slightly plastic; pH ranges from 6.2 to 7.5; 4 to 8 inches thick. |
| Subsoil layers: | Dark reddish brown or dark brown stony clay loam or silty clay loam; moderate, fine subangular blocky and moderate, medium granular structure; 5 to 50 percent gravel, cobbles, and stones by volume; firm; plastic; pH ranges from 6.2 to 7.2; 18 to 40 inches thick. |



MAPPING UNIT 36

Mapping Unit 36 consists dominantly of Landtype 36 and minor amounts of Landtypes 35 and 38. Landtype 36 is similar to Landtype 9 with the exception of landforms and slope.

Landtype 36 has moderately deep, gravelly, cobbly, and stony residual soils derived from reddish cinder flows and some interbedded tuffs. Surface soil layers are very thin or thin, stony, and medium textured. Subsoils are thin to moderately thick, stony or very stony, and moderately fine textured. Reddish, vesicular cinders cover a large part of the soil surface.

Bedrock is reddish brown, massive to highly fractured cinder flows and interbedded tuff. These rocks are soft to moderately hard and competent. Depth to bedrock ranges from 20 to 40 inches.

Typically, Landtype 36 occurs on footslopes derived from adjacent eruptive centers. Most of this landtype occurs adjacent to Hager Mountain. Slopes range from 5 to 20 percent.

This landtype ranges in elevation from 4,800 to 5,800 feet and supports ponderosa pine, mountain mahogany, manzanita, bitterbrush, squawcarpet, Ross sedge, Idaho fescue, bottlebrush squirreltail, and some junipers.

The soil is well drained. Permeability is moderate in the surface soils and moderate or slow in the subsoils.

Range of Profile Characteristics of Soil 36

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| Litter: | Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick. |
| Surface layers: | Dark reddish brown gravelly, cobbly, or stony loam; weak to moderate and fine to medium granular structure; 20 to 50 percent coarse fragment content by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 4 to 10 inches thick. |
| Subsoil layers: | Dark reddish brown gravelly, cobbly, or stony clay loam or silty clay loam; moderate, fine subangular blocky structure; 40 to 70 percent coarse fragments by volume; hard; plastic; pH ranges from 6.0 to 7.0; 15 to 30 inches thick. |

MAPPING UNIT 37A

Mapping Unit 37A consists dominantly of Landtype 37A and minor amounts of Landtypes 28, 30A, 34A, and 37B. Landtype 37A is similar to Landtype 34A with the exception of timber type, and it is similar to unit 37B with the exception of slope range and landforms.

Landtype 37A has moderately deep to deep, stony and residual reddish brown soils with mixed timber types. Surface soils layers are very thin or thin and medium or moderately coarse textured. Subsoils are moderately thick to thick and moderately fine or medium textured. Large basalt boulders commonly occupy a large part of the soil surface.

Bedrock is interbedded hard, gray basalt or soft, reddish brown tuff. The tuff rock is soft and massive. The basalt layers are hard and highly fractured. Depth to bedrock ranges from 25 to 48 inches.

Typically, Landtype 37A occurs on gently rolling plateaus and tablelands on medium or high elevations. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,500 to 7,500 feet and supports mixed conifers, snowbrush, manzanita, squawcarpet, serviceberry, mules ear, Ross sedge, wax currant, phlox, bottlebrush squirreltail, Oregon grape, lupine, and big sage.

The soil is well drained. Permeability is moderate to rapid in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 37A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick.
Surface layers:	Dark brown to black loam or sandy loam; weak, medium granular and weak, fine subangular blocky structure; 5 to 35 percent coarse fragments by volume; soft; friable; pH ranges from 6.0 to 7.2; 3 to 18 inches thick.
Subsoil layers:	Dark reddish brown or dark brown gravelly, cobbly, or stony clay loam, silty clay loam, or occasionally loam; moderate, fine or medium subangular blocky structure; 20 to 80 percent coarse fragments by volume; hard; plastic; pH ranges from 5.8 to 7.5; 3 to 18 inches thick.

MAPPING UNIT 37B

Mapping Unit 37B consists dominantly of Landtype 37B and minor amounts of Landtypes 37A, 37C, 34B, and 26. Landtype 37B is similar to Landtype 37A and 37C with the exception of landforms and slope range. Unit 34B differs by timber type, and landtype 26 contains deep, colluvial soils.

Landtype 37B has moderately deep to deep, reddish brown, stony residual and colluvial soils with mixed conifer timber types. Surface soil layers are very thin or thin and medium or moderately coarse textured. Subsoil layers are moderately thick to thick and moderately fine or medium textured. Large, vesicular basalt boulders make up a large part of the soil surface and profile

Bedrock is interbedded, soft, reddish brown tuff and hard, gray basalt or andesite. These rocks are massive to highly fractured and competent. Depth to bedrock ranges from 25 to 48 inches.

Typically, Landtype 37B occurs on moderately steep lands consisting of basaltic eruptive centers, block faults, and shield volcanoes. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 5,500 to 7,500 feet and supports mixed conifers, snowbrush, manzanita, squawcarpet, mules ear, serviceberry, wax currant, Ross sedge, Oregon grape, bottlebrush squirreltail, phlox, lupine, and sagebrush.

The soil is well drained. Permeability is moderate to rapid in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 37B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Dark brown loam or sandy loam; weak, medium granular and weak, fine subangular blocky structure; 5 to 40 percent coarse fragments by volume; soft; friable; pH ranges from 6.0 to 7.2; 3 to 15 inches thick.
Subsoil layers:	Dark brown to dark reddish brown gravelly, cobbly, or stony clay loam, silty clay loam, or occasionally loam; moderate or weak, fine, subangular blocky structure; 20 to 80 percent coarse fragments by volume; hard; plastic; pH ranges from 6.0 to 7.5; 20 to 40 inches thick.

MAPPING UNIT 37C

Mapping Unit 37C consists dominantly of Landtype 37C and minor amounts of Landtypes 26, 37B, and 34C. Landtype 37C is similar to Landtype 37B with the exception of slope range, and it is similar to 34C with the exception of timber type. Unit 26 contains deep, colluvial soils.

Landtype 37C has moderately deep to deep, stony, reddish brown residual and colluvial soils with mixed conifer timber sites. Surface soils are very thin or thin and medium or moderately coarse textured. Subsoils are moderately thick to thick and moderately fine or medium textured. Large vesicular basalt boulders occupy a large part of the soil surface and profile.

Bedrock is interbedded, hard, gray basalt and andesite or soft, reddish brown tuff. They are massive to highly fractured and competent. Depth to bedrock ranges from 24 to 48 inches.

Typically, Landtype 37C occurs on shield volcanoes basaltic eruptive centers and block faults on steep lands with slopes over 40 percent.

This landtype ranges in elevation from 5,500 to 7,500 feet and supports mixed conifers, snowbrush, manzanita, squawcarpet, serviceberry, wax currant, mules ear, Ross sedge, phlox, lupine, sagebrush, Oregon grape, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate to rapid in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 37C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Dark brown loam or sandy loam; weak, medium granular and weak, fine subangular blocky structure; 10 to 50 percent coarse fragments by volume; soft; friable; pH ranges from 6.0 to 7.2; 3 to 15 inches thick.
Subsoil layers:	Dark brown to dark reddish brown gravelly, cobbly, or stony clay loam, silty clay loam or loam; moderate or weak, fine, subangular blocky structure; 20 to 80 percent coarse fragments by volume; hard; plastic; pH ranges from 6.0 to 7.5; 20 to 40 inches thick.

MAPPING UNIT 38

Mapping Unit 38 consists dominantly of Landtype 38 and minor amounts of Landtypes 35 and 37A. Landtype 38 is similar to Landtype 35 and 37A with the exception of plant communities and position in the landscape. Landtype 38 occurs in transition zone locations in the landscape above unit 35 and below unit 37A.

Landtype 38 has moderately deep, stony residual soils located on tablelands with ponderosa pine and manzanita associated vegetation. Surface soil layers are very thin and medium or moderately coarse textured. Subsoil layers are moderately thick and moderately fine textured. Large basalt boulders make up a large part of the soil profile.

Bedrock is interbedded, soft, reddish brown tuff or hard, gray basalt or andesite. These rocks are competent and range from highly fractured to massive. Depth to bedrock ranges from 20 to 40 inches.

Typically, Landtype 38 occurs on gently rolling lava tablelands and sideslopes on transition zone locations. Slopes range up to 30 percent.

This landtype ranges in elevation from 5,000 to 6,000 feet and supports ponderosa pine, manzanita, bitterbrush, snowbrush, Idaho fescue, Ross sedge, mules ear, squawcarpet, strawberry, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate to rapid in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 38

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Dark reddish brown loam or sandy loam; weak, coarse platy and weak, medium granular structure; 5 to 30 percent coarse fragments by volume; soft; friable; pH ranges from 6.0 to 7.0; 2 to 6 inches thick.
Subsoil layers:	Dark reddish brown stony clay loam or silty clay loam; moderate, medium granular or moderate, fine subangular blocky structure; 20 to 60 percent coarse fragments by volume; hard; plastic; pH ranges from 6.5 to 7.5; 18 to 34 inches thick.

MAPPING UNIT 39

Mapping Unit 39 consists dominantly of Landtype 39 and minor amounts of Landtypes 30A, 34A, and 37A. Landtype 39 is similar to Landtype 34A and 37A with the exception of timber types.

Landtype 39 has moderately deep, stony and residual reddish brown soils with lodgepole pine or lodgepole pine-ponderosa pine timber types. Surface soil layers are very thin and medium textured. Subsoil layers are moderately thick and moderately fine textured. Large vesicular basalt boulders make up a large part of the soil surface in some areas.

Bedrock is interbedded hard, gray basalt and andesite or soft, reddish brown tuff. They are competent and range from massive to highly fractured. Depth to bedrock ranges from 20 to 40 inches.

Typically, Landtype 39 occurs on high elevation lava tablelands and plateaus on slopes from 0 to 15 percent.

This landtype ranges in elevation from 6,000 to 7,200 feet and supports lodgepole pine, ponderosa pine, big sagebrush, phlox, strawberry, wax currant, Idaho fescue, Ross sedge, longstolon sedge, rabbitbrush, and some bitterbrush.

The soil is well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 39

- Litter: Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
- Surface layers: Dark reddish brown or dark brown loam; weak, fine granular and weak, fine subangular blocky structure; 10 to 30 percent coarse fragments by volume; soft; slightly plastic; pH ranges from 6.0 to 7.0; 2 to 6 inches thick.
- Subsoil layers: Dark reddish brown stony clay loam or silty clay loam; moderate, fine subangular and moderate, fine granular structure; 20 to 50 percent coarse fragments by volume; hard; plastic; pH ranges from 6.0 to 7.0; 18 to 34 inches thick.

(40-49) Residual and Colluvial Soils From Rhyolite

MAPPING UNIT 40A

Mapping Unit 40A consists dominantly of Landtype 40A and minor amounts of Landtypes 34A and 40B. Landtype 40A is similar to Landtype 34A with the exception of soil type and landform and it is similar to unit 40B with the exception of slope range.

Landtype 40A has moderately deep to deep, brown and gravelly residual soils associated with rhyolitic eruptive centers. Surface soils are thin and moderately coarse or medium textured. Subsoil layers are moderately thick, gravelly, and moderately coarse or coarse textured. This landtype is often characterized by exposed mineral soil and no organic litter or ground cover vegetation.

Bedrock consists mostly of moderately hard, competent, highly fractured, light gray rhyolite. Soft tuff, welded tuff, obsidian, rhyolitic breccia, and andesites occur locally--primarily along the perimeter of the landform. Depth to bedrock ranges from 30 to 50 inches.

Typically, Landtype 40A occurs on gentle slopes associated with dome-shaped uplifts which consist of rhyolitic lava. Slopes are less than 15 percent.

This landtype ranges in elevation from 4,500 to 6,500 feet and supports ponderosa pine, manzanita, Ross sedge, bottlebrush squirreltail, squaw-carpet, phlox, snowbrush, mules ear, mountain mahogany, and Oregon grape.

The soil is excessively well drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 40A

- Litter: Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
- Surface layers: Very dark gray to dark brown, sandy loam or loam; weak, fine granular structure; 5 to 50 percent angular and subround gravels and cobbles by volume; soft; nonplastic to slightly plastic; pH ranges from 6.0 to 7.0; 6 to 15 inches thick.
- Subsoil layers: Yellowish brown to dark brown, gravelly and cobbly sandy loam or loamy sand; weak, fine subangular blocky structure; 20 to 60 percent angular and subround gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.3 to 7.5; 18 to 35 inches thick.

MAPPING UNIT 40B

Mapping Unit 40B consists dominantly of Landtype 40B and minor amounts of Landtypes 40A, 40C, 41B, and 42. Landtype 40B is similar to Landtype 41B with the exception of timber type. It is similar to units 40A and 40C with the exception of slope ranges.

Landtype 40B has moderately deep to deep, brown and gravelly residual and colluvial soils which have developed on rhyolitic lava domes. Surface soil layers are thin and moderately coarse textured. Subsoil layers are moderately thick to thick, gravelly or cobbly, and moderately coarse or coarse textured. Exposed mineral soil is common on some areas within this unit.

Bedrock is mainly moderately hard, competent, and highly fractured rhyolite or foliated rhyolite which is vertically jointed. Other rocks occurring locally are welded tuff, soft tuff, obsidian, andesite, and rhyolitic breccia. These rocks tend to occur more commonly along the perimeter of the landform. Depth to bedrock ranges from 30 to 60 inches.

Typically, Landtype 40B occurs primarily on south aspects of rhyolitic dome-shaped uplifts on slopes from 16 to 40 percent.

This landtype ranges in elevation from 4,600 to 6,500 feet and supports ponderosa pine, snowbrush, manzanita, Ross sedge, squawcarpet, Oregon grape, bottlebrush squirreltail, mountain mahogany, and mules ear.

The soil is excessively well drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 40B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface layers:	Very dark gray to dark brown sandy loam; weak medium granular and weak, fine subangular blocky structure; 10 to 50 percent angular and subround gravels and cobbles by volume; soft; nonplastic to slightly plastic; pH ranges from 6.0 to 7.0; 6 to 12 inches thick.
Subsoil layers:	Yellowish brown to dark brown, gravelly and cobbly sandy loam or loamy sand; weak, fine subangular blocky structure; 20 to 70 percent angular and subround gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.2 to 7.2; 20 to 50 inches thick.

MAPPING UNIT 40C

Mapping Unit 40C consists dominantly of Landtype 40C and minor amounts of Landtypes 40B, 41C, and 42. Landtype 40C is similar to Landtype 40B with the exception of slope range, and it is similar to unit 41C with the exception of timber type.

Landtype 40C has moderately deep to deep, gravelly, residual and colluvial soils which occur on steep slopes on rhyolitic domes. Surface soils are thin and moderately coarse textured. Subsoils are moderately thick to thick, gravelly or cobbly, and coarse to moderately coarse textured. Some areas are characterized by a high portion of exposed mineral soil.

Bedrock consists mostly of highly fractured, competent, and moderately hard rhyolite which may be foliated. Rhyolitic breccia, andesite, welded tuff, tuff, and obsidian occur locally along the perimeter of the landform. The bedrock layers are primarily vertically jointed. Depth to bedrock ranges from 30 to 60 inches.

Typically, Landtype 40C occurs on steep slopes usually on south aspects and associated with rhyolitic dome uplifts. Slopes are greater than 40 percent.

This landtype ranges in elevation from 4,600 to 6,500 feet and supports ponderosa pine, snowbrush, manzanita, mules ear, squawcarpet, Ross sedge, Oregon grape, mountain mahogany, and bottlebrush squirreltail.

The soil is excessively well drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 40C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface layers:	Very dark gray to dark brown sandy loam; weak, medium granular and weak, fine subangular blocky structure; 10 to 50 percent angular and subround gravels and cobbles by volume; soft; nonplastic to slightly plastic; pH ranges from 6.0 to 7.0; 6 to 12 inches thick.
Subsoil layers:	Yellowish brown to dark brown, gravelly and cobbly sandy loam or loamy sand; weak, fine subangular blocky structure; 30 to 70 percent angular and subround gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.2 to 7.2; 20 to 50 inches thick.

MAPPING UNIT 41A

Mapping Unit 41A consists dominantly of Landtype 41A and minor amounts of Landtypes 40A and 41B. Landtype 41A is similar to Landtype 40A with the exception of timber type and is similar to unit 41B with the exception of slope range.

Landtype 41A has moderately deep to deep, gravelly and cobbly, yellowish brown residual soils with mixed timber types. Surface soil layers are thin and moderately coarse or medium textured. Subsoil layers are moderately thick to thick, gravelly and cobbly, and coarse or moderately coarse textured.

Bedrock is moderately hard, highly fractured, and competent light gray rhyolite. Other rocks occurring locally within the unit are tuff, welded tuff, obsidian, andesite, and rhyolitic breccia. Depth to bedrock ranges from 30 to 55 inches.

Typically, Landtype 41A occurs on gentle slopes on rhyolitic dome-shaped landforms. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,000 to 7,200 feet and supports mixed conifers, lupine, snowbrush, manzanita, squawcarpet, sedge, needlegrass, rabbitbrush, and bottlebrush squirreltail.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 41A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick.
Surface layers:	Very dark gray to dark yellowish brown loam or sandy loam; very weak, medium granular structure; 10 to 40 percent angular and subround gravels and cobbles by volume; loose, nonplastic; pH ranges from 6.0 to 7.0; 6 to 12 inches thick.
Subsoil layers:	Dark yellowish brown or dark grayish brown gravelly and cobbly sandy loam or loamy sand; single grain or very weak, fine subangular blocky structure; 20 to 70 percent angular and subround gravels and cobbles by volume; loose; nonplastic, pH ranges from 6.2 to 7.4; 24 to 50 inches thick.

MAPPING UNIT 41B

Mapping Unit 41B consists dominantly of Landtype 41B and minor amounts of Landtypes 41A, 41C, 40B, and 42. Landtype 41B is similar to Landtype 40B with the exception of timber type, and it is similar to units 41A and 41C with the exception of slope-ranges.

Landtype 41B has moderately deep to deep, gravelly and cobbly residual and colluvial soils on rhyolitic domes with mixed timber types. Surface soils are thin and moderately coarse or medium textured. Subsoils are moderately thick to thick, moderately coarse or coarse textured, and gravelly or cobbly.

Bedrock is mainly vertically jointed, moderately hard, and highly fractured rhyolite which is often foliated. Welded tuff, tuff, andesite, obsidian, and breccia may occur locally but primarily along the perimeter of the landform. Depth to bedrock ranges from 30 to 60 inches.

Typically, Landtype 41B occurs on dome-shaped lava uplifts on north aspects on slopes from 16 to 40 percent.

This landtype ranges in elevation from 5,200 to 7,200 feet and supports mixed conifers, snowbrush, manzanita, Ross sedge, bottlebrush squirreltail, lupine, snowberry, Oregon grape, squawcarpet, and needlegrass.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 41B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Very dark grayish brown to dark yellowish brown loam or sandy loam; single grain or very weak, medium granular structure; 10 to 50 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 14 inches thick.
Subsoil layers:	Dark grayish brown, dark brown, or dark yellowish brown gravelly and cobbly sandy loam or loamy sand; single grain or very weak, fine subangular blocky structure; 30 to 70 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.0 to 7.5; 20 to 50 inches thick.

MAPPING UNIT 41C

Mapping Unit 41C consists dominantly of Landtype 41C and minor amounts of Landtypes 41B, 40C, and 42. Landtype 41C is similar to Landtype 41B with the exception of slope range. It is similar to unit 40C with the exception of timber type.

Landtype 41C has moderately deep to deep gravelly and cobbly residual and colluvial soils which occur on steep slopes and which have mixed conifer timber types. Surface soil layers are thin and moderately coarse or medium textured. Subsoil layers are moderately thick to thick, gravelly and cobbly, and coarse or moderately coarse textured.

Bedrock is moderately hard, highly fractured, and vertically jointed rhyolite and foliated rhyolite. Other rocks associated with the unit are tuff, welded tuff, breccia, andesite, and obsidian. Depth to bedrock ranges from 30 to 60 inches.

Typically, Landtype 41C occurs on north aspects of dome-shaped rhyolitic lava eruptive centers. Slopes are greater than 40 percent.

This landtype ranges in elevation from 5,200 to 7,200 feet and supports mixed conifers, needlegrass, Oregon grape, manzanita, snowberry, mules ear, Ross sedge, lupine, and squawcarpet.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 41C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Very dark grayish brown to dark yellowish brown loam or sandy loam; single grain or very weak, medium granular structure; 10 to 60 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 14 inches thick.
Subsoil layers:	Dark grayish brown, dark brown, or dark yellowish brown gravelly and cobbly sandy loam or loamy sand; single grain or very weak, fine subangular blocky structure; 30 to 80 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.0 to 7.5; 20 to 50 inches thick.

MAPPING UNIT 42

Mapping Unit 42 consists dominantly of Landtype 42 and minor amounts of Landtypes 41A, 41B, and 66. Landtype 42 is similar to Landtype 41A and 41B with the exception of soil depth; and it is similar to unit 66 with the exception of soil texture.

Landtype 42 has deep to very deep colluvial soils derived from rhyolite and rhyolitic breccias. Surface soils are very thin to thin, gravelly, and moderately coarse textured. Subsoil layers are thick to very thick, gravelly or cobbly, and moderately coarse or coarse textured. The unit may contain a hardpan and/or finer textures locally.

Bedrock is moderately hard, highly fractured, competent rhyolite or foliated rhyolite. Tuff, welded tuff, andesite, obsidian, and breccias also occur within the unit. Depth to bedrock is over 50 inches.

Typically, Landtype 42 occurs on benches, toeslopes, and footslopes where soil material has accumulated by downslope movement. Slopes range up to 30 percent.

This landtype ranges in elevation from 5,200 to 7,000 feet and supports mixed conifers, snowbrush, manzanita, Ross sedge, mules ear, and squaw carpet.

The soil is well drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 42

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Dark grayish brown or dark brown gravelly sandy loam; weak, medium granular structure to single grain; 5 to 40 percent flat and angular gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.0 to 7.0; 4 to 12 inches thick.
Subsoil layers:	Dark brown gravelly sandy loam or loamy sand; very weak, medium subangular blocky structure; 20 to 80 percent flat and angular gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.2 to 7.4; over 40 inches thick.

MAPPING UNIT 43

Mapping Unit 43 consists dominantly of Landtype 43 and minor amounts of Landtypes 41B, 42, and 44. Landtype 43 is similar to Landtype 41B with the exception of timber type and position in the landscape. It is similar to unit 44 with the exception of vegetation type.

Landtype 43 has moderately deep to deep gravelly and cobbly residual soils which occur at high elevations with subalpine coniferous vegetation. Surface soil layers are thin, gravelly, and moderately coarse or coarse textured. Subsoil layers are moderately thick to thick, gravelly and cobbly, and coarse textured.

Bedrock is moderately hard and highly fractured light gray rhyolite. Tuff, breccia, and andesite occurs locally within the unit. Depth to bedrock ranges from 30 to 50 inches.

Typically, Landtype 43 occurs on high elevation rhyolitic lava eruptive centers. Slopes range up to 40 percent.

This landtype ranges in elevation from 6,800 to 8,400 feet and supports whitebark pine, lodgepole pine, white fir, pinemat, sedge, lupine, waxcurrant, bottlebrush squirreltail, and bluegrass.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 43

Litter:	Needles, leaves, twigs and decomposing organic matter; 0.25 to 1 inch thick.
Surface layers:	Dark grayish brown or dark brown gravelly sandy loam or loamy sand; single grain or very weak, medium granular structure; 30 to 60 percent irregular or subround gravels and cobbles by volume; soft to loose; nonplastic; pH ranges from 5.5 to 6.5; 10 to 18 inches thick.
Subsoil layers:	Yellowish brown, very gravelly and cobbly loamy sand; single grain and very weak, fine subangular blocky structure; 50 to 90 percent irregular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 5.5 to 6.5; 20 to 40 inches thick.

MAPPING UNIT 44

Mapping Unit 44 consists dominantly of Landtype 44 and minor amounts of Landtypes 43. Landtype 44 is similar to Landtype 43 with the exception of plant community type.

Landtype 44 has moderately deep to deep gravelly and cobbly residual and colluvial soils occurring at high elevations on open and exposed rhyolitic domes. Surface soil layers are thin, gravelly, and moderately coarse textured. Subsoil layers are moderately thick to thick, gravelly and cobbly, and coarse textured. Pockets of finer textured colluvial soils occur along benches and drainages.

Bedrock is highly fractured, competent, and moderately hard rhyolite which is often foliated. Tuff, breccia, and andesite also occur within the unit. Depth to bedrock ranges from 30 to 60 inches.

Typically, Landtype 44 occurs on high elevation rhyolitic dome-shaped landforms. Slopes range up to 40 percent.

This landtype ranges in elevation from 6,800 to 8,400 feet and supports big sage, low sage, shrubby penstemon, lupine, waxcurrant, sedge, bottlebrush squirreltail, bluegrass, snowberry, pinemat, spirea, and stringers and patches of subalpine conifers on protected sites.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 44

Litter:	None
Surface layers:	Gray or dark grayish brown gravelly sandy loam; single grain to weak, medium granular structure; 20 to 50 percent angular or subround gravels by volume; loose; nonplastic; pH ranges from 5.5 to 6.5; 12 to 18 inches thick. (Colluvial soils are loams or sandy clay loams.)
Subsoil layers:	Dark grayish brown loamy sand; single grain; 50 to 80 percent angular or subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.0 to 6.6; 18 to 42 inches thick. (Colluvial soils are clay loams or sandy clay loams.)

MAPPING UNIT 50

Mapping Unit 50 consists dominantly of Landtype 50 and minor amounts of Landtypes 28, 51, 53, and 56A. Landtype 50 is similar to Landtype 28 with the exception of parent material and surface stoniness. It is similar to unit 53 with the exception of soil texture. Unit 51 and 56A have deeper soils and juniper associated vegetation.

Landtype 50 has very shallow to shallow clayey residual soils derived from tuff. Surface soil layers are very thin and medium to moderately fine textured. Subsoil layers are very thin to thin and fine or moderately fine textured. Large vertical cracks commonly extend through the subsoil and into the soft bedrock during summer when the soil dries out. The lower subsoil may contain a thin, silica-cemented duripan.

Bedrock is soft and massive yellowish brown or reddish brown tuff. Depth to bedrock is less than 20 inches.

Typically, Landtype 50 occurs on gently sloping toeslopes and benchlands above valley bottoms and below the coniferous zone. Slopes are generally less than 10 percent but some lands up to 30 percent are included.

This landtype ranges in elevation from 4,800 to 6,000 feet and supports low sage, Idaho fescue, oat grass, bottlebrush squirreltail, yarrow, and scattered bitterbrush and juniper.

The soil is well drained. Permeability is moderate to slow in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 50

Litter:	None
Surface layers:	Brown or dark brown loam, clay loam or silty clay loam; weak, medium granular structure; 0 to 5 percent subround gravel by volume; soft to hard; slightly plastic or plastic; pH ranges from 5.5 to 6.5; 4 to 6 inches thick.
Subsoil layers:	Dark brown to dark reddish brown clay, silty clay, or silty clay loam; strong, coarse prismatic parting to moderate, medium subangular blocky structure; 0 to 5 percent subround gravel by volume, very hard; very plastic; intermittent duripan layer in lower subsoil is hard, massive, and weakly cemented; pH ranges from 5.5 to 7.5; 4 to 12 inches thick.

MAPPING UNIT 51

Mapping Unit 51 consists dominantly of Landtype 51 and minor amounts of Landtypes 30A, 50, and 60. Landtype 51 is similar to Landtype 50 with the exception of soil depth and vegetative type. It is similar to unit 60 with the exception of soil color and texture.

Landtype 51 has shallow to moderately deep, reddish and clayey residual soils with juniper associated vegetation. Surface soils are very thin and moderately fine or fine textured. Subsoil layers are thin to moderately thick and fine textured. Soils crack deeply during the summer as the profile dries out.

Bedrock is very soft and massive reddish brown tuff which is high in mica. Depth to bedrock ranges from 18 to 38 inches.

Typically, Landtype 51 occurs on gently to moderately sloping footslopes and sideslopes below the coniferous forest zone. Most of the unit occurs on gently rolling lower elevations but slopes may range up to 30 percent. Most of this unit occurs in the Renner Lake area.

This landtype ranges in elevation from 4,900 to 6,000 feet and supports low sage, big sage, mountain mahogany, fescue, bitterbrush, cheatgrass, mules ear, bluegrass, oat grass, and scattered juniper and ponderosa pine.

The soil is well drained. Permeability is slow in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 51

Litter:	Needles, leaves, twigs and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Dusky red clay loam, silty clay loam, or silty clay; moderate, medium granular and subangular blocky structure; 0 to 10 percent subround gravel by volume; hard; plastic; pH ranges from 6.5 to 7.5; 3 to 6 inches thick.
Subsoil layers:	Dark reddish brown silty clay or clay; weak and moderate, medium subangular blocky structure; 0 to 40 percent angular and subround gravel by volume; extremely firm; very plastic; pH ranges from 6.5 to 7.5; 15 to 32 inches thick.

MAPPING UNIT 53

Mapping Unit 53 consists dominantly of Landtype 53 and minor amounts of Landtypes 28, 50, and 56A. Landtype 53 is similar to Landtype 50 with the exception of soil texture. It is similar to unit 56A with the exception of soil depth and vegetative type.

Landtype 53 has shallow to very shallow loamy residual soils derived from ash-flow tuffs. Surface soils are very thin and medium or moderately coarse textured. Subsoils are very thin to thin and medium or moderately coarse textured. The lower subsoil may contain a thin, silica cemented hardpan at the soil-bedrock interface.

Bedrock is soft, massive, and competent yellowish brown ash-flow tuff. It weathers rapidly when exposed and becomes highly fractured. Depth to bedrock is less than 20 inches.

Typically, Landtype 53 occurs on gently sloping toeslopes and benchlands on lower elevations. This unit is below the coniferous zone primarily on gentle slopes but includes some lands up to 30 percent.

This landtype ranges in elevation from 4,800 to 6,000 feet and supports low sage, Idaho fescue, sandberg bluegrass, oat grass, bottlebrush squirreltail, and scattered juniper.

The soil is well drained. Permeability is moderate in the surface soils and moderate or rapid in the subsoils.

Range of Profile Characteristics of Soil 53

Litter:	None
Surface layers:	Dark brown or dark yellowish brown loam or sandy loam; weak, medium granular structure; 0 to 5 percent subround gravel by volume; friable; slightly plastic; pH ranges from 6.0 to 7.0; 3 to 6 inches thick.
Subsoil layers:	Dark brown or dark yellowish brown loam or sandy loam; weak, fine subangular blocky structure; 0 to 8 percent subround gravel by volume; friable; slightly plastic; intermittent duripan in lower subsoil is hard, massive, and weakly cemented; pH ranges from 6.0 to 7.0; 4 to 12 inches thick.

MAPPING UNIT 56A

Mapping Unit 56A consists dominantly of Landtype 56A and minor amounts of Landtypes 30A, 51, 53, and 56B. Landtype 56A is similar to Landtype 30A with the exception of surface stoniness, soil texture and bedrock type. It is similar to unit 53 with the exception of soil depth and vegetative type; and it is similar to unit 51 with the exception of soil texture.

Landtype 56A has shallow to moderately deep residual soils which have juniper and mahogany associated vegetation. Surface soil layers are very thin or thin and medium or moderately coarse textured. Subsoil layers are thin to moderately thick and moderately fine to medium textured.

Bedrock is mostly brown or yellowish brown, soft and massive tuff and breccia with some localized basalt and rhyolite. Depth to bedrock ranges from 18 to 34 inches.

Typically, Landtype 56A occurs on footslopes on forest fringe areas at lower elevations. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 4,500 to 6,000 feet and supports juniper, mountain mahogany, bitterbrush, rabbitbrush, big sage, cheat-grass, mules ear, Idaho fescue, bluegrass, oat grass, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 56A

Litter:	None
Surface layers:	Dark brown or very dark grayish brown loam or sandy loam; weak, medium granular structure; 0 to 10 percent angular and subround gravel by volume; soft; slightly plastic; pH ranges from 6.0 to 7.5; 4 to 8 inches thick.
Subsoil layers:	Dark brown, strong brown, or very dark grayish brown clay loam, silty clay loam, or loam; weak and moderate, fine subangular blocky structure; 0 to 40 percent subround and angular coarse fragments by volume; hard; slightly plastic to plastic; pH ranges from 6.5 to 7.5; 14 to 26 inches thick.

MAPPING UNIT 56B

Mapping Unit 56B consists dominantly of Landtype 56B and minor amounts of Landtypes 30B, 51, 56A, and 57. Landtype 56B is similar to Landtype 30B with the exception of soil texture, bedrock type, and surface stoniness. It is similar to unit 51 with the exception of texture. Unit 56B occurs on knolls and steeper slopes above unit 56A.

Landtype 56B has shallow to moderately deep gravelly residual soils derived from tuff and breccia and which has juniper associated vegetation. Surface soils are very thin or thin and medium or moderately coarse textured. Subsoils are thin to moderately thick and medium to moderately fine textured.

Bedrock is usually brown or yellowish brown, soft and massive tuff and breccia with localized basalt and rhyolite lava flows. Depth to bedrock ranges from 16 to 34 inches.

Typically, Landtype 56B occurs on knolls, ridges, and steeper slopes at lower elevations below the coniferous forest zone. It generally occurs upslope from unit 56A on slopes from 16 to 40 percent.

This landtype ranges in elevation from 4,500 to 6,500 feet and supports juniper, mountain mahogany, bitterbrush, rabbitbrush, big sage, phlox, Idaho fescue, cheatgrass, mules ear, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 56B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Black, dark brown, and very dark grayish brown loam or sandy loam; weak, fine to medium granular structure; 5 to 30 percent subround and angular coarse fragments by volume; soft; slightly plastic; pH ranges from 6.0 to 8.0; 5 to 12 inches thick.
Subsoil layers:	Dark brown or dark reddish brown gravelly clay loam, loam, or silty clay loam; weak and moderate, fine subangular blocky structure; 20 to 70 percent subround and angular coarse fragments by volume; hard; slightly plastic to plastic; pH ranges from 6.5 to 8.0; 10 to 24 inches thick.

MAPPING UNIT 57

Mapping Unit 57 consists dominantly of Landtype 57 and minor amounts of Landtypes 4, 30B, and 56B. Landtype 57 is similar to Landtype 56B with the exception of landform and surface stoniness.

Landtype 57 has very shallow to moderately deep, stony residual soils located primarily in the Chewaucan River area. The unit is dominated by steep slopes, rock outcrops, talus, and very stony areas. Surface soil layers are very thin to thin and moderately coarse or medium textured. Subsoils are very thin to thin and medium or moderately fine textured.

Bedrock is moderately hard and consists of massive breccia, mudflows, and tuff with some basalt and rhyolite locally. Rock outcrops and talus areas are common but soil depth generally ranges from 8 to 32 inches.

Typically, Landtype 57 occurs on highly dissected topography on domes, ridges, and sideslopes with slopes from 20 to 70 percent.

This landtype ranges in elevation from 5,000 to 7,000 feet and supports juniper, mountain mahogany, big sage, rabbitbrush, bitterbrush, cheatgrass, needlegrass, low sage, and some ponderosa pine.

The soil is well drained. Permeability is rapid in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 57

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Very dark gray to dark brown gravelly sandy loam or loam; weak, medium granular structure; 20 to 60 percent subround and angular coarse fragments by volume; friable; slightly plastic; pH ranges from 6.0 to 7.6; 4 to 16 inches thick.
Subsoil layers:	Dark brown gravelly clay loam, loam, and occasionally silty clay loam; weak, fine or medium subangular blocky structure; 25 to 70 percent flat, subround and irregular coarse fragments by volume; friable; slightly plastic to plastic; pH ranges from 6.0 to 7.6; 4 to 16 inches thick.

MAPPING UNIT 60

Mapping Unit 60 consists dominantly of Landtype 60 and minor amounts of Landtypes 50, 53, 56B, 57, and 61. Landtype 60 is similar to Landtype 56B with the exception of soil color and texture, and it is similar to unit 61 with the exception of soil depth.

Landtype 60 has very dark, moderately deep residual soils weathered from breccias and tuffs with juniper associated vegetation. Most of this unit occurs within the lower Chewaucan area. Surface soils are thin and medium textured. Subsoils are thin to moderately thick and moderately fine to fine textured. Mineral soil is exposed on 25-50 percent of the unit.

Bedrock is soft or moderately hard and massive to highly fractured reddish, yellowish, or olive breccia, tuff, and tuffaceous sandstone. Depth to bedrock ranges from 20 to 36 inches.

Typically, Landtype 60 occurs on highly dissected topography at lower elevations below the coniferous forest zone. It occurs on ridges and sideslopes on slopes from 20 to 50 percent.

This landtype ranges in elevation from 4,700 to 6,400 feet and supports juniper, big sage, low sage, mountain mahogany, rabbitbrush, bottlebrush squirreltail, Idaho fescue, cheatgrass, and scattered ponderosa pine.

The soil is well drained. Permeability is moderate in the surface soils and slow in the subsoils.

Range of Profile Characteristics of Soil 60

Litter:	None
Surface layers:	Black or very dark grayish brown loam or silt loam; weak, medium granular and weak, fine subangular blocky structure; 2 to 30 percent angular and subround gravels and cobbles by volume; soft; slightly plastic; pH ranges from 6.5 to 7.5; 8 to 12 inches thick.
Subsoil layers:	Very dark gray, very dark grayish brown, or dark brown gravelly silty clay loam, clay loam, or silty clay; weak and moderate, medium subangular blocky structure; 5 to 60 percent angular and subround gravels and cobbles by volume; hard; plastic or very plastic; pH ranges from 6.5 to 7.5; 12 to 24 inches thick.

MAPPING UNIT 61

Mapping Unit 61 consists dominantly of Landtype 61 and minor amounts of Landtypes 60. Landtype 61 is similar to Landtype 60 with the exception of soil depth, texture, and position in the landscape. Unit 60 occurs upslope from unit 61.

Landtype 61 has deep to very deep, dark valley fill soils weathered from breccia and tuff and with juniper associated vegetation. Surface soil layers are thin and medium textured. Subsoil layers are thick to very thick and moderately coarse to moderately fine textured.

Bedrock is soft to moderately hard reddish, yellowish, and olive breccia and tuff. Depth to bedrock ranges from 50 to 120 inches.

Typically, Landtype 61 occurs on benches, toeslopes, footslopes, and valleys where soil material has accumulated by colluvial action. Slopes range up to 30 percent.

This landtype ranges in elevation from 4,700 to 6,700 feet and supports juniper, big sage, rabbitbrush, cheatgrass, waxcurrant, bottlebrush squirreltail, and scattered ponderosa pine.

The soil is moderately well drained. Permeability is moderate in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 61

Litter:	None
Surface layers:	Black or very dark gray loam or silt loam; weak, medium subangular blocky structure; 0 to 10 percent gravels and cobbles by volume; soft; slightly plastic; pH ranges from 6.5 to 7.5; 8 to 12 inches thick.
Subsoil layers:	Black, very dark grayish brown, or dark brown loam, sandy loam, or clay loam; weak, coarse subangular blocky structure; 0 to 10 percent gravels and cobbles by volume; soft to hard; slightly plastic to plastic; pH ranges from 6.5 to 7.5; depth ranges from 40 to over 100 inches.

MAPPING UNIT 62A

Mapping Unit 62A consists dominantly of Landtype 62A and minor amounts of Landtypes 60, 62B, and 63A. Landtype 62A is similar to Landtype 62B with the exception of slope range and position in the landscape. It is similar to unit 63A with the exception of soil texture.

Landtype 62A has moderately deep clayey residual soils with ponderosa pine timber types. Surface soil layers are very thin or thin and medium or moderately fine textured. Subsoil layers are thin to moderately thick and fine or moderately fine textured.

Bedrock is soft and massive, yellow, brown, gray and reddish brown tuffaceous sedimentary rock, tuff, and breccia. Depth to highly weathered bedrock ranges from 22 to 34 inches. Lower subsoil typically blends into bedrock which results in estimated soil depth determinations.

Typically, Landtype 62A occurs on gently sloping ridges and sideslopes at lower elevations between the juniper and mixed conifer timber types. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 4,800 to 6,300 feet and supports ponderosa pine, bitterbrush, Idaho fescue, mules ear, waxcurrant, big sage, and some juniper.

The soil is well drained. Permeability is moderate in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 62A

Litter:	Needles, leaves, twigs and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Black or very dark grayish brown loam, silt loam, or silty clay loam; moderate, medium granular structure; 0 to 20 percent subround gravels and cobbles by volume; soft to slightly hard; slightly plastic to plastic; pH ranges from 6.4 to 7.4; 3 to 10 inches thick.
Subsoil layers:	Dark brown, dark grayish brown, reddish brown or dark yellowish brown clay, silty clay, or silty clay loam; moderate, medium subangular blocky structure; 0 to 50 percent gravels and cobbles by volume; very hard; very plastic or plastic; pH ranges from 6.0 to 7.0; 14 to 25 inches thick.

MAPPING UNIT 62B

Mapping Unit 62B consists dominantly of Landtype 62B and minor amounts of Landtypes 60, 62A, and 63B. Landtype 62B is similar to Landtype 62A with the exception of position in the landscape and slope range. It is similar to unit 63B with the exception of soil texture.

Landtype 62B has moderately deep, very plastic residual soils with ponderosa pine timber types. Surface soil layers are very thin or thin and medium or moderately fine textured. Subsoil layers are thin to moderately thick and fine or moderately fine textured.

Bedrock is soft and massive reddish brown, brown, yellow, and gray tuffaceous sedimentary rock, tuff, and breccia. Depth to highly weathered bedrock ranges from 22 to 34 inches. The lower subsoil typically blends into soft bedrock.

Typically, Landtype 62B occurs on dissected topography on moderately steep ridges and sideslopes at lower elevations adjacent to juniper and mixed conifer timber types. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 4,800 to 6,400 feet and supports ponderosapine, bitterbrush, big sage, Idaho fescue, mules ear, waxcurrant, and some juniper and mountain mahogany.

The soil is well drained. Permeability is moderate in the surface soils and slow or very slow in the subsoils.

Range of Profile Characteristics of Soil 62B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Black or very dark grayish brown loam, silt loam, or silty clay loam; moderate, medium granular structure; 0 to 20 percent gravels and cobbles by volume, soft to slightly hard; slightly plastic to plastic; pH ranges from 6.4 to 7.4; 3 to 10 inches thick.
Subsoil layers:	Dark brown, dark grayish brown, reddish brown, or dark yellowish brown clay, silty clay, or silty clay loam; moderate, medium subangular blocky structure; 0 to 50 percent gravels and cobbles by volume; very hard; very plastic or plastic; pH ranges from 6.0 to 7.0; 14 to 25 inches thick.

MAPPING UNIT 63A

Mapping Unit 63A consists dominantly of Landtype 63A and minor amounts of Landtypes 62A and 63B. Landtype 63A is similar to Landtype 62A with the exception of soil texture. It is similar to unit 63B with the exception of slope range and position in the landscape.

Landtype 63A has moderately deep, brown to yellowish brown loamy residual soils with ponderosa pine vegetation. Surface soils are thin and moderately coarse or medium textured. Subsoils are thin to moderately thick and medium to moderately coarse textured.

Bedrock is massive and soft to moderately hard brown or yellowish brown tuff or breccia. Depth to bedrock ranges from 22 to 40 inches. Bedrock weathers rapidly when exposed and becomes highly fractured.

Typically, Landtype 63A occurs on gently sloping ridges and sideslopes at lower elevations and above juniper associated vegetation. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 4,800 to 6,300 feet and supports ponderosa pine, bitterbrush, Idaho fescue, lupine, mules ear, big sage, Ross sedge, bottlebrush squirreltail, and some juniper and mountain mahogany.

The soil is well drained. Permeability is rapid in the surface soils and moderate to rapid in the subsoils.

Range of Profile Characteristics of Soil 63A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Dark brown or very dark grayish brown sandy loam or loam; weak, medium granular structure; 0 to 5 percent gravel by volume; soft; slightly plastic; pH ranges from 6.5 to 7.2; 10 to 18 inches thick.
Subsoil layers:	Dark brown or brown loam or sandy loam; weak to moderate, fine to medium subangular blocky structure; 0 to 50 percent blocky and subround gravels and cobbles by volume; soft to slightly hard; slightly plastic; pH ranges from 6.5 to 7.5; 10 to 25 inches thick.

MAPPING UNIT 63B

Mapping Unit 63B consists dominantly of Landtype 63B and minor amounts of Landtypes 62B and 63A. Landtype 63B is similar to Landtype 62B with the exception of soil texture; and it is similar to unit 63A with the exception of slope range and position in the landscape.

Landtype 63B has moderately deep, brown to yellowish brown loamy residual soils with ponderosa pine timber types. Surface soil layers are very thin to thin and moderately coarse textured. Subsoil layers are thin to moderately thick and moderately coarse textured.

Bedrock is soft to moderately hard and massive, brown or yellowish brown tuff or breccia. Depth to bedrock ranges from 22 to 40 inches. Bedrock weathers rapidly when exposed.

Typically, Landtype 63A occurs on dissected topography on moderately steep ridges and sideslopes at lower elevations. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 4,800 to 6,400 feet and supports ponderosa pine, big sage, Idaho fescue, mules ear, lupine, Ross sedge, bottlebrush squirreltail, and some juniper, mountain mahogany, and bitterbrush.

The soil is well drained. Permeability is rapid in the surface soils and rapid in the subsoils.

Range of Profile Characteristics of Soil 63B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Dark brown or very dark grayish brown loam; weak, medium granular structure; 0 to 5 percent gravel by volume; soft; slightly plastic; pH ranges from 6.5 to 7.2; 5 to 12 inches thick.
Subsoil layers:	Dark brown or brown sandy loam; weak, fine subangular blocky structure; 0 to 50 percent gravels and cobbles by volume; soft to slightly hard; slightly plastic; pH ranges from 6.5 to 7.5; 15 to 30 inches thick.

MAPPING UNIT 64

Mapping Unit 64 consists dominantly of Landtype 64 and minor amounts of Landtypes 30A, 35, 56A, and 63A. Landtype 64 is similar to Landtype 63A with the exception of soil parent material and plant community type.

Landtype 64 has moderately deep to deep, brown and yellowish brown gravelly residual soils with ponderosa pine-bitterbrush vegetation. Surface soils are very thin to thin and moderately coarse or medium textured. Subsoil layers are moderately thick to thick and moderately fine to moderately coarse textured.

Bedrock is soft and massive rhyolitic ash-flow tuff, ashy diatomite, and lacustrine tuffaceous siltstone and sandstone. Depth to bedrock ranges from 25 to 45 inches.

Typically, Landtype 64 occurs on gently rolling tablelands at lower elevations along the forest fringe. Slopes are less than 15 percent.

This landtype ranges in elevation from 4,600 to 5,600 feet and supports ponderosa pine, bitterbrush, Idaho fescue, Ross sedge, bottlebrush squirreltail, squawcarpet, and some manzanita and mountain mahogany.

The soil is well drained. Permeability is rapid or moderate in the surface soils and slow or moderate in the subsoils.

Range of Profile Characteristics of Soil 64

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 2 inches thick.
Surface layers:	Very dark grayish brown or dark brown sandy loam or loam; weak, fine granular structure; 2 to 25 percent subround and angular gravel by volume; soft, slightly plastic; pH ranges from 6.0 to 7.0; 4 to 7 inches thick.
Subsoil layers:	Dark yellowish brown, dark brown, or dark reddish brown gravelly clay loam, loam, or sandy loam; weak to moderate, medium granular and weak to moderate, fine subangular blocky structure; 3 to 60 percent gravels and cobbles by volume; slightly hard; slightly plastic; pH ranges from 6.4 to 7.2, 25 to 40 inches thick.

MAPPING UNIT 66

Mapping Unit 66 consists dominantly of Landtype 66 and minor amounts of Landtypes 41A, 42, and 68A. Landtype 66 is similar to Landtype 42 with the exception of soil texture. It is similar to unit 68A with the exception of soil depth, texture, and position in the landscape.

Landtype 66 has deep to very deep, brown and gravelly colluvial soils derived from tuffs and breccias. Surface soil layers are thin and moderately coarse or medium textured. Subsoil layers are thick to very thick and moderately fine to moderately coarse textured. A hard fragipan usually occurs at a depth of 25 to 35 inches.

Bedrock is soft to moderately hard and massive to highly fractured tuff and breccia. Depth to bedrock is over 50 inches.

Typically, Landtype 66 occurs on benches, toeslopes, footslopes, and along drainages where soil material has accumulated by downslope movement. Slopes range up to 30 percent.

This landtype ranges in elevation from 4,900 to 7,000 feet and supports mixed conifers, Ross sedge, Oregon grape, squawcarpet, and mules ear.

The soil is moderately well drained. Permeability is rapid in the surface soils and moderate to slow in the subsoils.

Range of Profile Characteristics of Soil 66

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Dark brown loam or sandy loam; weak, medium granular structure; 10 to 30 percent gravels and cobbles by volume; soft; slightly plastic; pH ranges from 6.3 to 7.2; 7 to 14 inches thick.
Subsoil layers:	Dark brown or dark yellowish brown gravelly clay loam, loam, or sandy loam; moderate, medium subangular blocky structure; 30 to 60 percent gravels and cobbles by volume; slightly hard; slightly plastic; hardpan is weakly cemented, very hard, and has moderate and very coarse platy structure; pH ranges from 6.2 to 7.2; over 40 inches thick.

MAPPING UNIT 67A

Mapping Unit 67A consists dominantly of Landtype 67A and minor amounts of Landtypes 62A, 67B, 68A, and 70. Landtype 67A is similar to Landtype 62A with exception of plant community type and position in the landscape. It is similar to unit 67B except for slope range and landscape characteristics.

Landtype 67A has moderately deep to deep, plastic residual soils weathered from tuffs with mixed conifer vegetation. Surface soils are thin and medium or moderately fine textured. Subsoils are thin to moderately thick and moderately fine or fine textured.

Bedrock is soft and massive, yellow, brown, gray, and reddish-brown tuff, breccia, and tuffaceous sedimentary rock. The lower subsoil usually blends into highly weathered bedrock at a depth of 20 to 50 inches.

Typically, Landtype 67A occurs on gently sloping ridges and sideslopes at higher elevations above ponderosa pine timber types. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,300 to 7,000 feet and supports mixed conifers, Ross sedge, waxcurrant, squawcarpet, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate to slow in the surface soils and moderate to very slow in the subsoils.

Range of Profile Characteristics of Soil 67A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark gray, grayish brown, or dark brown silt loam, clay loam, or silty clay loam; weak or moderate; fine subangular blocky structure; 0 to 5 percent gravel by volume; soft to slightly hard; slightly plastic to plastic; pH ranges from 5.7 to 6.7; 10 to 14 inches thick.
Subsoil layers:	Light yellowish brown, brown, olive, or reddish brown clay loam, silty clay loam, or silty clay; weak or moderate and medium to coarse subangular blocky structure; 0 to 10 percent gravel by volume; hard to very hard; plastic to very plastic; pH ranges from 5.5 to 7.0; 10 to 40 inches thick.

MAPPING UNIT 67B

Mapping Unit 67B consists dominantly of Landtype 67B and minor amounts of Landtypes 66, 67A, 67C, 68B, and 70. Landtype 67B is similar to Landtype 67C with the exception of slope range, and it is similar to unit 68B with the exception of soil texture.

Landtype 67B has moderately deep to deep, clayey residual and colluvial soils derived from tuffs with mixed conifer timber types. Surface soils are thin and medium or moderately fine textured. Subsoils are thin to moderately thick and fine or moderately fine textured.

Bedrock is massive and soft, brown, yellow, gray, and reddish brown tuff, breccia, and tuffaceous sedimentary rock. Bedrock is highly weathered and blends into the lower subsoil at a depth from 20 to 50 inches.

Typically, Landtype 67B occurs on dissected topography on moderately steep ridges and sideslopes at higher elevations. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 5,400 to 7,000 feet and supports mixed conifers, waxcurrant, squawcarpet, Ross sedge, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate or slow in the surface soils and moderate to very slow in the subsoils.

Range of Profile Characteristics of Soil 67B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark gray, grayish brown, or dark brown silt loam, clay loam, or silty clay loam; weak or moderate, fine subangular blocky structure; 0 to 5 percent gravel by volume; soft to slightly hard; slightly plastic to plastic; pH ranges from 5.7 to 6.7; 10 to 14 inches thick.
Subsoil layers:	Brown, light yellowish brown, reddish brown, or olive clay loam, silty clay loam, silty clay, or clay; weak or moderate and medium to coarse subangular blocky structure; 0 to 10 percent gravel by volume; hard to very hard; plastic to very plastic; pH ranges from 5.5 to 7.0; 10 to 40 inches thick.

MAPPING UNIT 67C

Mapping Unit 67C consists dominantly of Landtype 67C and minor amounts of Landtypes 66, 67B, 68C, and 70. Landtype 67C is similar to Landtype 67B with the exception of slope range. It is similar to unit 68C with the exception of soil texture.

Landtype 67C has moderately deep to deep, clayey residual and colluvial soils weathered from tuffs with mixed coniferous timber types. Surface soil layers are thin and medium or moderately fine textured. Subsoil layers are thin to moderately thick and fine or moderately fine textured.

Bedrock is soft and massive, brown, yellow, gray, and reddish brown tuff, breccia, and tuffaceous sedimentary rock. The bedrock typically is highly weathered and blends into the lower subsoil. Depth to bedrock ranges from 20 to 50 inches.

Typically, Landtype 67C occurs on highly dissected topography on steeply sloping ridges and sideslopes at higher elevations. Slopes are greater than 40 percent.

This landtype ranges in elevation from 5,400 to 7,000 feet and supports mixed conifers, squawcarpet, waxcurrant, Ross sedge, and bottlebrush squirreltail.

The soil is well drained. Permeability is moderate or slow in the surface soils and moderate to very slow in the subsoils.

Range of Profile Characteristics of Soil 67C

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2.0 inches thick.

Surface layers: Very dark gray, grayish brown, or dark brown silt loam, clay loam, or silty clay loam; weak or moderate, fine subangular blocky structure; 0 to 5 percent gravel by volume; soft to slightly hard; slightly plastic to plastic; pH ranges from 5.6 to 6.7; 10 to 14 inches thick.

Subsoil layers: Brown, light yellowish brown, reddish brown, or olive clay loam, silty clay loam, silty clay, or clay; weak or moderate and medium to coarse subangular blocky structure; 0 to 10 percent gravel by volume; hard to very hard; plastic to very plastic; pH ranges from 5.5 to 7.0; 10 to 40 inches thick.

MAPPING UNIT 68A

Mapping Unit 68A consists dominantly of Landtype 68A and minor amounts of Landtypes 63A, 67A, and 68B. Landtype 68A is similar to Landtype 63A with the exception of plant community type and position in the landscape. It is similar to unit 67A with the exception of soil texture. Unit 68B occurs on steeper slopes.

Landtype 68A has moderately deep to deep, brown or yellowish brown loamy residual soils with mixed coniferous timber types. Surface soils are thin to moderately thick and moderately coarse or coarse textured. Subsoils are thin to moderately thick and coarse or moderately coarse textured.

Bedrock is soft or moderately hard and massive, yellow, brown, green, and pink ash-flow tuff and breccia. Bedrock may be highly fractured near the soil-rock contact. Depth to bedrock ranges from 22 to 50 inches.

Typically, Landtype 68A occurs on cool, moist sites on gentle slopes at higher elevations. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,300 to 7,000 feet and supports mixed conifers, Ross sedge, squawcarpet, waxcurrant, yarrow, mules ear, and occasionally manzanita and snowbrush.

The soil is well drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 68A

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark grayish brown or dark brown sandy loam or loamy sand; weak, medium granular and weak, fine subangular blocky structure; 0 to 5 percent gravels and cobbles by volume; soft; slightly plastic or nonplastic; pH ranges from 5.8 to 7.0; 6 to 20 inches thick.

Subsoil layers: Brown, dark grayish brown, or yellowish brown sandy loam or loamy sand; weak, fine subangular blocky structure; 0 to 35 percent gravels and cobbles by volume; soft; nonplastic or slightly plastic; pH ranges from 5.8 to 7.0; 14 to 36 inches thick.

MAPPING UNIT 68B

Mapping Unit 68B consists dominantly of Landtype 68B and minor amounts of Landtypes 63B, 66, 67B, 68A, and 68C. Landtype 68B is similar to Landtype 63B with the exception of vegetative type and position in the landscape. Unit 67B is similar with the exception of soil texture. And it is similar to units 68A and 68C with the exception of slope range and landform.

Landtype 68B has moderately deep to deep, yellowish brown or brown loamy residual and colluvial soils at higher elevations with mixed coniferous timber types. Surface soils are thin to moderately thick and moderately coarse or coarse textured. Subsoils are thin to moderately thick and coarse or moderately coarse textured.

Bedrock is soft or moderately hard and massive, brown, yellow, green, or pink ash-flow tuff and breccia. Upper bedrock layers are often highly fractured. Depth to bedrock ranges from 22 to 50 inches.

Typically, Landtype 68B occurs on dissected topography on cool, moist sites on moderately steep ridges and sideslopes. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 5,300 to 7,000 feet and supports mixed conifers, squawcarpet, Ross sedge, waxcurrant, mules ear, yarrow, and some manzanita and snowbrush.

The soil is well drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 68B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown or dark brown sandy loam or loamy sand; weak, medium granular and weak, fine subangular blocky structure; 0 to 5 percent gravels and cobbles by volume; soft; slightly plastic or nonplastic; pH ranges from 5.8 to 7.0; 6 to 20 inches thick.
Subsoil layers:	Brown, dark grayish brown, or yellowish brown sandy loam or loamy sand; weak, fine subangular blocky structure; 0 to 35 percent gravels and cobbles by volume; soft, slightly plastic or nonplastic; pH ranges from 5.8 to 7.0; 14 to 36 inches thick.

MAPPING UNIT 68C

Mapping Unit 68C consists dominantly of Landtype 68C and minor amounts of Landtypes 66, 67C, and 68B. Landtype 68C is similar to Landtype 67C with the exception of soil texture, and it is similar to unit 68B with the exception of slope range.

Landtype 68C has moderately deep to deep, brown or yellowish brown loamy residual and colluvial soils on steep slopes with mixed conifer timber types. Surface soils are thin to moderately thick and moderately coarse or coarse textured. Subsoils are thin to moderately thick and coarse or moderately coarse textured.

Bedrock is soft or moderately hard and massive, brown, yellow, green or pink ash-flow tuff and breccia. Bedrock layers near the soil contact may be highly fractured. Depth to bedrock ranges from 22 to 50 inches.

Typically, Landtype 68C occurs on highly dissected topography on steeply sloping ridges and sideslopes on higher elevations. Slopes are greater than 40 percent.

This landtype ranges in elevation from 5,300 to 7,000 feet and supports mixed conifers, squawcarpet, Ross sedge, waxcurrant, mules ear, yarrow and occasionally manzanita and snowbrush.

The soil is well drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 68C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2.0 inches thick.
Surface layers:	Very dark grayish brown or dark brown sandy loam or loamy sand; weak, medium granular and weak, fine subangular blocky structure; 0 to 5 percent gravels and cobbles by volume; soft; slightly plastic or nonplastic; pH ranges from 5.8 to 7.0; 6 to 20 inches thick.
Subsoil layers:	Brown, dark grayish brown, or yellowish brown sandy loam or loamy sand; weak, fine subangular blocky structure; 0 to 35 percent gravels and cobbles by volume, soft; slightly plastic or nonplastic; pH ranges from 5.8 to 7.0; 14 to 36 inches thick.

MAPPING UNIT 70

Mapping Unit 70 consists dominantly of Landtype 70 and minor amounts of Landtypes 16, 25, 67A, and 68A. Landtype 70 is similar to Landtype 16 with the exception of internal drainage and position in the landscape. Unit 25 is similar except for internal drainage and soil texture.

Landtype 70 has deep to very deep, dark colluvial and alluvial soils, derived from tuffs and breccias, with poor drainage. Surface soil layers are very thin to thin and medium textured. Subsoils are thick to very thick and medium to fine textured.

Bedrock is soft and massive, brown and yellow ash-flow tuff, tuffaceous sedimentary rock, and breccia. Depth to bedrock is over 50 inches.

Typically, Landtype 70 occurs on benches and footslopes and also in depressions and drainages where soil material has accumulated by downslope movement. Slopes are less than 5 percent.

This landtype ranges in elevation from 5,200 to 7,000 feet and supports willow, alder, false helibore, aspen, wet meadow sedges, and rushes.

The soil is somewhat poorly to poorly drained. Permeability is slow in the surface soils and very slow in the subsoils.

Range of Profile Characteristics of Soil 70

- Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
- Surface layers: Black, very dark gray, or very dark grayish brown loam or silt loam; weak, fine granular structure; 0 to 10 percent gravel by volume; friable; slightly plastic; pH is estimated to range from 5.5 to 7.0; 4 to 8 inches thick.
- Subsoil layers: Black to dark grayish brown silt loam, silty clay loam, or silty clay; weak, medium granular and moderate, medium and coarse blocky and subangular blocky structure; 0 to 10 percent gravel by volume; friable to firm; slightly plastic to very plastic; pH estimated to range from 5.7 to 7.0; over 45 inches thick.



MAPPING UNIT 74A

Mapping Unit 74A consists dominantly of Landtype 74A and minor amounts of Landtypes 41A, 68A, 74B, and 76A. Landtype 74A is similar to Landtype 41A with the exception of type of bedrock and landform. Unit 74B is similar with the exception of slope range, and unit 76A differs by vegetative type.

Landtype 74A has moderately deep, brown and dark brown gravelly to very cobbly residual soils with mixed conifer timber types. Surface soils are thin and moderately coarse or coarse textured. Subsoils are moderately thick, gravelly or cobbly, and coarse or moderately coarse textured.

Bedrock is highly fractured and moderately hard, light gray rhyolitic breccia. Tuff, welded tuff, and andesite occur locally. Depth to bedrock ranges from 25 to 40 inches.

Typically, Landtype 74A occurs on gently sloping ridges and sideslopes associated with highly dissected topography. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,400 to 7,000 feet and supports mixed conifers, Ross sedge, bottlebrush squirreltail, bluegrass, yarrow, lupine, squawcarpet, big sagebrush, snowbrush, manzanita, and waxcurrant.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 74A

- Litter: Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
- Surface layers: Very dark grayish brown, very dark gray, or dark brown loamy sand or sandy loam; single grain or very weak, medium granular structure; 10 to 40 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 5.7 to 7.5; 6 to 12 inches thick.
- Subsoil layers: Dark brown, brown, or yellowish brown gravelly to very cobbly loamy sand or sandy loam; single grain or very weak, fine subangular blocky structure; 40 to 80 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.4 to 7.4; 18 to 32 inches thick.

MAPPING UNIT 74B

Mapping Unit 74B consists dominantly of Landtype 74B and minor amounts of Landtypes 41B, 42, 68B, 74A, and 76B. Landtype 74B is similar to Landtype 41B with the exception of landform and kind of bedrock. Landtype 74B is similar to unit 74A with the exception of slope range. It is similar to unit 76B with the exception of vegetative type.

Landtype 74B has moderately deep, brown and dark brown gravelly to very cobbly residual and colluvial soils with mixed coniferous timber types. Surface soil layers are thin and moderately coarse or coarse textured. Subsoils are moderately thick, gravelly or cobbly, and coarse or moderately coarse textured.

Bedrock is moderately hard and highly fractured light gray rhyolitic breccia with tuff, welded tuff, and andesite in some areas. Depth to bedrock ranges from 25 to 40 inches.

Typically, Landtype 74B occurs on moderately steep ridges and sideslopes within highly dissected topography. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 5,400 to 7,000 feet and supports mixed conifers, snowbrush, manzanita, Ross sedge, bottlebrush squirreltail, lupine, squawcarpet, and waxcurrant.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 74B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface layers:	Very dark gray, very dark grayish brown, or dark brown loamy sand or sandy loam; single grain or very weak, medium granular structure; 10 to 40 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 5.7 to 7.5; 6 to 12 inches thick.
Subsoil layers:	Dark brown, brown, or yellowish brown gravelly to very cobbly loamy sand or sandy loam; single grain or very weak, fine subangular blocky structure; 40 to 80 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.4 to 7.4; 18 to 32 inches thick.

MAPPING UNIT 74C

Mapping Unit 74C consists dominantly of Landtype 74C and minor amounts of Landtypes 41C, 42, 68C, and 74B. Landtype 74C is similar to Landtype 41C with the exception of bedrock type and landform. Unit 74C is similar to 68C with the exception of soil texture, gravel content, and bedrock. And it is similar to unit 74B with the exception of slope range.

Landtype 74C has moderately deep, brown and dark brown gravelly to very cobbly residual and colluvial soils with mixed conifer timber types. Surface soil layers are thin and moderately coarse or coarse textured. Subsoil layers are moderately thick, gravelly or cobbly, and coarse or moderately coarse textured.

Bedrock is moderately hard and highly fractured light gray rhyolitic breccia. Tuff, welded tuff, and andesite occur locally. Depth to bedrock ranges from 25 to 40 inches.

Typically, Landtype 74C occurs on highly dissected topography on steeply sloping ridges and sideslopes. Slopes are over 40 percent.

This landtype ranges in elevation from 5,400 to 7,000 feet and supports mixed conifers, snowbrush, manzanita, squawcarpet, Ross sedge, bottlebrush squirreltail, and lupine.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 74C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
Surface layers:	Very dark gray, very dark grayish brown, or dark brown loamy sand or sandy loam; single grain or very weak, medium granular structure; 10 to 40 percent angular and subround gravels and cobbles by volume; loose; nonplastic; pH ranges from 5.7 to 7.6; 6 to 12 inches thick.
Subsoil layers:	Dark brown, brown, or yellowish brown gravelly to very cobbly loamy sand or sandy loam; single grain or very weak, fine subangular blocky structure; 40 to 80 percent angular gravels and cobbles by volume; loose; nonplastic; pH ranges from 6.4 to 7.4; 18 to 32 inches thick.

MAPPING UNIT 76A

Mapping Unit 76A consists dominantly of Landtype 76A and minor amounts of Landtypes 40A, 63A, 74A, and 76B. Landtype 76A is similar to Landtype 40A with the exception of landform and type of bedrock. Landtype 76A differs from unit 74A in vegetative type, and unit 76B is similar except for slope range.

Landtype 76A has moderately deep, brown or dark brown gravelly to very cobbly residual soils with ponderosa pine timber types. Surface soil layers are thin and moderately coarse or coarse textured. Subsoil layers are moderately thick, gravelly and cobbly, and coarse or moderately coarse textured.

Bedrock is highly fractured and moderately hard light gray rhyolitic breccia. Soft tuff, welded tuff, and andesite occur locally. Depth to bedrock ranges from 24 to 40 inches.

Typically, Landtype 76A occurs on gently sloping ridges and sideslopes within highly dissected topography. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,000 to 6,500 feet and supports ponderosa pine, Ross sedge, bottlebrush squirreltail, bluegrass, yarrow, and big sage.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid to very rapid in the subsoils.

Range of Profile Characteristics of Soil 76A

- Litter: Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
- Surface layers: Very dark gray or very dark grayish brown sandy loam or loamy sand; very weak, medium granular structure or single grain; 10 to 30 percent angular and flat gravels and cobbles by volume; loose; nonplastic to slightly plastic; pH ranges from 6.0 to 7.5; 6 to 15 inches thick.
- Subsoil layers: Brown or dark brown gravelly to very cobbly loamy sand or sandy loam; weak, fine subangular blocky structure or single grain; 40 to 70 percent flat and angular gravels and cobbles by volume; loose or soft; nonplastic; pH ranges from 6.4 to 7.6; 18 to 30 inches thick.

MAPPING UNIT 76B

Mapping Unit 76B consists dominantly of Landtype 76B and minor amounts of Landtypes 40B, 42, 63B, 74B, and 76A. Landtype 76B is similar to Landtype 40B with the exception of landform and bedrock type. Landtype 76B differs from unit 74B by vegetative type, and unit 76A is similar except for slope range.

Landtype 76B has moderately deep, brown or dark brown gravelly to very cobbly residual soils with ponderosa pine timber types. Surface soils are thin and moderately coarse or coarse textured. Subsoil layers are moderately thick, gravelly and cobbly, and coarse or moderately coarse textured.

Bedrock is moderately hard and highly fractured light gray rhyolitic breccia with tuff, welded tuff, and andesite occurring locally. Depth to bedrock ranges from 24 to 40 inches.

Typically, Landtype 76B occurs on moderately steep ridges and sideslopes on highly dissected topography at low to midrange elevations.

This landtype ranges in elevation from 5,000 to 6,500 feet and supports ponderosa pine, Ross sedge, bottlebrush squirreltail, bluegrass, yarrow, Idaho fescue, and big sage.

The soil is excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoils.

Range of Profile Characteristics of Soil 76B

- Litter: Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.
- Surface layers: Very dark gray or very dark grayish brown sandy loam or loamy sand; very weak, medium granular structure or single grain; 10 to 30 percent angular and flat gravels and cobbles by volume; loose; nonplastic to slightly plastic; pH ranges from 6.0 to 7.5; 6 to 12 inches thick.
- Subsoil layers: Brown or dark brown gravelly to very cobbly loamy sand or sandy loam; weak, fine subangular blocky structure or single grain; 40 to 70 percent flat and angular gravels and cobbles by volume; loose or soft; nonplastic; pH ranges from 6.4 to 7.6; 18 to 30 inches thick.

(77-80) Shallow to Moderately Deep Pumiceous Soils Over Buried
Residual and Colluvial Soils Derived from Rhyolite

MAPPING UNIT 77A

Mapping Unit 77A consists dominantly of Landtype 77A and minor amounts of Landtypes 40A, 77B, and 88A. Landtype 77A is similar to Landtype 77B with the exception of landform and timber type. Unit 88A is similar with the exception of bedrock and vegetative type. Landtype 40A contains no pumiceous soil layers.

Landtype 77A has shallow to moderately deep ashy soils over buried residual soils derived from rhyolite. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin and coarse textured. The buried soils are moderately thick to thick, gravelly, and moderately coarse or coarse textured.

Bedrock is mostly moderately hard, competent, and highly fractured light gray rhyolite. Other rocks occurring within the unit are soft tuff, welded tuff, obsidian, breccia, and basalt. Depth to bedrock ranges from 40 to 70 inches.

Typically, Landtype 77A occurs on gently sloping narrow ridges or side-slopes associated with dissected rhyolitic eruptive centers. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 4,800 to 6,200 feet and supports ponderosa pine, bitterbrush, Ross sedge, Idaho fescue, needlegrass, lupine, bottlebrush squirreltail, snowbrush, and manzanita. Some areas at the higher elevations contain mixed conifers.

The soil is excessively drained. Permeability is rapid to very rapid in the surface soils, subsoils, and buried soils.

Range of Profile Characteristics of Soil 77A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown, dark brown, or brown ashy loamy sand; single grain or weak, medium granular structure; 0 to 25 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 8.0; 6 to 14 inches thick.
Subsoil layers:	Dark brown to yellowish brown ashy sand or loamy sand; single grain, 4 to 30 percent pumice gravel by volume; loose, nonplastic; pH ranges from 6.5 to 7.8; 8 to 14 inches thick.
Buried Soil:	Dark yellowish brown, brown, or grayish brown very gravelly loamy sand or sandy loam; weak, fine sub-angular blocky structure; 40 to 70 percent angular and subround gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.4 to 7.7; 20 to over 40 inches thick.

MAPPING UNIT 77B

Mapping Unit 77B consists dominantly of Landtype 77B and minor amounts of Landtypes 40B, 77A, 78, and 88B. Landtype 77B is similar to Landtype 40B with the exception of soil type. It is similar to unit 77A with the exception of slope range and timber type. Unit 88B differs in vegetation and bedrock types.

Landtype 77B has shallow to moderately deep ashy soils over buried residual and colluvial soils associated with rhyolitic eruptive centers. Surface soils are very thin to thin and coarse textured. Subsoil layers are thin and coarse textured. Buried soil layers are moderately thick to thick, gravelly, and moderately coarse or coarse textured.

Bedrock consists mostly of moderately hard and highly fractured light gray rhyolite which may be foliated. Basalt, breccia, tuff, welded tuff, and obsidian also occur within the unit. Depth to bedrock ranges from 40 to 70 inches.

Typically, Landtype 77B occurs on moderately steep sideslopes associated with highly dissected rhyolitic eruptive centers. Slopes generally range from 16 to 40 percent but some lands with slopes over 40 percent are included.

This landtype ranges in elevation from 5,000 to 6,400 feet and supports mixed conifers, snowbrush, manzanita, needlegrass, Ross sedge, bracken fern, and lupine.

The soil is excessively drained. Permeability is rapid to very rapid in the surface soils, subsoils, and buried soils.

Range of Profile Characteristics of Soil 77B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown, dark brown, or brown ashy loamy sand to loamy coarse sand; single grain or weak, medium granular structure; 0 to 25 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 8.0; 6 to 14 inches thick.
Subsoil layers:	Dark brown to yellowish brown ashy loamy sand to coarse sand; single grain; 4 to 30 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.8; 8 to 14 inches thick.
Buried Soil:	Dark yellowish brown, brown, or grayish brown very gravelly loamy sand or sandy loam; weak, fine sub-angular blocky structure; 40 to 70 percent angular and subround gravel and cobbles by volume; soft; nonplastic; pH ranges from 6.4 to 7.7; 20 to over 40 inches thick.

MAPPING UNIT 78

Mapping Unit 78 consists dominantly of Landtype 78 and minor amounts of Landtype 77B. Landtype 78 is similar to Landtype 77B with the exception of position in the landscape and slope range.

Landtype 78 has shallow to moderately deep ashy soils on steep, south and west aspects of rhyolitic dome uplifts. Surface and subsoil layers are thin and coarse textured. Buried soil layers are moderately thick, gravelly or cobbly, and coarse or moderately coarse textured. The unit is characterized by having sparse ground cover vegetation, exposed mineral soil, and surface soil raveling.

Bedrock is mostly moderately hard and highly fractured rhyolite which is often foliated. Basalt, breccia tuff, welded tuff, and obsidian also occur within the unit. Depth to bedrock ranges from 40 to 65 inches.

Typically, Landtype 78 occurs on steep south and west aspects of highly dissected rhyolite dome shaped uplifts. Slopes range from 25 to 70 percent.

This landtype ranges in elevation from 5,000 to 6,400 feet and supports ponderosa pine, manzanita, snowbrush, bracken fern, needlegrass, and Ross sedge. Some units also contain scattered sugar pine and white fir.

The soil is excessively drained. Permeability is rapid to very rapid in the surface soils, subsoils, and buried soils.

Range of Profile Characteristics of Soil 78

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Very dark grayish brown, dark brown, or brown ashy loamy sand or loamy coarse sand; weak, medium granular structure; 0 to 15 percent pumice gravel by volume; soft; nonplastic; pH ranges from 6.5 to 7.5; 6 to 12 inches thick.
Subsoil layers:	Yellowish brown or brown ashy loamy sand to coarse sand; single grain; 5 to 30 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 8 to 16 inches thick.
Buried Soil:	Dark brown to yellowish brown very gravelly or cobbly loamy sand or sandy loam; weak, medium granular structure; 40 to 80 percent angular and subround gravels and cobbles by volume; soft; nonplastic; pH ranges from 6.5 to 7.5; 20 to over 35 inches thick.

MAPPING UNIT 79

Mapping Unit 79 consists dominantly of Landtype 79 and minor amounts of Landtypes 80A, 80B, and 88B. Landtype 79 is similar to Landtype 80A and 80B with the exception of position in the landscape and plant community type. Unit 88B is similar except for bedrock and buried soil characteristics.

Landtype 79 has shallow to moderately deep ashy soils over residual and colluvial soils weathered from rhyolite and located at high elevations. Surface soil layers are very thin to thin and coarse textured. Subsoils are thin and coarse textured. The buried soil layers are gravelly or cobbly, moderately thick, and moderately coarse or coarse textured.

Bedrock is highly fractured and moderately hard light gray rhyolite. Tuff, breccia, basalt, and welded tuff also occur within the unit. Depth to bedrock ranges from 35 to 65 inches.

Typically, Landtype 79 occurs on high elevation rhyolitic eruptive centers on slopes from 10 to 40 percent.

This landtype ranges in elevation from 6,000 to 8,000 feet and supports mixed conifers, pinemat, waxcurrant, long-stolon sedge, Ross sedge, strawberry, needlegrass, bottlebrush squirreltail, and lupine.

The soil is excessively to well drained. Permeability is rapid to very rapid in the surface soils, subsoils, and buried soils.

Range of Profile Characteristics of Soil 79

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown, dark brown, or brown ashy loamy sand; single grain or very weak, medium granular structure; 0 to 10 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 2 to 10 inches thick.
Subsoil layers:	Dark yellowish brown or brown ashy loamy sand or sand; single grain; 0 to 20 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 6 to 18 inches thick.
Buried Soil:	Yellowish brown or brown gravelly to very gravelly sandy loam or loamy sand; weak, fine subangular blocky structure; 30 to 70 percent angular and subround coarse fragments by volume; soft; nonplastic; pH ranges from 5.5 to 7.0; 20 to over 35 inches thick.

MAPPING UNIT 80A

Mapping Unit 80A consists dominantly of Landtype 80A and minor amounts of Landtypes 79, 80B, and 89A. Landtype 80A is similar to Landtype 80B with the exception of landforms and slope range. It is similar to unit 89A with the exception of bedrock type and buried soil characteristics.

Landtype 80A has shallow to moderately deep ashy soils on high elevation upland flats with lodgepole timber types. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin and coarse textured. The buried soil is moderately thick to thick, gravelly or cobbly, and moderately coarse or coarse textured.

Bedrock is soft to moderately hard and highly fractured light gray rhyolite. Breccia, tuff, and andesite also occur within the unit. Depth to bedrock ranges from 30 to 70 inches.

Typically, Landtype 80A occurs on high elevation lava tablelands on slopes from 0 to 15 percent.

This landtype ranges in elevation from 6,000 to 7,500 feet and supports lodgepole pine, long-stolon sedge, Ross sedge, lupine, waxcurrant, pinemat, bluegrass, and bottlebrush squirreltail.

The soil is well to excessively drained. Permeability is very rapid in the surface soils and rapid or very rapid in the subsoil and buried soil.

Range of Profile Characteristics of Soil 80A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 1 inch thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; weak, medium granular structure; 0 to 20 percent gravel by volume; soft; nonplastic; pH ranges from 6.0 to 7.0; 3 to 10 inches thick.
Subsoil layers:	Dark brown or dark yellowish brown ashy loamy sand or sand; very weak, fine subangular blocky structure or single grain; 0 to 25 percent gravel by volume; soft to loose; nonplastic; pH ranges from 6.5 to 7.5; 6 to 18 inches thick.
Buried Soil:	Dark yellowish brown, yellowish brown, or brown gravelly or cobbly sandy loam or loamy sand; weak, medium granular or weak, fine subangular blocky structure; 30 to 70 percent angular and subround gravel and cobbles by volume; soft; nonplastic; pH ranges from 6.0 to 7.0; 20 to over 40 inches thick.

MAPPING UNIT 80B

Mapping Unit 80B consists dominantly of Landtype 80B and minor amounts of Landtypes 79, 80A, and 89B. Landtype 80B is similar to Landtype 80A with the exception of position in the landscape and slope range. It is similar to unit 89B with the exception of kind of bedrock and buried soil characteristics.

Landtype 80B has shallow to moderately deep ashy soils over buried residual and colluvial soils weathered from rhyolite at high elevations. Surface soils are very thin to thin and coarse textured. Subsoils are thin and coarse textured. Buried soils are gravelly or cobbly, moderately thick to thick, and moderately coarse or coarse textured.

Bedrock is light gray rhyolitic lava which is highly fractured and moderately hard. Other rocks occurring within the unit are andesite, tuff, and breccia. Depth to bedrock ranges from 30 to 70 inches.

Typically, Landtype 80B occurs on moderately steep sideslopes which are associated with rhyolitic lava tablelands. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 6,200 to 7,800 feet and supports lodgepole pine, lupine, waxcurrant, Ross sedge, bottlebrush squirreltail, and long-stolon sedge.

The soil is well to excessively drained. Permeability is rapid in the surface soils and rapid or very rapid in the subsoil and buried soil.

Range of Profile Characteristics of Soil 80B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 1 inch thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; weak, medium granular structure; 0 to 20 percent gravel by volume; soft; nonplastic; pH ranges from 6.0 to 7.0; 3 to 10 inches thick.
Subsoil layers:	Dark brown or dark yellowish brown ashy loamy sand or sand; very weak, fine subangular blocky structure or single grain; 0 to 25 percent gravel by volume; soft; nonplastic; pH ranges from 6.5 to 7.5; 6 to 18 inches thick.
Buried Soil:	Dark yellowish brown, yellowish brown, or brown gravelly or cobbly sandy loam or loamy sand; weak, medium granular or weak, fine subangular blocky structure; 30 to 70 percent angular and subround gravel and cobbles by volume; soft; nonplastic; pH ranges from 6.0 to 7.0; 20 to over 40 inches thick.

(81-92) Shallow to Moderately Deep Pumiceous Soils Over
Buried Residual, Colluvial, and Valley Fill Soils Derived
from Basalt, Andesite, and Interbedded Tuffs

MAPPING UNIT 81

Mapping Unit 81 consists dominantly of Landtype 81 and minor amounts of Landtypes 30A and 85. Landtype 81 is similar to Landtype 30A with the exception of soil type.

Landtype 81 has shallow to moderately deep ashy soils overlying buried residual soils located at low elevations along the Forest fringe. Ashy surface soils and subsoils are thin and coarse textured. Buried soils are thin, very stony, and moderately fine or fine textured.

Bedrock is hard to soft and competent basalt lava and interbedded tuff. Basalt ledge outcrops are common throughout the unit. Depth to bedrock ranges from 20 to over 40 inches for most of the unit.

Typically, Landtype 81 occurs on gently rolling plateaus and tablelands adjacent to ponderosa pine associated vegetation. Slopes are less than 15 percent.

This landtype ranges in elevation from 4,500 to 5,800 feet and supports juniper, mountain mahogany, bitterbrush, big sage, Idaho fescue, bottlebrush squirreltail, cheatgrass, Ross sedge, and some ponderosa pine.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and slow in the buried soil.

Range of Profile Characteristics of Soil 81

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; weak, medium granular structure or single grain; 0 to 20 percent coarse fragments by volume; loose or soft; nonplastic; pH ranges from 6.5 to 7.5; 6 to 14 inches thick.
Subsoil layers:	Brown or dark yellowish brown ashy loamy sand; single grain to very weak, medium subangular blocky structure; 0 to 20 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 6 to 12 inches thick.
Buried Soil:	Dark brown or brown very stony clay loam, silty clay loam, or silty clay; moderate, fine subangular blocky structure; 20 to 70 percent subround coarse fragments by volume; very hard; very plastic; pH ranges from 6.0 to 7.2; 8 to 18 inches thick.

MAPPING UNIT 82

Mapping Unit 82 consists dominantly of Landtype 82 and minor amounts of Landtypes 83 and 84. Landtype 82 is similar to Landtype 84 with the exception of position in the landscape and plant community type.

Landtype 82 has shallow to moderately deep ashy soils over buried deep valley fill basalt derived deposits with lodgepole pine timber types. Surface soil and subsoil layers are thin and coarse textured. Buried soil layers are thick to very thick and moderately fine textured.

Bedrock is interbedded, hard to soft tuff and basalt lava flows. Depth to bedrock is over 50 inches.

Typically, Landtype 82 occurs on lower elevations in broad basins. Slopes are less than 10 percent.

This landtype ranges in elevation from 4,500 to 5,500 feet and supports lodgepole pine, bitterbrush, Ross sedge, bottlebrush squirreltail, lupine, and strawberry.

The soil is well to moderately well drained. Permeability is rapid or very rapid in the ashy soils and slow in the buried soil.

Range of Profile Characteristics of Soil 82

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, medium granular structure; 0 to 10 percent pumice gravel by volume; soft or loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 12 inches thick.
Subsoil layers:	Yellowish brown or brown ashy sand to coarse sand; single grain; 2 to 30 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 18 inches thick.
Buried Soil:	Dark brown clay loam; moderate, fine subangular blocky structure; 20 to 40 percent subround gravel and cobbles by volume; friable; plastic; pH ranges from 6.0 to 7.2; over 36 inches thick.

MAPPING UNIT 83

Mapping Unit 83 consists dominantly of Landtype 83 and minor amounts of Landtypes 13, 82, and 84. Landtype 83 is similar to Landtype 82 with the exception of internal soil drainage and vegetation type. Unit 13 occurs within similar positions of the landscape but has different soil characteristics and vegetation.

Landtype 83 has poorly drained shallow to moderately deep ashy soils overlying buried valley fill deposits with dense lodgepole pine. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin to moderately thick and coarse textured. Buried soils are thick to very thick and moderately fine to moderately coarse textured.

Bedrock is hard, gray basalt or interbedded and soft, reddish brown tuff. Depth to bedrock is over 50 inches.

Typically, Landtype 83 occurs on low to medium elevations within broad basins where water accumulates from surrounding uplands. Slopes are less than 5 percent.

This landtype ranges in elevation from 4,500 to 6,200 feet and supports a dense vegetation cover of lodgepole pine, clover, pinemat, spirea, moss, and dwarf huckleberry.

The soil is poorly drained. Permeability is slow in the ashy soils and very slow in the buried soil.

Range of Profile Characteristics of Soil 83

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, fine subangular blocky structure; 0 to 15 percent pumice gravel by volume; soft; nonplastic; pH ranges from 5.3 to 6.5; 2 to 10 inches thick.
Subsoil layers:	Dark yellowish brown, light gray, or pale yellow ashy loamy sand to coarse sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.4; 16 to 34 inches thick.
Buried Soil:	Dark grayish brown, dark brown, or dark yellowish brown clay loam, sandy loam, or silty clay loam; weak, medium subangular blocky structure; 10 to 30 percent subround gravel and cobbles by volume; hard; slightly plastic or plastic; pH ranges from 6.2 to 7.2; over 36 inches thick. (Intermittent hardpan is strongly cemented, very hard, and massive.)

MAPPING UNIT 84

Mapping Unit 84 consists dominantly of Landtype 84 and minor amounts of Landtypes 28, 82, and 85. Landtype 84 is similar to Landtype 82 and 85 with the exception of vegetative type and position in the landscape.

Landtype 84 has shallow to moderately deep ashy soils over buried basalt and tuff derived residual soils with ponderosa pine and lodgepole pine timber types. Surface soils are thin and coarse textured. Subsoil layers are thin to moderately thick and coarse textured. The buried soils are moderately thick, stony, and moderately fine textured.

Bedrock is soft to hard, interbedded reddish brown tuff or gray basalt. Depth to bedrock ranges from 35 to 70 inches.

Typically, Landtype 84 occurs on gently rolling lava plateaus and tablelands at lower elevations. Slopes are less than 10 percent.

This landtype ranges in elevation from 4,500 to 5,800 feet and supports ponderosa pine, lodgepole pine, bitterbrush, Idaho fescue, Ross sedge, lupine, waxcurrant, strawberry, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid to very rapid in the ashy soils and slow in the buried soil.

Range of Profile Characteristics of Soil 84

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, medium granular structure; 0 to 10 percent pumice gravel by volume; soft or loose; nonplastic; pH ranges from 6.0 to 7.2; 6 to 10 inches thick.
Subsoil layers:	Yellowish brown, brown, very pale brown, and yellow ashy loamy sand to coarse sand; single grain or very weak, medium granular structure; 0 to 35 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.5; 12 to 30 inches thick.
Buried Soil:	Dark brown or dark reddish brown stony clay loam; moderate, fine subangular blocky structure; 5 to 50 percent subround coarse fragments by volume; friable; plastic; pH ranges from 6.2 to 7.2; 18 to 34 inches thick.

MAPPING UNIT 85

Mapping Unit 85 consists dominantly of Landtype 85 and minor amounts of Landtypes 84 and 88A. Landtype 85 is similar to Landtype 84 with the exception of position in the landscape and vegetation type. Unit 88A occurs on higher elevations on cool, moist sites and contains mixed conifers.

Landtype 85 has shallow to moderately deep ashy soils overlying buried residual soils weathered from basalt and tuff with ponderosa pine timber types. Surface soil and subsoil layers are thin and coarse textured. Buried soils are moderately thick, stony, and moderately fine textured.

Bedrock is hard, gray basalt and interbedded soft, reddish brown tuff. They are highly fractured to massive and competent. Depth to bedrock ranges from 35 to 65 inches.

Typically, Landtype 85 occurs on gently rolling tablelands and plateaus at low or medium elevations. Slopes are less than 10 percent.

This landtype ranges in elevation from 4,800 to 6,200 feet and supports ponderosa pine, bitterbrush, lupine, Ross sedge, mules ear, waxcurrant, Idaho fescue, and rabbitbrush.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and slow in the buried soils.

Range of Profile Characteristics of Soil 85

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand or loamy coarse sand; weak, medium granular structure; 0 to 15 percent pumice gravel by volume; soft or loose; nonplastic; pH ranges from 6.0 to 7.0; 6 to 12 inches thick.
Subsoil layers:	Yellowish brown or brown ashy loamy sand to coarse sand; single grain or very weak, medium granular structure; 0 to 20 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 8 to 18 inches thick.
Buried Soil:	Reddish brown, dark brown, or yellowish brown stony clay loam; weak, fine subangular blocky structure; 10 to 50 percent subround coarse fragments by volume; friable; plastic; pH ranges from 6.0 to 7.0; 18 to 34 inches thick.

MAPPING UNIT 86

Mapping Unit 86 consists dominantly of Landtype 86 and minor amounts of Landtypes 88A, 89A, and 91. Landtype 86 is similar to Landtype 88A and 89A with the exception of plant community type and associated landforms. Unit 91 is similar with the exception of timber type.

Landtype 86 has shallow to moderately deep ashy soils over buried residual soils with ponderosa pine timber types located at medium to high elevations. Surface and subsoil layers are thin and coarse textured. Buried soils are moderately thick, stony, and moderately fine textured.

Bedrock is interbedded hard, gray basalt or soft, reddish brown tuff. These rocks are competent and highly fractured to massive. Depth to bedrock ranges from 35 to 65 inches.

Typically, Landtype 86 occurs on gently rolling tablelands and plateaus on slopes less than 10 percent.

This landtype ranges in elevation from 5,800 to 7,000 feet and supports ponderosa pine, big sage, Ross sedge, lupine, mules ear, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and slow in the buried soils.

Range of Profile Characteristics of Soil 86

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; weak, medium granular structure; 0 to 15 percent pumice gravel by volume; soft or loose, nonplastic; pH ranges from 6.0 to 7.0; 6 to 10 inches thick.
Subsoil layers:	Yellowish brown or brown ashy loamy sand to coarse sand; single grain or very weak, fine subangular blocky structure; 10 to 30 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 18 inches thick.
Buried Soil:	Dark reddish brown or dark brown stony clay loam or silty clay loam; moderate, fine subangular blocky structure; 20 to 60 percent subround coarse fragments by volume; hard; plastic or very plastic; pH ranges from 6.2 to 7.2; 18 to 36 inches thick.

MAPPING UNIT 87

Mapping Unit 87 consists dominantly of Landtype 87 and minor amounts of Landtypes 84, 85, and 88A. Landtype 87 is similar to Landtype 84 and 85 with the exception of position in the landscape and vegetative type. Unit 88A is similar with the exception of plant community type.

Landtype 87 has shallow to moderately deep ashy soils overlying basalt and tuff derived residual soils located on transition zone locations. Surface and subsoil layers are thin and coarse textured. Buried soils are moderately deep, stony, and moderately fine textured.

Bedrock is interbedded hard, gray basalt or andesite and soft, reddish brown tuff. The lava layers are highly fractured and the tuff layers are massive. Depth to bedrock ranges from 35 to 65 inches.

Typically, Landtype 87 occurs on lower slopes in transition zone locations. The unit generally occurs on south and west aspects on slopes less than 30 percent.

This landtype ranges in elevation from 4,800 to 5,800 feet and supports ponderosa pine, snowbrush, manzanita, Ross sedge, Idaho fescue, bottlebrush squirreltail, and bluegrass.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and slow in the buried soils.

Range of Profile Characteristics of Soil 87

Litter:	Needles, leaves, twigs, and decomposing organic matter; 1 to 3 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand or loamy coarse sand; very weak, medium granular structure; 0 to 15 percent pumice gravel by volume; soft to loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 14 inches thick.
Subsoil layers:	Dark yellowish brown or brown ashy loamy sand to gravelly sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 18 inches thick.
Buried Soil:	Dark brown or dark reddish brown stony clay loam; weak, fine subangular blocky structure; 10 to 50 percent subround coarse fragments by volume; friable; plastic; pH ranges from 6.0 to 7.0; 18 to 34 inches thick.

MAPPING UNIT 88A

Mapping Unit 88A consists dominantly of Landtype 88A and minor amounts of Landtypes 87, 88B, and 89A. Landtype 88A is similar to Landtype 88B with the exception of landforms and slope range. Unit 89A is similar with the exception of timber type.

Landtype 88A has shallow to moderately deep ashy soils over reddish brown residual soils with mixed timber types. Surface and subsurface soil layers are thin and coarse textured. Buried soil layers are stony, thin to moderately thick, and medium or moderately fine textured.

Bedrock is soft to hard, interbedded tuff, basalt, and andesite. They are massive to highly fractured and competent. Depth to bedrock ranges from 28 to 60 inches.

Typically, Landtype 88A occurs on gently rolling plateaus and tablelands on cool, moist sites on slopes from 0 to 15 percent.

This landtype ranges in elevation from 5,400 to 7,400 feet and supports mixed conifers, lupine, big sage, Ross sedge, waxcurrant, spirea, squirrel-tail, long-stolon sedge, and manzanita and snowbrush in some areas.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate or slow in the buried soils.

Range of Profile Characteristics of Soil 88A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick.
Surface layers:	Very dark grayish brown to dark yellowish brown ashy loamy sand; single grain or very weak, medium granular structure; 0 to 20 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 16 inches thick.
Subsoil layers:	Brown or yellowish brown ashy loamy sand or sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 6 to 12 inches.
Buried Soil:	Dark reddish brown, strong brown, or dark brown stony clay loam, silty clay loam, or loam; moderate, fine subangular blocky structure; 20 to 70 percent subround coarse fragments by volume; friable; plastic; pH ranges from 6.0 to 7.0; 14 to 30 inches thick.

MAPPING UNIT 88B

Mapping Unit 88B consists dominantly of Landtype 88B and minor amounts of Landtypes 87, 88A, 88C, 89B, and 90. Landtype 88B is similar to Landtype 88A and 88C with the exception of slope range. It is similar to Unit 89B with the exception of timber type.

Landtype 88B has shallow to moderately deep ashy soils overlying buried residual and colluvial soils with mixed timber types. Surface soils are very thin to thin and coarse textured, and subsoils are thin and coarse textured. Buried soil layers are stony, moderately thick, and medium or moderately fine textured.

Bedrock is hard, gray basalt or andesite or soft, reddish brown interbedded tuff. They are competent and range from highly fractured to massive. Depth to bedrock ranges from 35 to 65 inches.

Typically, Landtype 88B occurs on moderately steep slopes associated with basaltic eruptive centers, block faults, and shield volcanoes on slopes from 16 to 40 percent.

This landtype ranges in elevation from 5,500 to 7,400 feet and supports mixed conifers, lupine, waxcurrant, Ross sedge, strawberry, bottlebrush squirreltail, and long-stolon sedge. Snowbrush and manzanita are common within some units.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate to slow in the buried soils.

Range of Profile Characteristics of Soil 88B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, medium granular structure; 0 to 20 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 3 to 10 inches thick.
Subsoil layers:	Yellowish brown or brown ashy loamy sand or sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 10 to 18 inches thick.
Buried Soil:	Dark brown, brown, or reddish brown stony loam or clay loam; moderate, fine subangular blocky structure; 20 to 70 percent subround coarse fragments by volume; friable; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 18 to 36 inches thick.

MAPPING UNIT 88C

Mapping Unit 88C consists dominantly of Landtype 88C and minor amounts of Landtypes 88B, 89C, and 90. Landtype 88C is similar to Landtype 88B with the exception of slope range. It is similar to unit 89C with the exception of timber type.

Landtype 88C has shallow to moderately deep ashy soils overlying buried residual and colluvial soils with mixed timber types. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin and coarse textured. Buried soils are moderately thick, stony, and medium or moderately fine textured.

Bedrock is interbedded hard, gray basalt or andesite and soft, reddish brown tuff. These rocks range from being massive to highly fractured. Depth to bedrock ranges from 35 to 65 inches.

Typically, Landtype 88C occurs on shield volcanoes, basaltic eruptive centers, and block faults on steep lands which have slopes over 40 percent.

This landtype ranges in elevation from 5,500 to 7,400 feet and supports mixed conifers, wax currant, bottlebrush squirreltail, lupine, long-stolon sedge, strawberry and snowbrush and manzanita in some areas.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate to slow in the buried soil.

Range of Profile Characteristics of Soil 88C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, medium granular structure; 0 to 20 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 3 to 10 inches thick.
Subsoil layers:	Yellowish brown or brown ashy loamy sand or sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 10 to 18 inches thick.
Buried Soil:	Reddish brown, dark brown, or brown stony loam or clay loam; moderate, fine subangular blocky structure; 20 to 70 percent subround coarse fragments by volume; friable; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 18 to 36 inches thick.

MAPPING UNIT 89A

Mapping Unit 89A consists dominantly of Landtype 89A and minor amounts of Landtypes 88A and 89B. Landtype 89A is similar to Landtype 88A with the exception of plant community type, and it is similar to Unit 89B with the exception of slope range.

Landtype 89A has shallow to moderately deep ashy soils overlying buried residual soils at high elevations with lodgepole pine timber types. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin to moderately thick and coarse textured. Buried soils are moderately thick, stony, and medium or moderately fine textured.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt or andesite. They range from massive to highly fractured. Depth to bedrock ranges from 40 to 75 inches.

Typically, Landtype 89A occurs on high elevation gently rolling tablelands, plateaus, or wide basins associated with eruptive centers. Slopes range from 0 to 15 percent.

This landtype ranges in elevation from 5,800 to 7,800 feet and supports lodgepole pine, long-stolon sedge, lupine, Ross sedge, pinemat, bottlebrush squirreltail, and needlegrass.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate to slow in the buried soils.

Range of Profile Characteristics of Soil 89A

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Very dark grayish brown, dark brown, dark yellowish brown, or dark reddish brown, ashy loamy sand; very weak, medium granular structure; 0 to 10 percent coarse fragments by volume; loose; nonplastic; pH ranges from 5.8 to 7.0; 4 to 10 inches thick.
Subsoil layers:	Brownish yellow, very pale brown, dark yellowish brown, or brown ashy loamy sand to coarse sand; single grain or very weak medium granular structure; 10 to 50 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.0 to 7.6; 8 to 32 inches thick.
Buried Soil:	Brown, dark reddish brown, or dark yellowish brown stony loam, clay loam, or silty clay loam; moderate fine subangular blocky structure; 30 to 70 percent angular and subround coarse fragments by volume; friable; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 18 to 36 inches thick.

MAPPING UNIT 89B

Mapping Unit 89B consists dominantly of Landtype 89B and minor amounts of Landtypes 88B, 89A, 89C, 90, and 91. Landtype 89B is similar to Landtype 88B with the exception of plant community type. It is similar to Units 89A and 89C with the exception slope range. Unit 90 occurs in colluvial positions of the landscape.

Landtype 89B has shallow to moderately deep ashy soils overlying buried residual and colluvial soils with lodgepole pine timber types at high elevations. Surface soils are very thin to thin and coarse textured. Subsoils are thin to moderately thick and coarse textured. Buried soils are stony, moderately thick, and moderately fine to moderately coarse textured.

Bedrock consists of hard, gray basalt or andesite or interbedded soft, reddish brown tuff. These rocks are massive to highly fractured and competent. Depth to bedrock ranges from 40 to 75 inches.

Typically, Landtype 89B occurs on moderately steep slopes associated with basaltic eruptive centers, block faults, and shield volcanoes. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 5,800 to 7,800 feet and supports lodgepole pine, long-stolon sedge, lupine, Ross sedge, pinemat, needlegrass, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate to slow in the buried soils.

Range of Profile Characteristics of Soil 89B

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Very dark grayish brown, brown, or yellowish brown ashy loamy sand to coarse sand; single grain; 10 to 40 percent coarse fragments by volume; loose; nonplastic; pH ranges from 5.8 to 7.0; 3 to 8 inches thick.
Subsoil layers:	Yellowish brown, brownish yellow, or very pale brown ashy loamy sand to coarse sand; single grain or very weak, medium granular structure; 20 to 60 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 13 to 30 inches thick.
Buried Soil:	Dark brown, brown, or dark reddish brown stony loam, clay loam, or sandy loam; moderate, fine subangular blocky structure; 30 to 75 percent angular and subround coarse fragments by volume; friable; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 20 to 36 inches thick.

MAPPING UNIT 89C

Mapping Unit 89C consists dominantly of Landtype 89C and minor amounts of Landtypes 88C, 89B, and 90. Landtype 89C is similar to Landtype 88C with the exception of vegetation type, and it is similar to Unit 89B with the exception of slope range. Unit 90 contains a much deeper soil which is located in colluvial positions within the landscape.

Landtype 89C has shallow to moderately deep ashy soils overlying buried residual and colluvial soils located at high elevations with lodgepole pine timber types. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin to moderately thick and coarse textured. Buried soils are stony, moderately thick, and moderately fine to moderately coarse textured.

Bedrock is interbedded soft, reddish brown tuff or hard, gray basalt or andesite. They are massive to highly fractured and competent. Depth to bedrock ranges from 40 to 75 inches.

Typically, Landtype 89C occurs on steep slopes associated with shield volcanoes, block faults, and basaltic eruptive centers. Slopes are greater than 40 percent.

This landtype ranges in elevation from 5,800 to 7,800 feet and supports lodgepole pine, long-stolon sedge, lupine, Ross sedge, pinemat, needlegrass, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate to slow in the buried soils.

Range of Profile Characteristics of Soil 89C

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.
Surface layers:	Very dark grayish brown, brown, or yellowish brown ashy loamy sand to coarse sand; single grain; 10 to 40 percent coarse fragments by volume; loose; nonplastic; pH ranges from 5.8 to 7.0; 3 to 8 inches thick.
Subsoil layers:	Yellowish brown, brownish yellow, or very pale brown ashy loamy sand to coarse sand; single grain or very weak, medium granular structure; 20 to 60 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 13 to 30 inches thick.
Buried Soil:	Dark brown, brown, or dark reddish brown stony loam, clay loam, or sandy loam; moderate, fine subangular blocky structure; 30 to 75 percent angular and subround coarse fragments by volume; friable; slightly plastic to plastic; pH ranges from 6.0 to 7.0; 20 to 36 inches thick.

MAPPING UNIT 90

Mapping Unit 90 consists dominantly of Landtype 90 and minor amounts of Landtypes 7, 13, 25, and 89A. Landtype 90 is similar to Landtype 13 with the exception of vegetation type and soil drainage. Landtype 90 is similar to Unit 89A with the exception of soil depth, drainage, and position in the landscape.

Landtype 90 has shallow to moderately deep ashy soils overlying deep to very deep basalt and tuff derived valley fill deposits. Surface soils are very thin and coarse textured. Subsoils are thin to moderately thick and coarse textured. Buried soils are thick to very thick, gravelly, and moderately fine textured.

Bedrock is mostly interbedded hard, gray basalt or andesite or soft tuff. Breccias and rhyolite also underlie some areas. Depth to bedrock is over 60 inches.

Typically, Landtype 90 occurs on medium to high elevations on footslopes, basins, and valleys where soil material has accumulated by colluvial action. Slopes range up to 20 percent.

This landtype ranges in elevation from 5,600 to 7,600 feet and supports mostly pure lodgepole pine, pinemat, waxcurrent, Ross sedge, bottlebrush squirreltail, lupine, and long-stolon sedge. Some areas with mixed conifers are included.

The soil is moderately well to somewhat poorly drained. Permeability is rapid in the ashy soils and slow or very slow in the buried soils.

Range of Profile Characteristics of Soil 90

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, medium granular structure; 0 to 10 percent pumice gravel by volume; loose to soft; nonplastic; pH ranges from 4.8 to 6.6; 1 to 5 inches thick.
Subsoil layers:	Dark yellowish brown or yellowish brown ashy loamy sand or sand; very weak, medium granular structure or single grain; 0 to 20 percent pumice gravel by volume; loose; nonplastic; pH ranges from 5.5 to 6.5; 12 to 25 inches thick.
Buried Soil:	Dark brown, dark yellowish brown, strong brown, or reddish brown clay loam; moderate, fine subangular blocky structure or massive; 5 to 50 percent angular and subround coarse fragments by volume; friable or firm; plastic; pH ranges from 6.0 to 7.0; over 40 inches thick.

MAPPING UNIT 91

Mapping Unit 91 consists dominantly of Landtype 91 and minor amounts of Landtypes 86 and 89A. Landtype 91 is similar to Landtype 89A with the exception of position in the landscape and vegetative type. Unit 86 is similar with the exception of timber type.

Landtype 91 has shallow to moderately deep ashy soils overlying buried residual soils at higher elevations with mixed ponderosa pine and lodgepole pine timber types. Surface soil layers are very thin to thin and coarse textured. Subsoil layers are thin to moderately thick and coarse textured. The buried soil layers are medium to moderately fine textured, stony, and moderately thick.

Bedrock is hard, gray basalt or andesite or interbedded soft, reddish brown tuff. These rocks are competent and massive to highly fractured. Depth to bedrock ranges from 40 to 75 inches.

Typically, Landtype 91 occurs on gently sloping uplifted tablelands at higher elevations on slopes up to 15 percent. It is associated with unit 89A.

This landtype ranges in elevation from 5,800 to 7,000 feet and supports ponderosa pine, lodgepole pine, lupine, long-stolon sedge, Ross sedge, bottlebrush squirreltail, and needlegrass.

The soil is well drained. Permeability is rapid or very rapid in the ashy soils and moderate to slow in the buried soils.

Range of Profile Characteristics of Soil 91

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.
Surface layers:	Very dark grayish brown or dark brown ashy loamy sand; very weak, medium granular structure; 0 to 10 percent pumice gravel by volume; loose; nonplastic; pH ranges from 5.8 to 7.0; 4 to 10 inches thick.
Subsoil layers:	Yellowish brown, brownish yellow, or very pale brown ashy loamy sand to coarse sand; single grain or very weak, medium granular structure; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.4; 8 to 30 inches thick.
Buried Soil:	Brown, dark yellowish brown, or dark reddish brown stony clay loam, loam, or silty clay loam; moderate fine subangular blocky structure; 30 to 70 percent angular and subround coarse fragments by volume; friable; slightly plastic or plastic; pH ranges from 6.0 to 7.0; 18 to 36 inches thick.

MAPPING UNIT 92

Mapping Unit 92 consists dominantly of Landtype 92 and minor amounts of Landtypes 89A, 89B, 90, and 98. Landtype 92 is similar to Landtype 89B with the exception of plant community type and position in the landscape.

Landtype 92 has shallow to moderately deep ashy soils overlying residual and colluvial soils at high elevations primarily on Yamsay Mountain. Surface soils are very thin to thin and coarse textured. Subsoils are thin and coarse textured. Buried soils are gravelly, moderately coarse to moderately fine textured, and moderately thick to thick.

Bedrock consists of a wide variety of materials. Basalt, andesite, and tuff make up most of the unit with breccias, mudflows, and rhyolite occurring in some areas. They range from massive to highly fractured. Depth to bedrock is over 40 inches.

Typically, Landtype 92 occurs on north aspects at high elevations on cold and moist sites on Yamsay Mountain. Slopes range up to 50 percent.

This landtype ranges in elevation from 6,800 to 8,000 feet and supports mountain hemlock, white bark pine, lodgepole pine, red fir, white fir, western white pine, pinemat, waxcurrant, lupine, Ross sedge, moss, and grouse huckleberry.

The soil is moderately well drained. Permeability is rapid or very rapid in the ashy soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 92

Litter:	Needles, leaves, twigs, and decomposing organic matter; 0.5 to 3 inches thick.
Surface layers:	Very dark grayish brown, dark brown, or yellowish brown ashy loamy sand; very weak, medium granular structure; 0 to 30 percent coarse fragments by volume; loose or soft; nonplastic; pH ranges from 5.6 to 6.8; 3 to 12 inches thick.
Subsoil layers:	Dark yellowish brown, yellowish brown, very pale brown, and yellow ashy loamy sand to gravelly coarse sand; single grain; 10 to 50 percent coarse fragments by volume; loose, nonplastic; pH ranges from 6.0 to 7.0; 6 to 18 inches thick.
Buried Soil:	Dark brown or brown gravelly sandy loam, loam, or clay loam; weak, fine subangular blocky structure; 20 to 70 percent coarse fragments by volume; soft, slightly plastic to plastic; pH ranges from 5.4 to 6.4; over 25 inches thick.

(93-99) Moderately Deep to Deep Pumiceous Soils Over
Buried Residual, Colluvial, and Valley Fill Soils
Derived from Basalt, Andesite, and Interbedded Tuff

MAPPING UNIT 93A

Mapping Unit 93A consists dominantly of Landtype 93A and minor amounts of Landtypes 30A, 81, 93B, 94A, and 99. Landtype 93A is similar to Landtype 99 with the exception of slope range and landforms. It is similar to unit 94A with the exception of plant community type. Unit 99 is similar except for soil characteristics and position in the landscape.

Landtype 93A has moderately deep pumiceous soils overlying dark brown residual soils with ponderosa pine timber types. Surface and subsoil layers are thin and coarse textured. Buried soil layers are gravelly or cobbly, moderately fine textured, and thin to moderately thick.

Bedrock is soft to hard, interbedded basalt, tuff, and andesite. These rocks are competent and massive to highly fractured. Breccias and mudflows also underlie some areas. Depth to bedrock ranges from 32 to 70 inches.

Typically, Landtype 93A occurs on gently rolling lava tablelands and plateaus on slopes from 0 to 15 percent.

This landtype ranges in elevation from 4,600 to 5,600 feet and supports ponderosa pine, bitterbrush, Idaho fescue, Ross sedge, bottlebrush squirreltail, and big sage.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and slow in the buried soil.

Range of Profile Characteristics of Soil 93A

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark grayish brown, dark grayish brown, or dark brown pumiceous loamy sand to loamy coarse sand; single grain or very weak, medium granular structure; 5 to 35 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 6 to 18 inches thick.

Subsoil layers: Light gray, dark brown, pale brown, or brownish yellow pumiceous loamy coarse sand to coarse sand; single grain; 10 to 40 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 10 to 30 inches thick.

Buried Soil: Dark brown or very dark grayish brown gravelly or cobbly clay loam on silty clay loam; moderate, fine subangular blocky structure; 25 to 70 percent coarse fragments by volume; firm; plastic; pH ranges from 6.4 to 7.4; 12 to 34 inches thick.

MAPPING UNIT 93B

Mapping Unit 93B consists dominantly of Landtype 93B and minor amounts of Landtypes 93A, 94B, and 96B. Landtype 93B is similar to Landtype 93A with the exception of slope range and position in the landscape. It is similar to units 94B and 96B except for vegetative type and pumice soil depth.

Landtype 93B has moderately deep pumiceous soils overlying dark brown residual and colluvial soils with ponderosa pine timber types. Surface and subsoil layers are thin and coarse textured. Buried soils are gravelly or cobbly, thin to moderately thick, and moderately fine or medium textured.

Bedrock is soft to hard, interbedded basalt, tuff, and andesite. They are massive to highly fractured and competent. Some units are underlain with breccias and mudflows. Basalt rock outcrops are common along the upslope side of the unit. Depth to bedrock generally ranges from 30 to 60 inches.

Typically, Landtype 93B occurs on moderately steep slopes associated with block faults, eruptive centers, and drainages. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 4,600 to 5,700 feet and supports ponderosa pine, bitterbrush, big sage, Idaho fescue, Ross sedge, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and slow in the buried soil.

Range of Profile Characteristics of Soil 93B

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark grayish brown, dark grayish brown, or dark brown pumiceous loamy sand to loamy coarse sand; single grain or very weak, medium granular structure; 10 to 40 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 6 to 16 inches thick.

Subsoil layers: Brownish yellow, pale brown, light gray, or dark brown pumiceous loamy coarse sand to coarse sand; single grain; 20 to 50 percent coarse fragments by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 8 to 16 inches thick.

Buried Soil: Dark brown or very dark grayish brown gravelly or cobbly clay loam, loam, or silty clay loam; moderate, fine subangular blocky structure; 30 to 70 percent coarse fragments by volume; firm; plastic or slightly plastic; pH ranges from 6.4 to 7.4; 15 to 30 inches thick.

MAPPING UNIT 94A

Mapping Unit 94A consists dominantly of Landtype 94A and minor amounts of Landtypes 93A, 94B, 95, and 96A. Landtype 94A is similar to Landtype 93A with the exception of pumice soil depth. It is similar to units 95 and 96A except for vegetation type and position in the landscape. Unit 94B occurs on steeper slopes.

Landtype 94A has deep pumiceous soils overlying buried residual soils with mixed ponderosa pine and lodgepole pine timber types. Surface soil layers are thin and coarse textured. Subsoil layers are moderately thick to thick, gravelly, and coarse textured. Buried soils are thin to moderately thick, gravelly or cobbly, and moderately coarse to moderately fine textured.

Bedrock is mostly interbedded basalt, tuff, and andesite with some breccias and mudflows. These rocks are competent and massive to highly fractured. Depth to bedrock ranges from 50 to 90 inches.

Typically, Landtype 94A occurs on gently rolling lava tablelands and plateaus on slopes less than 15 percent.

This landtype ranges in elevation from 4,700 to 6,000 feet and supports ponderosa pine, lodgepole pine, bitterbrush, Idaho fescue, Ross sedge, lupine, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 94A

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark gray, very dark grayish brown, dark brown, yellowish brown pumiceous loamy sand; very weak, medium subangular blocky structure; 20 to 50 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 10 to 15 inches thick.

Subsoil layers: Brownish yellow, very pale brown, pale yellow, or yellow pumiceous gravelly sand or coarse sand; single grain; 40 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 10 to 20 inches thick.

Very pale brown, light gray, pale yellow, and black pumiceous coarse sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 7.0 to 8.0; 15 to 25 inches thick.

Buried Soil: Dark brown or dark yellowish brown gravelly or loam, sandy loam, or clay loam; weak, medium subangular blocky structure; 30 to 70 percent coarse fragments by volume; friable; slightly plastic; pH ranges from 6.5 to 7.0; 15 to 30 inches thick.

MAPPING UNIT 94B

Mapping Unit 94B consists dominantly of Landtype 94B and minor amounts of Landtypes 93B, 94A, and 96B. Landtype 94B is similar to Landtypes 93B and 96B with the exception of plant community type and position in the landscape. Unit 94A is similar with the exception of slope range.

Landtype 94B has deep pumiceous soils overlying buried residual and colluvial soils with ponderosa pine and lodgepole pine timber types. Surface soils are thin and coarse textured. Subsoils are moderately thick to thick, coarse textured, and gravelly. Buried soils are thin to moderately thick, gravelly or cobbly, and moderately coarse to moderately fine textured.

Bedrock is interbedded basalt, tuff, and andesite with mudflows and breccias underlying some areas. They range from massive to highly fractured. Depth to bedrock ranges from 50 to 90 inches.

Typically, Landtype 94B occurs on moderately steep slopes associated with drainages, eruptive centers, and block faults. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 4,800 to 6,000 feet and supports ponderosa pine, lodgepole pine, bitterbrush, Idaho fescue, Ross sedge, lupine, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 94B

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark gray, very dark grayish brown, dark brown, or yellowish brown pumiceous loamy sand; very weak, medium subangular blocky structure; 20 to 50 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.2 to 7.2; 8 to 14 inches thick.

Subsoil layers: Brownish yellow, very pale brown, pale yellow, or olive yellow pumiceous gravelly sand or coarse sand; single grain; 40 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 10 to 20 inches thick.

Very pale brown, light gray, pale yellow, and black pumiceous coarse sand; single grain; 10 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 7.0 to 8.0; 15 to 22 inches thick.

Buried Soil: Dark brown or dark yellowish brown gravelly or cobbly loam, sandy loam, or clay loam; weak, medium subangular blocky structure; 30 to 70 percent coarse fragments by volume; friable; slightly plastic; pH ranges from 6.0 to 7.0; 15 to 34 inches thick.

MAPPING UNIT 95

Mapping Unit 95 consists dominantly of Landtype 95 and minor amounts of Landtypes 83, 93A, and 94A. Landtype 95 is similar to Landtype 82 with the exception of pumice soil depth and texture.

Landtype 95 has moderately deep to very deep pumiceous soils overlying buried valley fill materials. Surface soil layers are thin and coarse textured. Subsoil layers are moderately thick to thick, gravelly, and coarse textured. Buried soils are thick or very thick and medium or moderately fine textured.

Bedrock is interbedded hard basalt or soft, reddish brown tuff. Depth to bedrock is over 60 inches.

Typically, Landtype 95 occurs in wide, gently sloping basins or footslopes which have slopes less than 6 percent.

This landtype ranges in elevation from 4,500 to 6,000 feet and supports lodgepole pine, bitterbrush, Idaho fescue, needlegrass, waxcurrant, lupine, Ross sedge, and rabbitbrush.

The soil is well to moderately well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 95

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.25 to 2.0 inches thick.

Surface layers: Very dark gray, very dark grayish brown, or brown pumiceous loamy sand to gravelly loamy coarse sand; single grain or very weak, medium granular and subangular blocky structure; 0 to 30 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 6 to 14 inches thick.

Subsoil layers: Yellow or pale yellow very gravelly pumiceous coarse sand; single grain; 40 to 90 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 6 to 24 inches thick.

White, pale yellow, light gray, and black pumiceous coarse sand; single grain; 0 to 40 percent pumice gravel; loose; nonplastic; pH ranges from 6.2 to 7.5; 10 to 34 inches thick.

Buried Soil: Dark brown or dark yellowish brown clay loam or loam; weak, fine subangular blocky structure; 0 to 10 percent subround gravel by volume; friable; plastic or slightly plastic; pH ranges from 6.0 to 7.0; over 40 inches thick.

MAPPING UNIT 96A

Mapping Unit 96A consists dominantly of Landtype 96A and minor amounts of Landtypes 94A, 96B, and 97A. Landtype 96A is similar to Landtypes 94A and 97A with the exception of position in the landscape and vegetative type. Unit 96B is similar with the exception of landforms and slope range.

Landtype 96A has deep pumiceous soils overlying buried residual soils in transition locations adjacent to mixed conifer units. Surface soil layers are thin and coarse textured. Subsoil layers are moderately thick to thick, gravelly, and coarse textured. Buried soils are gravelly or cobbly, medium or moderately fine textured, and thin to moderately thick.

Bedrock consists mostly of interbedded, hard, gray basalt or andesite or soft reddish brown tuff. They are massive to highly fractured and competent. Some areas are underlain with breccias or mudflows. Depth to bedrock ranges from 60 to 90 inches.

Typically, Landtype 96A occurs on gently rolling lava tablelands and plateaus below mixed conifer units. Slopes range up to 15 percent.

This landtype ranges in elevation from 4,800 to 6,000 feet and supports ponderosa pine, lodgepole pine, snowbrush, manzanita, bitterbrush, Ross sedge, strawberry, and needlegrass.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 96A

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark grayish brown, dark brown, or brown pumiceous loamy sand to gravelly loamy coarse sand; single grain or very weak, medium granular or subangular blocky structure; 10 to 50 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 18 inches thick.

Subsoil Layers: Very pale brown, yellow, or white pumiceous very gravelly coarse sand; single grain; 50 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 9 to 24 inches thick.

White, pale yellow, light gray, and black pumiceous coarse sand; single grain; 0 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.6 to 7.6; 15 to 25 inches thick.

Buried Soil: Dark reddish brown or dark brown gravelly or cobbly clay loam or loam; weak, fine subangular blocky structure; 20 to 70 percent coarse fragments by volume; friable; slightly plastic or plastic; pH ranges from 6.5 to 7.5; 15 to 30 inches thick.

MAPPING UNIT 96B

Mapping Unit 96B consists dominantly of Landtype 96B and minor amounts of Landtypes 94B, 96A, and 97B. Landtype 96B is similar to Landtypes 94B and 97B with the exception of plant community type and position in the landscape. It is similar to unit 96A with the exception of landform and slope range.

Landtype 96B has deep pumiceous soils overlying buried residual and colluvial soils in transition locations in the landscape and adjacent to mixed conifer landtypes. Surface soil layers are very thin or thin and coarse textured. Subsoil layers are moderately thick to thick, gravelly, and coarse textured. Buried soils are gravelly or cobbly, medium or moderately fine textured, and thin to moderately thick.

Bedrock is mostly hard, gray basalt or andesite or interbedded, soft, reddish brown tuff. These rocks are massive to highly fractured and competent. Some units are underlain with mudflows and breccias. Typically the upper edge of this landtype is rimmed with basalt ledge rock outcrops. Depth to bedrock generally ranges from 60 to over 90 inches.

Typically, Landtype 96B occurs on moderately steep slopes associated with block faults, eruptive centers, and drainages. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 4,800 to 6,000 feet and supports ponderosa pine, lodgepole pine, snowbrush, manzanita, bitterbrush, Ross sedge, needlegrass, and strawberry.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 96B

Litter: Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick.

Surface layers: Very dark grayish brown, dark brown, or brown, pumiceous loamy sand to gravelly loamy coarse sand; single grain or very weak, medium granular or subangular blocky structure; 10 to 50 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 4 to 14 inches thick.

Subsoil layers: Very pale brown, yellow, or white pumiceous very coarse sand; single grain; 50 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.5; 9 to 24 inches thick.

White, pale yellow, light gray, and black pumiceous coarse sand; single grain; 0 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.6; 15 to 25 inches thick.

Buried Soil: Dark reddish brown or dark brown gravelly or cobbly clay loam or loam; weak, fine subangular blocky structure; 20 to 70 percent coarse fragments by volume; friable; slightly plastic or plastic; pH ranges from 6.5 to 7.0; 15 to 36 inches thick.

MAPPING UNIT 97A

Mapping Unit 97A consists dominantly of Landtype 97A and minor amounts of Landtypes 96A, 97B, and 98. Landtype 97A is similar to Landtype 96A with the exception of position in the landscape and plant community type. Unit 97B is similar with the exception of landform and slope range.

Landtype 97A has deep to very deep pumiceous soils overlying buried residual soils located on cool, moist sites with mixed conifer timber types. Surface soil layers are thin, gravelly, and coarse textured. Subsoil layers are moderately thick to thick, gravelly, and coarse textured. Buried soils are gravelly to stony, medium or moderately fine textured, and thin to moderately thick.

Bedrock is interbedded hard, gray basalt or andesite or soft, reddish brown tuff. Breccias and mudflows may underlie some units. Depth to bedrock ranges from 60 to 90 inches.

Typically, Landtype 97A occurs on gently sloping lava tablelands, plateaus, and eruptive centers on slopes from 0 to 15 percent.

This landtype ranges in elevation from 5,400 to 6,600 feet and supports mixed conifers, snowbrush, manzanita, Ross sedge, pinemat, waxcurrent, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 97A

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark grayish brown, dark brown, or dark yellowish brown pumiceous loamy coarse sand to gravelly loamy sand; single grain or very weak, medium granular or subangular blocky structure; 10 to 50 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.0 to 7.0; 8 to 14 inches thick.

Subsoil layers: Light gray, yellow, or pale yellow pumiceous very gravelly coarse sand or coarse sand; single grain; 50 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.4; 10 to 25 inches thick.

White, pale yellow, yellow, and black pumiceous coarse sand; single grain; 0 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.6; 15 to 30 inches thick.

Buried Soil: Dark brown gravelly to stony clay loam or loam; moderate, fine subangular blocky structure; 20 to 70 percent subround coarse fragments by volume; friable; slightly plastic or plastic; pH ranges from 6.0 to 7.0; 15 to 30 inches thick.

MAPPING UNIT 97B

Mapping Unit 97B consists dominantly of Landtype 97B and minor amounts of Landtypes 96B, 97A, and 98. Landtype 97B is similar to Landtype 96B with the exception of plant community type and position in the landscape. Unit 97A is similar with the exception of landform and slope range.

Landtype 97B has deep to very deep pumiceous soils overlying buried residual and colluvial soils on cool, moist sites with mixed conifer timber types. Surface soils are thin, gravelly, and coarse textured. Subsoils are moderately thick to thick, gravelly, and coarse textured. Buried soils are gravelly to stony, thin to moderately thick, and moderately fine or medium textured.

Bedrock is interbedded hard, gray basalt or andesite or soft, reddish brown tuff. They are massive to highly fractured and competent. Breccias and mudflows may also underlie some areas. Depth to bedrock ranges from 60 to over 90 inches.

Typically, Landtype 97B occurs on moderately steep slopes associated with eruptive centers, block faults, and drainages. Slopes range from 16 to 40 percent.

This landtype ranges in elevation from 5,400 to 6,600 feet and supports mixed conifers, snowbrush, manzanita, waxcurrant, pinemat, Ross sedge, and bottlebrush squirreltail.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate or slow in the buried soil.

Range of Profile Characteristics of Soil 97B

Litter: Needles, leaves, twigs, and decomposing organic matter; 0.5 to 2 inches thick.

Surface layers: Very dark grayish brown, dark brown, or dark yellowish brown pumiceous loamy coarse sand to gravelly loamy sand; single grain or very weak, medium granular or subangular blocky structure; 10 to 50 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.0; 8 to 14 inches thick.

Subsoil layers: Light gray, yellow, or pale yellow pumiceous very gravelly coarse sand or coarse sand; single grain; 0 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.4; 10 to 25 inches thick.

White, pale yellow, yellow, and black pumiceous coarse sand; single grain; 0 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.4 to 7.0; 15 to 30 inches thick.

Buried Soil: Dark brown gravelly to stony clay loam or loam; moderate fine subangular blocky structure; 20 to 70 percent subround coarse fragments by volume; friable; slightly plastic or plastic; pH ranges from 6.0 to 7.0; 15 to 30 inches thick.

MAPPING UNIT 98

Mapping Unit 98 consists dominantly of Landtype 98 and minor amounts of Landtypes 89A, 92, and 97A. Landtype 98 is similar to Landtype 89A with the exception of soil productivity, plant community type, and average pumice soil depth and characteristics.

Landtype 98 has shallow to deep pumiceous soils overlying buried residual soils located on high elevation upland flats. The unit is characterized by having very little ground cover vegetation, exposed mineral soil, and stunted, noncommercial lodgepole pine. Generally, the areas with the more shallow pumice units are located on Yamsay Mountain whereas the deeper units occur in the Timothy Butte-Wickiup Springs area. Surface soils are very thin or thin and coarse textured. Subsoils are gravelly, thin to thick and coarse textured. Buried soils are gravelly or cobbly, moderately coarse to moderately fine textured, and moderately thick.

Bedrock is mostly interbedded hard, gray basalt or andesite and reddish brown, soft tuff. Rhyolite and breccias also underlie some areas. Depth to bedrock ranges from 30 to over 80 inches.

Typically, Landtype 98 occurs on high elevation upland flats, plateaus, and tablelands on slopes up to 25 percent.

This landtype ranges in elevation from 5,900 to 7,800 feet and supports lodgepole pine with generally very little ground cover vegetation of any type. Some areas contain scattered manzanita, pinemat, and lupine.

The soil is well drained. Permeability is rapid or very rapid in the pumiceous soils and moderate to slow in the buried soil.

Range of Profile Characteristics of Soil 98

Litter: Needles, leaves, twigs, and decomposing organic matter; 0 to 1 inch thick.

Surface layers: Very dark grayish brown, dark brown, or dark yellowish brown pumiceous loamy sand or gravelly loamy sand; very weak, medium granular or subangular blocky structure; 0 to 40 percent pumice gravel by volume; loose; nonplastic; pH ranges from 5.8 to 6.8; 4 to 7 inches thick.

Subsoil layers: Yellowish brown, very pale brown, brownish yellow, or yellow pumiceous very gravelly coarse sand; single grain; 40 to 80 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 8 to 24 inches thick.

Light gray, yellow, pale yellow, and black pumiceous coarse sand; single grain; 0 to 30 percent pumice gravel by volume; loose; nonplastic; pH ranges from 6.5 to 7.5; 15 to 25 inches thick. (This horizon does not occur in the Yamsay Mt. area.)

Buried Soil: Dark brown or brown gravelly or cobbly sandy loam, loam, or clay loam; weak, fine subangular blocky structure; 20 to 60 percent coarse fragments by volume; friable; slightly plastic or plastic; pH ranges from 6.0 to 7.0; 15 to 30 inches thick.

Mapping Unit 99 consists dominantly of Landtype 99 and minor amounts of Landtypes 93A. Landtype 99 is similar to Landtype 93A with the exception of position in the landscape and pumice soil characteristics.

Landtype 99 has deep to very deep ashy soils overlying basalt and tuff derived valley fill materials with ponderosa pine timber types. Surface soil layers are thin to very thin and coarse textured. Subsoil layers are thick, coarse textured, and contain a hardpan in the lower part. Buried soil layers are thick to very thick and medium or moderately fine textured.

Bedrock is interbedded, soft tuff or hard gray basalt or andesite. They range from massive to highly fractured. Depth to bedrock is over 60 inches.

Typically, Landtype 99 occurs on wide, gently sloping basins at lower elevations. Slopes are less than 8 percent.

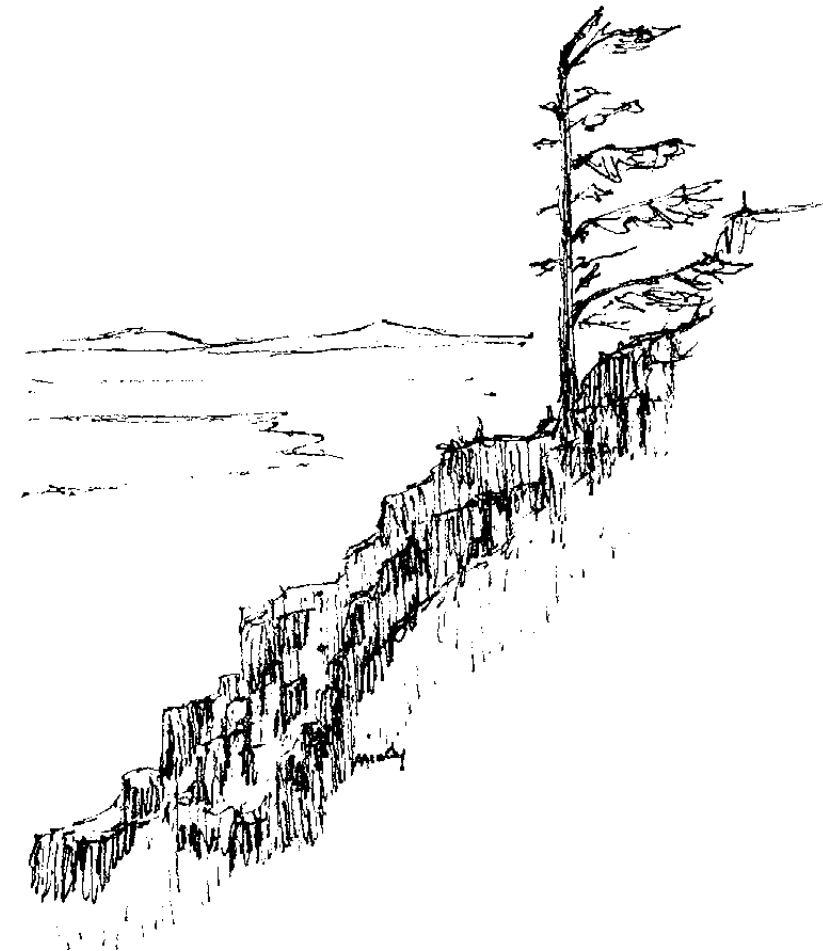
This landtype ranges in elevation from 4,800 to 5,200 feet and supports ponderosa pine, bitterbrush, Idaho fescue, Ross sedge, waxcurrant, lupine, big sage, and rabbitbrush.

The soil is moderately well drained. Permeability is rapid in the surface soils and moderate to slow in the subsoil and buried soil.

Range of Profile Characteristics of Soil 99

- | | |
|-----------------|--|
| Litter: | Needles, leaves, twigs, and decomposing organic matter; 0 to 2 inches thick. |
| Surface layers: | Very dark grayish brown, dark grayish brown, or dark brown ashy loamy sand or loamy fine sand; very weak, medium granular structure or single grain; 0 to 3 percent coarse fragments by volume; loose or soft; nonplastic; pH ranges from 6.0 to 7.0; 3 to 6 inches thick. |
| Subsoil layers: | Dark brown, dark grayish brown, or very dark grayish brown ashy loamy sand; weak, coarse platy or very weak, fine subangular blocky structure; 0 to 3 percent coarse fragments by volume; weakly cemented; soft; nonplastic; pH ranges from 6.4 to 7.4; 20 to 35 inches thick. |
| | Dark brown or dark grayish brown ashy loamy sand or fine loamy sand; weak or moderate, coarse platy structure; 0 to 3 percent coarse fragments by volume; strongly cemented; very firm; brittle and dense; nonplastic; pH ranges from 6.5 to 7.5; 20 to over 40 inches thick. |
| Buried Soil: | Dark brown or dark yellowish brown clay loam or loam; weak, fine subangular blocky structure; 0 to 10 percent gravel by volume; firm or friable; pH ranges from 6.0 to 7.0; over 40 inches thick. |

Soil and Landtype Characteristics



This section contains the terms and definitions used in compiling information for three tables on soil and landtype characteristics: (1) TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES; (2) TABLE OF SOIL CHARACTERISTICS OF MODAL SITES; and (3) TABLE OF BEDROCK CHARACTERISTICS. It was also used in compiling information for the previous section on MAPPING UNIT DESCRIPTIONS.



TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Landform - Refers to the shape and configuration of a specific, identifiable part of the landscape common to the mapping unit.

Slope - Range of slope of landtype.

Aspect - Direction of slope exposure.

Elevation - Altitude above mean sea level expressed in feet.

Origin of Soil Material - Identifies what geologic materials the soil is derived from.

Depth to Bedrock - Average range of depth to consolidated rock materials.

Infiltration Class - Rate of entry of water into soil surface. The rate is dependent upon the type of surface soil texture, rock fragment content, structure, porosity, bulk density, and organic matter content.

Slow - Water stands on surface for long periods. Soils are fine textured, poorly aggregated, and puddle easily.

Moderate - Water enters soil at commensurated rates of normal rainfall or water application. Water may pond for short periods (a few days) following very intensive rainfall. Soils are medium-textured and well aggregated.

Rapid - Water rarely ponds, enters soil surface very rapidly. Soils are coarse textured, porous, loose, and usually single-grained.

Drainage Class - The rapidity and extent of removal of water from the soil. Based on soil permeability, infiltration, internal drainage, and topographic position.

Poorly drained - Water table at or near the surface a considerable part of the time. Soils of this class usually occupy level or depressed sites and are frequently ponded. Water is removed so slowly that soil remains wet almost all the time.

Somewhat poorly drained - Water removed so slowly that the soil remains wet for significant periods but not all the time.

Moderately well drained - Soil remains wet for a period somewhat longer (up to one month) than the wet season; may be due in part to a slowly permeable layer, high water table, or lateral seepage.

Well drained - Water is removed from soil readily and these soils are saturated only during the wet season for short periods.

Excessively drained - Water is removed from soil rapidly and these soils are rarely ever saturated. Commonly, these soils are coarse-textured or shallow, stony, and/or occur on steep slopes.

Major Drainage Pattern and Intensity - The dominant drainage pattern and number of drainage miles per square mile.

Intensity Classes

Few - 0 to 2 drainage miles per square mile.

Common - 3 to 6 drainage miles per square mile.

Abundant - Greater than 6 drainage miles per square mile.

Overstory Species - Identifies the predominate tree species of the landtype. Doesn't refer to abundance.

Understory Species - Identifies the predominate shrubs of the landtype.

Ground Cover Species - Identifies the predominate grasses and forbs of the landtype.

Productivity - Combined evaluation of measured and observed production of timber and forage types. Site indexes are used for timber types, and potential forage productivity for all landtypes.

Site Index - The site index information is based primarily on the 1973 Fremont N.F. timber inventory. It is the average of all the site indices which were taken from the inventory plots located on a given landtype. The first number listed is the average of all the plots, and the second number is the number of plots associated with that SRI landtype. The letters in parenthesis identify the timber type on which the site index is based: (P) - ponderosa pine, (PA) - pine associated, and (PML) - ponderosa pine and lodgepole pine. The productivity of some landtypes is estimated. The site indices are based on 50 years of age for lodgepole pine and 100 years of age for white fir and ponderosa pine.

Plant Community Type - This identifies the major plant community types associated with pumiceous soils. They have been correlated with the landtypes and are shown by a code. The community type is described in Leonard A. Volland's "Plant Communities of the Central Oregon Pumice Zone." Landtypes 1 through 76B do not have community codes listed.

Potential Forage Productivity - Two ratings are shown. The first rating is for all landtypes when undisturbed. The second rating, in parenthesis, is for landtypes with commercial timber following a regeneration harvest. The ratings are based on five production classes as follows:

1. Less than 250 lbs./acre
2. 250-500 lbs./acre
3. 500-1,000 lbs./acre
4. 1,000-2,500 lbs./acre
5. Over 2,500 lbs./acre

Fertility - Estimated inherent soil fertility and availability of plant nutrients for undisturbed soils. This rating is derived by correlating measured productivity with soil factors such as texture, pH, color and organic matter content.

High - These soils generally have medium to fine texture, dark surface colors; are slightly acid to slightly alkaline and have abundant incorporated organic matter. Nutrient quantities are adequate and readily available.

Moderate - These soils generally have one or more soil factors that limit nutrient quantity and/or availability.

Low - These soils generally have several factors that are limiting. They may be coarse-textured, strongly acid or strongly alkaline, and lacking in sufficient organic matter. Nutrient quantity and/or availability is seriously limiting.



TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
1	V-Shaped Canyonlands	30-70	All	4500-7500	Residuum and Colluvium	10-40	Variable	Well-Excessively Drained
2	V-Shaped Canyonlands	30-70	All	4700-7500	Ash and Pumice over Basalt, Andesite, Rhyolite, Breccia, Tuff, Mudflows	20-40	Variable	Well-Excessively Drained
3	Steep, Rocky Lands	30+	All	4500-8400	Basalt, Rhyolite, and Breccia Rock and Talus	0-10	N.A.	N.A.
4	Moderately Steep to Steep Upland Sideslopes	20-80	Southerly	4500-8000	Breccia, Tuff, and Basalt Residuum	0-20	Variable	Excessively Drained
6	Steep Upland Sideslopes	30-80	All	6000-8400	Basalt, Andesite, Rhyolite, and Breccia Residuum	0-30	Variable	Well Drained
7	Alluvial-Colluvial Stringer Bottomlands	0-5	-	5000-8000	Basalt, Andesite, Rhyolite, Tuff, and Breccia, Alluvium and Colluvium	40+	Variable	Variable
8	Subalpine Knolls and Sideslopes	10-70	All	7400-8400	Ash and Pumice over Andesite, Basalt, Rhyolite, and Tuff Residuum and Colluvium	20-50	Rapid	Well Drained
9	Cinder Cones	10-50	All	4500-6500	Cinder Residuum	20-40	Rapid	Well Drained
10	Cinder Cones	10-50	All	4500-6500	Eolian Ash and Pumice over Cinder Residuum	30-60	Rapid	Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
1	N.A. ^{1/}	Juniper	Mahogany, Big Sage, Low Sage	Idaho Fescue, B. Squirreltail	N.A.	Variable	Variable
2	N.A.	Ponderosa Pine, Mixed Conifers, Lodgepole Pine	Big Sage, Snowberry, Manzanita	Mules Ear, Ross Sedge, B. Squirreltail, Lupine	Variable	Variable	Variable
3	N.A.	None	None	None	N.A.	N.A.	N.A.
4	N.A.	Juniper	Rabbitbrush, Mahogany, Big Sage, Low Sage, Bitterbrush	Needlegrass, B. Squirreltail	N.A.	Variable	Low
6	N.A.	Whitebark Pine, White Fir, Lodgepole Pine	Shrubby Pestemon, Ocean Spray, Pin Cherry, Pine Mat, Big Sage	Ross Sedge, B. Squirreltail, Lupine, Long Stolon Sedge	N.C. ^{2/}	Variable	Low
7	N.A.	Lodgepole Pine, Aspen	Willow, Alder, Big Sage, False Helibore	Sedge, Bluegrass	N.A.	Variable	Moderate-High
8	Radial, Common	Lodgepole Pine, White Bark Pine, Mt. Hemlock	Shrubby Penstemon, Heather, Laurel, Blueberry	Long Stolon Sedge, Buck Wheat, B. Squirreltail	N.C.	N.R.	Low
9	Radial, Few	Ponderosa Pine, Mixed Conifers	Snowbrush, Manzanita	Ross Sedge, B. Squirreltail	N.R. ^{3/}	N.R.	Low
10	Radial, Few	Ponderosa Pine, Mixed Conifers	Snowbrush, Manzanita, Bitterbrush	Idaho Fescue, Ross Sedge, B. Squirreltail	N.R.	N.R.	Low

^{1/} Not Applicable^{2/} Noncommercial^{3/} Not Rated

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
11	Dome-Shaped Eruptive Centers	20-50	All	7000-8400	Basalt and Rhyolite Residuum	10-20	Slow-Moderate	Excessively Drained
12	Depressions, Ponds, and Marshlands	N.R.						
13	Broad Basins	0-5	-	4700-6500	Lake-Laid Deposits	60+	Moderate-Rapid	Moderately Well-Somewhat Poorly Drained
14	Broad Basins	0-5	-	4500-5500	Lake-Laid Pumice Deposits	60+	Rapid	Well-Moderately Well Drained
16	Broad Upland Basins	0-5	-	5500-7500	Alluvial and Colluvial Deposits	60+	Moderate	Moderately Well-Somewhat Poorly Drained
17	Valley Bottomlands -	0-5	-	5000-6000	Alluvium Derived from Tuff and Breccia	40+	Moderate	Moderately Well-Well Drained
18	Wide Valley Bottomlands	0-5	-	5000-6000	Alluvium Derived from Tuff, Breccia, and Basalt	40+	Moderate	Somewhat Poor-Poorly Drained
19	Narrow Valley Bottomlands	0-5	-	4900-6000	Alluvium Derived from Tuff, Breccia, and Basalt	40+	Rapid	Well Drained
20	Lakebeds and Alluvial-Colluvial Meadows	0-5	-	4900-6500	Lacustrine Clay Deposits	40+	Slow-Moderate	Somewhat Poorly Drained
22	Valley Terraces and Broad Basins	0-5	-	4800-5500	Stream Deposited Alluvium Derived from Tuff, Breccia, Basalt, and Rhyolite	15-40	Moderate	Moderately Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
11	Radial, Few	None	Low Sage	Phlox, Idaho Fescue, Pussytoes, Buck Wheat	N.A.	N.R.	Low
12	N.R.						
13	N.R.	None	Big Sage	Idaho Fescue, Blue Grass, Sedge	N.A.	4	High
14	N.R.	None	Big Sage Rabbit-brush	Lupine, Sedge, I. Fescue	N.A.	2	Moderate
16	N.A.	None	Big Sage	Sedge, Meadow Foxtail, K. Bluegrass, Rush, Tufted Hairgrass	N.A.	5	High
17	N.R.	None	Big Sage, Rabbit brush	Idaho Fescue, Blue Grass, B. Squirreltail	N.A.	3	High
18	N.R.	None	None	Sedge, Rush, Meadow Foxtail, Blue Grass	N.A.	4	High
19	N.R.	Scattered Willow and Lodgepole Pine	Big Sage	Idaho Fescue, Sedge	N.A.	2	Moderate
20	N.R.	None	Big Sage, Low Sage	Sedge, Bluegrass, B. Squirreltail	N.A.	1-3	Moderate
22	N.R.	None	Low Sage, Big Sage	B. Squirreltail, Cheat Grass, Crested Wheatgrass	N.A.	1-2	Low

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
23	Valley Terraces and Broad Basins	0-5	-	4800-5800	Stream Deposited Alluvium Derived from Tuff, Breccia, Basalt, and Rhyolite	22-50	Rapid	Well Drained
24	Lakebeds	0-5	-	4900-5700	Lacustrine Deposits Derived from Tuff and Basalt	40+	Moderate	Moderately Well Drained
25	High Elevation Valleys and Footslopes	5-20	All	6000-8000	Colluvium Derived from Basalt and Tuff	60+	Moderate	Moderately Well-Somewhat Poorly Drained
26	Benches, Toeslopes, and Valleys	5-20	All	5800-7200	Colluvium from Basalt and Tuff	40+	Moderate	Moderate Well Drained
27	High Elevation Upland Slopes and Ridges	15-50	All	5800-7000	Residuum from Basalt, Andesite, and Tuff	20-50	Moderate	Well Drained
28	Gently Sloping Lava Tablelands and Plateaus "Scabrock Flats"	0-5	-	4500-7000	Basalt and Tuff Residuum	8-20	Slow	Well Drained
29	Gently Sloping Uplifted Tablelands	2-12	West	6600-7200	Residuum from Tuff and Basalt	20-40	Moderate	Moderately Well Drained
30A	Gently Rolling Tablelands and Plateaus	0-15	Southerly	4500-6300	Basalt, Andesite, and Tuff Residuum	10-25	Moderate-Slow	Well Drained
30B	Moderately Sloping Sidelopes and Fault Block Uplifts	16-40	Southerly	4500-6300		10-25		

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
23	N.R.	Ponderosa Pine, Lodgepole Pine	Rabbitbrush, Big Sage	Idaho Fescue, Cheat Grass, Ross Sedge, B. Squirreltail	N.R.	2 (3)	Low-Moderate
24	N.R.	None	Low Sage	Idaho Fescue, B. Squirreltail, Crested Wheatgrass, Phlox, Bluegrass	N.A.	2	Moderate
25	N.R.	Scattered Aspen, Ponderosa Pine, and Lodgepole Pine	Big Sage, Snowberry, False Helibore	Sedge, Mulesear, B. Squirreltail	N.A.	3	High
26	N.R.	Mixed Conifers, Ponderosa Pine, Lodgepole Pine	Waxcurrant, Squawcarpet	Mules Ear, Lupine, B. Squirreltail, Ross Sedge	N.R.	1 (3)	Moderate-High
27	Dendritic, Common	Sparce White Fir, Ponderosa Pine, Willow and Aspen	Big Sage, Rabbitbrush, Snowberry	Mules Ear, Mountain Brome, B. Squirreltail, Ross Sedge, Phlox	N.C.	2	Moderate
28	Dendritic, Few	Sparce Juniper, Mt. Mahogany, and Ponderosa Pine	Low Sage	Idaho Fescue, Sedge, Cheat Grass, Bluegrass, B. Squirreltail	N.A.	1-2	Low
29	Dendritic, Few	Sparce White Fir, Ponderosa Pine, Lodgepole Pine, and Aspen	Big Sage, Low Sage, Snowberry, Waxcurrant	Blue Grass, B. Squirreltail, Sweet Pea, Buckwheat, Smooth Brome	N.C.	2	Moderate
30A 30B	Dendritic, Few	Sparce Juniper and Ponderosa Pine	Mt. Mahogany, Big Sage, Low Sage, Bitterbrush	Phlox, B. Squirreltail, Idaho Fescue	N.C.	2 2	Low

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
34A	Gently Sloping Lava Tablelands and Plateaus	0-15	All	4800-7000	Basalt and Tuff Residuum and colluvium	25-48	Moderate	Well Drained
34B	Moderately Steep Slopes on Block Faults and Eruptive Centers	16-40	Southerly					
34C	Steep Slopes on Block Faults and Eruptive Centers	40+	Southerly					
35	Gently Rolling, Lava Tablelands and Plateaus	0-15	All	5000-6200	Residuum from Tuff, Basalt, and Andesite	25-48	Moderate	Well Drained
36	Footslopes Adjacent to Eruptive Centers	5-20	Southerly	4800-5800	Residuum from Cinders and Tuff	20-40	Moderate	Well Drained
37A	Gently Rolling Plateaus and Tablelands	0-15	All	5500-7500	Basalt, Andesite, and Tuff Residuum and Colluvium	25-48	Moderate-Rapid	Well Drained
37B	Moderately Steep Slopes on Block Faults and Eruptive Centers	16-40	Northerly					
37C	Steep Slopes on Block Faults and Eruptive Centers	40+	Northerly					
38	Gentle to Moderately Sloping Tablelands and Sideslopes	5-30	All	5000-6000	Residuum from Basalt, Andesite, and Tuff	20-40	Moderate-Rapid	Well Drained
39	High Elevation Lava Tablelands and Plateaus	0-15	All	6000-7200	Basalt, Andesite, and Tuff Residuum	20-40	Moderate	Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
34A	Dendritic, Few	Ponderosa Pine	Big Sage, Wax-currant, Squawcarpet, Serviceberry, Oregon Grape and occasionally Manzanita	Mules Ear, B. Squirreltail, Ross Sedge, I. Fescue, Lupine, Bluegrass, Phlox	63(P)4	1 (3)	Moderate
34B	Dendritic-Radial Common				70(P)5	1 (3)	
34C	Dendritic-Radial, Common				70(P) Est. 4/	1 (3)	
35	Dendritic, Few	Ponderosa Pine	Bitterbrush	Idaho Fescue, Ross Sedge	57(P)6	2 (4)	Moderate
36	Dendritic, Few	Ponderosa Pine	Mahogany, Manzanita, Bitterbrush, Squawcarpet	Ross Sedge, Idaho Fescue, B. Squirreltail	50(P) Est.	1 (2)	Low
37A	Dendritic, Few	Mixed Conifers	Snowbrush, Manzanita, Squawcarpet, Serviceberry, Waxcurrant, Oregon Grape, Big Sage	Mules Ear, Ross Sedge, Phlox, B. Squirreltail, Lupine	65(PA)17	1 (3)	Moderate
37B	Dendritic-Radial, Common				62(PA)21	1 (3)	
37C	Dendritic-Radial, Common				70(PA)2	1 (3)	
38	Dendritic, Few	Ponderosa Pine	Manzanita, Snowbrush, Bitterbrush, Squawcarpet	Idaho Fescue, Ross Sedge, Mules Ear, Strawberry, B. Squirreltail	53(P)6	1 (3)	Moderate
39	Dendritic, Few	Lodgepole Pine, Ponderosa Pine	Big Sage, Wax-currant, Rabbitbrush, Bitterbrush	Phlox, Strawberry, Idaho Fescue, Ross Sedge, Long Stolon Sedge	40(PML)3	1 (3)	Moderate

4/ Estimated

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
40A	Gentle Slopes on Dome-Shaped Uplifts	0-15	All	4500-6500	Rhyolite and Tuff Residuum and Colluvium	30-50	Rapid	Excessively Drained
40B	Moderately Steep Slopes on Dome-Shaped Uplifts	16-40	Southerly	4600-6500		30-60		
40C	Steep Slopes on Dome-Shaped Uplifts	40+	Southerly	4600-6500		30-60		
41A	Gentle Slopes on Dome-Shaped Uplifts	0-15	All	5000-7200	Rhyolite and Tuff Residuum and Colluvium	30-55	Rapid	Excessively Drained
41B	Moderately Steep Slopes on Dome-Shaped Uplifts	16-40	Northerly	5200-7200		30-60		
41C	Steep Slopes on Dome-Shaped Uplifts	40+	Northerly	5200-7200		30-60		
42	Benches, Toeslopes, and Footslopes	5-30	All	5200-7000	Colluvium from Rhyolite and Tuff	50+	Rapid	Well Drained
43	High Elevation Dome-Shaped Uplifts	10-40	All	6800-8400	Rhyolite and Tuff Residuum	30-50	Rapid	Excessively Drained
44	High Elevation Dome-Shaped Uplifts	10-40	All	6800-8400	Rhyolite and Tuff Residuum and Colluvium	30-60	Rapid	Excessively Drained
50	Toeslopes and Benchlands	0-10	All	4800-6000	Tuff Residuum	6-20	Moderate-Slow	Well Drained
51	Low Elevation Footslopes and Sideslopes	5-30	All	4900-6000	Tuff Residuum	18-36	Slow	Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
40A	Radial, Few	Ponderosa Pine	Manzanita, Squawcarpet, Snowbrush, Mahogany, Oregon Grape	Ross Sedge, B. Squirreltail, Phlox, Mules Ear	50(P) Est.	1 (2)	Low
40B	Radial, Common					1 (1-2)	
40C	Radial, Common					1 (1-2)	
41A	Radial, Few	Mixed Conifers	Snowbrush, Manzanita, Squawcarpet, Rabbitbrush, Snowberry	Lupine, Ross Sedge, Needlegrass, B. Squirreltail	55(PA) Est.	1 (2)	Low-Moderate
41B	Radial, Common					1 (1-2)	
41C	Radial, Common					1 (1-2)	
42	N.R.	Mixed Conifers	Snowbrush, Manzanita, Squawcarpet	Ross Sedge, Mules Ear	80(PA)1	1 (2)	Moderate-High
43	Radial, Few	Whitebark Pine, Lodgepole Pine, White Fir	Pinemat, Waxcurrant	Ross Sedge, Lupine, B. Squirreltail, Bluegrass	N.R.	1	Low
44	Radial, Few	None	Big Sage, Low Sage, Shrubby Penstemon, Waxcurrant, Snowberry, Pinemat, Spirea	Lupine, Sedge, B. Squirreltail, Bluegrass	N.A.	2	Low
50	Dendritic, Few	Widely Scattered Juniper	Low Sage	Idaho Fescue, Oat Grass, B. Squirreltail, Yarrow	N.A.	2	Low
51	Dendritic, Abundant	Sparse Juniper and Ponderosa Pine	Low Sage, Big Sage, M. Mahogany, Bitterbrush	Idaho Fescue, Cheatgrass, Mules Ear, Bluegrass, Oat Grass	N.C.	2	Moderate

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
53	Low Elevation Toeslopes and Benchlands	0-10	All	4800-6000	Ash-Flow Tuff Residuum	6-20	Moderate	Well Drained
56A	Low Elevation Foot-slopes	0-15	Southerly	4500-6000	Tuff and Breccia Residuum	18-34	Moderate	Well Drained
56B	Low Elevation, Knolls Ridges, and Sideslopes	16-40	Southerly	4500-6500		16-34		
57	Highly Dissected Topography on Domes, Ridges, and Sideslopes	20-70	All	5000-7000	Breccia, Mudflow, and Tuff Residuum	8-32	Rapid	Well Drained
60	Highly Dissected Ridges and Sideslopes	20-50	All	4700-6400	Breccia, Tuff, and Tuffaceous Sandstone Residuum	20-36	Moderate	Well Drained
61	Toeslopes, Footslopes, and Valleys	5-30	All	4700-6700	Breccia and Tuff Colluvium	50-120	Moderate	Moderately Well Drained
62A	Gently Sloping Ridges and Sideslopes	0-15	All	4800-6300	Residuum from Tuff, Breccia, and Tuffaceous, Sedimentary Rocks	22-34	Moderate	Well Drained
62B	Moderately Steep Ridges and Sideslopes	16-40	Southerly	4800-6400				
63A	Gently Sloping Ridges and Sideslopes	0-15	All	4800-6300	Tuff and Breccia Residuum	22-40	Rapid	Well Drained
63B	Moderately Steep Ridges and Sideslopes	16-40	Southerly	4800-6400				
64	Gently Rolling Tablelands	0-15	All	4600-5600	Residuum from Tuff, Ashy Diatomite, and Tuffaceous Siltstone and Sandstone	25-45	Moderate-Rapid	Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
53	Dendritic, Few	Scattered Juniper	Low Sage	Idaho Fescue, Sandberg Bluegrass, Oat Grass, B. Squirreltail	N.A.	2	Low
56A 56B	Dendritic, Common	Juniper	Bitterbrush, Mt. Mahogany, Rabbitbrush, Big Sage	Cheatgrass, Mules Ear, Idaho Fescue, Bluegrass, Oat Grass, B. Squirreltail	N.C.	3 3	Moderate
57	Dendritic, Abundant	Juniper and Sparce Ponderosa Pine	Mt. Mahogany, Big Sage, Rabbitbrush, Bitterbrush, Low Sage	Cheatgrass, Needlegrass	N.C.	1-2	Low
60	Dendritic, Abundant	Juniper and Sparce Ponderosa Pine	Big Sage, Low Sage, Mt. Mahogany, Rabbitbrush	B. Squirreltail, Idaho Fescue, Cheat Grass	N.C.	2	High
61	N.R.	Juniper and some Ponderosa Pine	Big Sage, Rabbitbrush, Waxcurrent	Cheat Grass, B. Squirreltail	N.C.	2	High
62A 62B	Dendritic, Common Dendritic, Abundant	Ponderosa Pine	Bitterbrush, Waxcurrent, Big Sage	Idaho Fescue, Mules Ear	60(P) Est.	1 (3) 1 (3)	Moderate
63A 63B	Dendritic, Common Dendritic, Abundant	Ponderosa Pine	Bitterbrush, Big Sage, some Mt. Mahogany	Idaho Fescue, Lupine, Mules Ear, Ross Sedge, B. Squirreltail	60(P)2 57(P)3	1 (3) 1 (3)	Moderate
64	Dendritic, Few	Ponderosa Pine	Bitterbrush, Squawcarpet, some Manzanita and Mt. Mahogany	Idaho Fescue, Ross Sedge, B. Squirreltail	67(P)3	2 (3)	Moderate

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
66	Benches, Toeslopes, and Drainages	5-30	All	4900-7000	Colluvium from Tuff and Breccia	50+	Rapid	Moderately Well Drained
67A	Gently Sloping Ridges and Sideslopes	0-15	All	5300-7000	Tuff, Breccia, and Tuffaceous Sedimentary Rock Residuum and Colluvium	20-50	Moderate-Slow	Well Drained
67B	Moderately Steep Ridges and Sideslopes	16-40	Northerly	5400-7000				
67C	Steep Ridges and Sideslopes	40+	Northerly	5400-7000				
68A	Gently Sloping Ridges and Sideslopes	0-15	All	5300-7000	Ash Flow Tuff and Breccia Residuum and Colluvium	22-50	Rapid	Well Drained
68B	Moderately Steep Ridges and Sideslopes	16-40	Northerly					
68C	Steep Ridges and Sideslopes	40+	Northerly					
70	Benches, Footslopes, Depressions, and Drainages	0-5	All	5200-7000	Tuff and Breccia Colluvium and Alluvium	50+	Slow	Somewhat Poorly-Poorly Drained
74A	Gently Sloping Ridges and Sideslopes	0-15	All	5400-7000	Residuum and Colluvium from Rhyolitic Breccia	25-40	Rapid	Excessively Drained
74B	Moderately Steep Ridges and Sideslopes	16-40	Northerly					
74C	Steep Ridges and Sideslopes	40+	Northerly					
76A	Gently Sloping Ridges and Sideslopes	0-15	Southerly	5000-6500	Residuum and Colluvium from Rhyolitic Breccia	24-40	Rapid	Excessively Drained
76B	Moderately Steep Ridges and Sideslopes	16-40	Southerly					

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
66	N.R.	Mixed Conifers	Oregon Grape, Squawcarpet	Ross Sedge, Mules Ear	90(PA)1	1 (2)	Moderate-High
67A	Dendritic, Common	Mixed Conifers	Waxcurrant, Squawcarpet	Ross Sedge, B. Squirreltail	70(PA)	1 (3)	Moderate
67B	Dendritic, Abundant					1 (3)	
67C	Dendritic, Abundant					1 (3)	
68A	Dendritic, Common	Mixed Conifers	Squawcarpet, Waxcurrant, some Manzanita and Snowbrush	Ross Sedge, Yarrow, Mules Ear	73(PA)6	1 (3)	Moderate
68B	Dendritic, Abundant					1 (3)	
68C	Dendritic, Abundant					1 (3)	
70	N.R.	Willow, Alder, Aspen	False Helibore	Wet Meadow Sedges and Rushes	N.A.	4	High
74A	Dendritic, Common	Mixed Conifers	Waxcurrant, Squawcarpet, Big Sage, Snowbrush, Manzanita	Lupine, Ross Sedge, B. Squirreltail, Bluegrass, Yarrow	58(PA)12	1 (2)	Low
74B	Dendritic, Abundant					1 (2)	
74C	Dendritic, Abundant					1 (2)	
76A	Dendritic, Common	Ponderosa Pine	Big Sage	Ross Sedge, B. Squirreltail Bluegrass, Yarrow	63(P)7	1 (2)	Low
76B	Dendritic, Abundant					1 (2)	

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
77A	Gently Sloping Narrow Ridges and Sideslopes on Dome-Shaped Uplifts	0-15	All	4800-6200	Ash over Rhyolite Residuum and Colluvium	40-70	Rapid-Very Rapid	Excessively Drained
77B	Moderately Steep Sideslopes on Dome-Shaped Uplifts	16-40	All	5000-6400				
78	Steep Sideslopes on Dome-Shaped Uplifts	25-70	Southerly	5000-6400	Ash over Rhyolite Residuum	40-65	Rapid-Very Rapid	Excessively Drained
79	Gentle to Moderately Steep Sideslopes on Eruptive Centers	10-40	All	6000-8000	Ash over Rhyolite Residuum	35-65	Rapid-Very Rapid	Well to Excessively Drained
80A	High Elevation Upland Tablelands	0-15	All	6000-7500	Ash over Rhyolite Residuum	30-70	Rapid-Very Rapid	Excessively Drained
80B	Moderately Steep Slopes on Rhyolitic Lava Tablelands	16-40	All	6200-7300	Ash over Rhyolite Residuum and Colluvium			
81	Gently Rolling Lava Tablelands and Plateaus	0-15	All	4500-5800	Ash over Basalt and Tuff Residuum	20-40	Rapid-Very Rapid	Well Drained
82	Broad Basins	0-10	All	4500-5500	Ash over Basalt and Tuff Derived Valley Fill Deposits	50+	Rapid-Very Rapid	Moderately Well Drained
83	Broad Basins	0-5	All	4500-6200	Ash over Basalt and Tuff Derived Valley Fill Deposits	50+	Slow	Poorly Drained
84	Gently Rolling Lava Plateaus and Tablelands	0-10	All	4500-5800	Ash Overlying Basalt and Tuff Residuum	35-70	Rapid-Very Rapid	Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
77A	Radial, Common	Ponderosa Pine	Bitterbrush, Snowbrush, Manzanita	Ross Sedge, Idaho Fescue, Needlegrass, Lupine	57(P)3 CP-S2-17 CP-S2-13 CP-S3-11	1 (2)	Low
77B	Radial, Abundant	Mixed Conifers	Snowbrush, Manzanita	Needlegrass, Ross Sedge, Bracken Fern, Lupine	60(PA)3 CW-S1-14 CW-S1-12	1 (2)	Low
78	Radial, Abundant	Ponderosa Pine	Manzanita, Snowbrush	Bracken Fern, Needlegrass, Ross Sedge	50(P) Est. CP-S2-17 CP-S3-11	1 (1-2)	Low
79	Radial, Few	Mixed Conifers	Pinemat, Waxcurrent	Long Stolon Sedge, Ross Sedge, Lupine, Needlegrass, B. Squirreltail	60(PA)1 CW-S1-14 CW-S1-12	1 (2)	Low-Moderate
80A	Dendritic, Few	Lodgepole Pine	Waxcurrent, Pinemat	Long Stolon Sedge, Ross Sedge, Lupine, Bluegrass, B. Squirreltail	24(LP)7	1 (3)	Low
80B					CL-G3-13	1 (3)	
81	Dendritic, Few	Juniper and some Ponderosa Pine	Mt. Mahogany, Bitterbrush, Big Sage	Idaho Fescue, B. Squirreltail, Cheatgrass, Ross Sedge	N.C. CJ-53-11	2-3	Low
82	N.R.	Lodgepole Pine	Bitterbrush	Ross Sedge, B. Squirreltail, Lupine, Strawberry	42(LP)11 CL-S2-13 CL-S2-14	1 (2)	Moderate
83	N.R.	Lodgepole Pine	Bearberry, Spirea, Dwarf Huckleberry	Clover, Moss	52(LP)5 CL-M1-11 CL-M3-11	1	Moderate
84	Dendritic, Few	Ponderosa Pine, Lodgepole Pine	Bitterbrush, Waxcurrent	Idaho Fescue, Ross Sedge, Lupine, Strawberry, B. Squirreltail	40(PML)3 CP-S2-11 CP-S2-12	1 (2)	Moderate

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
85	Gently Rolling Lava Tablelands and Plateaus	0-10	All	4800-6200	Ash Overlying Basalt and Tuff Residuum	35-65	Rapid - Very Rapid	Well Drained
86	Gently Sloping Lava Tablelands	0-10	All	5800-7000	Ash Overlying Buried Residual Soils from Basalt and Tuff	35-65	Rapid - Very Rapid	Well Drained
87	Gentle to Moderately Sloping Ridges and Sideslopes	5-30	Southerly	4800-5800	Ash Overlying Buried Basalt and Tuff Residuum	35-65	Rapid - Very Rapid	Well Drained
88A	Gently Rolling Lava Tablelands and Plateaus	0-15	All	5400-7400	Ash Overlying Basalt and Tuff Residuum and Colluvium	28-60	Rapid - Very Rapid	Well Drained
88B	Moderately Steep Slopes on Basaltic Eruptive Centers, Shield Volcanoes, and Block Faults	16-40		5500-7400		35-65		
88C	Steep Slopes on Basaltic Eruptive Centers, Shield Volcanoes, and Block Faults	40+		5800-7800		35-65		
89A	Gently Rolling Tablelands, Plateaus, and Basins	0-15	All	5800-7800	Ash Overlying Basalt and Tuff Residuum and Colluvium	40-75	Rapid - Very Rapid	Well Drained
89B	Moderately Steep Slopes on Basaltic Eruptive Centers, Block Faults, and Shield Volcanoes	16-40						
89C	Steep Slopes on Basaltic Eruptive Centers, Block Faults, and Shield Volcanoes	40+						

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index, and Plant Community Type	Potential Range Productivity	Fertility
85	Dendritic, Few	Ponderosa Pine	Bitterbrush, Wax-currant, Rabbitbrush	Lupine, Ross Sedge, Mules Ear, Idaho Fescue	60(P)6 CP-S2-11 CP-S2-12	1 (2)	Moderate
86	Dendritic, Few	Ponderosa Pine	Big Sage	Ross Sedge, Lupine, Mules Ear, B. Squirreltail	60(P) Est. -	1 (2)	Moderate
87	Dendritic, Few	Ponderosa Pine	Snowbrush, Manzanita	Ross Sedge, Idaho Fescue, B. Squirreltail, Bluegrass	55(P) Est. CP-S2-17 CP-S3-11	1 (2)	Moderate
88A	Dendritic, Few	Mixed Conifers	Wax-currant and some Snowbrush and Manzanita	Lupine, Ross Sedge, Strawberry, B. Squirreltail	61(PA)19 CW-S1-14 CW-S1-12	1 (3)	Moderate
88B	Dendritic, Few					1 (3)	
88C	Dendritic, Common					1 (3)	
89A	Dendritic, Few	Lodgepole Pine	Pinemat	Long Stolon Sedge, Lupine, Ross Sedge, B. Squirreltail, Needlegrass	34(LP)7 CL-G3-13	1 (3)	Low
89B	Dendritic, Few					1 (3)	
89C	Dendritic, Common					1 (3)	

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
90	High Elevation Foot-slopes, Basins, and Valleys	5-20	All	5600-7600	Ash Overlying Basalt and Tuff Colluvium and Alluvium	60+	Rapid	Moderately Well-Somewhat Poorly Drained
91	Gently Sloping Uplifted Tablelands	0-15	All	5800-7000	Ash Overlying Residuum from Basalt, Andesite, and Tuff	40-75	Rapid-Very Rapid	Well Drained
92	High Elevation Moderately Steep to Steep Sideslopes	5-50	North	6800-8000	Ash Overlying Basalt, Andesite, and Tuff Residuum and Colluvium	40+	Rapid-Very Rapid	Moderately Well Drained
93A	Gently Rolling Lava Tablelands and Plateaus	0-15	All	4600-5600	Pumice Overlying Basalt, Andesite, and Tuff Residuum	32-70	Rapid-Very Rapid	Well Drained
93B	Moderately Steep Slopes on Block Faults, Eruptive Centers, and Drainages	16-40	All	4600-5700	Pumice Overlying Basalt, Andesite, and Tuff Residuum and Colluvium	30-60	Rapid-Very Rapid	Well Drained
94A	Gently Rolling Lava Tablelands and Plateaus	0-15	All	4700-6000	Pumice Overlying Basalt, Andesite, and Tuff Residuum	50-90	Rapid - Very Rapid	Well Drained
94B	Moderately Steep Side-slopes on Eruptive Centers, Drainages, and Block Faults	16-40	All	4800-6000	Pumice Overlying Basalt, Andesite, and Tuff Residuum and Colluvium	50-90	Rapid - Very Rapid	Well Drained
95	Gently Sloping Basins and Footslopes	0-6	N.A.	4500-6000	Pumice Overlying Deep Valley Fill Materials	60+	Rapid - Very Rapid	Moderately Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index and Plant Community Type	Potential Range Productivity	Fertility
90	N.R.	Lodgepole Pine, Mixed Conifers	Pinemat, Waxcurrant	Ross Sedge, B. Squirreltail, Lupine, Long Stolon Sedge	65(PA,LP) Est. CL-G3-13 CL-S1-14 CL-S1-12	1 (3)	Moderate
91	Dendritic, Few	Ponderosa Pine, Lodgepole Pine	-	Lupine, Long Stolon Sedge, Ross Sedge B. Squirreltail	60(PML) Est. CL-G3-13	1 (3)	Moderate
92	Radial, Few	Mt. Hemlock, Whitebark Pine, Lodgepole Pine, Red Fir, White Fir, Western White Pine	Pinemat, Wax-Currant, Grouse Huckleberry	Lupine, Ross Sedge, Moss	82(MH)6 CM-S1-11	1	Low
93A	Dendritic, Few	Ponderosa Pine	Bitterbrush, Big Sage	Idaho Fescue, Ross Sedge, B. Squirreltail	58(P)4 CP-S1-11 CP-S2-16	1 (2)	Low
93B	Dendritic, Common					1 (2)	
94A	Dendritic, Few	Ponderosa Pine, Lodgepole Pine	Bitterbrush	Idaho Fescue, Ross Sedge, Lupine, B. Squirreltail	54(PML)7 CP-S2-11 CP-S2-12	1 (2)	Low
94B						1 (2)	
95	N.R.	Lodgepole Pine	Bitterbrush, Waxcurrant, Rabbitbrush	Idaho Fescue, Needlegrass, Lupine, Ross Sedge	33(LP)13 CL-S2-13 CL-S2-14	1 (2)	Low

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES

Land Type No.	LandForm	Slope (%)	Aspect	Elevation (Ft.)	Origin of Soil Material	Depth to Bedrock (in)	Infiltration Class	Drainage Class
96A	Gently Rolling Lava Tablelands and Plateaus	0-15	All	4800-6000	Pumice Overlying Basalt, Andesite, and Tuff Residuum	60-90	Rapid-Very Rapid	Well Drained
96B	Moderately Steep Side-slopes on Block Faults, Eruptive Centers and Drainages	16-40	All	4800-6000	Pumice Overlying Basalt, Andesite, and Tuff Residuum and Colluvium	60-90+	Rapid - Very Rapid	Well Drained
97A	Gently Sloping Lava Tablelands and Side-slopes	0-15	All	5400-6600	Pumice Overlying Buried Basalt, Andesite, and Tuff Residuum	60-90	Rapid - Very Rapid	Well Drained
97B	Moderately Steep Side-slopes on Eruptive Centers, Block Faults, and Drainages	16-40	All		Pumice Overlying Buried Basalt, Andesite, and Tuff Residuum and Colluvium	60-90+		
98	High Elevation Upland Flats, Plateaus, and Tablelands	0-25	All	5900-7800	Ash and Pumice Overlying Buried Basalt, Andesite, and Tuff Residuum	30-80+	Rapid - Very Rapid	Well Drained
99	Wide, Gently Sloping Basins	0-8	N.A.	4800-5200	Ash Overlying Buried Basalt and Tuff Derived Valley Fill Deposits	60+	Rapid	Moderately Well Drained

TABLE OF LANDTYPE CHARACTERISTICS, FEATURES, AND QUALITIES (Cont.)

Land Type No.	Major Drainage Pattern and Intensity	Overstory Major Species	Understory Major Species	Ground Cover Major Species	Timber Site Index, and Plant Community Type	Potential Range Productivity	Fertility
96A	Dendritic, Few	Ponderosa Pine.	Snowbrush,	Ross Sedge,	75(PML)2	1 (1-2)	Low
96B	Dendritic - Radial, Few	Lodgepole Pine	Manzanita, Bitterbrush	Strawberry, Needlegrass	CP-S2-13 CP-S3-11	1 (1-2)	
97A	Dendritic - Radial, Few	Mixed Conifers	Snowbrush, Manzanita, Pinemat, Waxcurrant	Ross Sedge, B. Squirreltail	55(PA)4 CW-S1-14 CW-S1-12 CW-H1-11	1 (1-2) 1 (1-2)	Low
98	Dendritic - Radial, Few	Lodgepole Pine	Very Sparce or none	Very Sparce or none	26(LP)11 CL-G3-14	1	Low
99	N.A.	Ponderosa Pine	Bitterbrush, Waxcurrant, Big Sage, Rabbitbrush	Idaho Fescue, Ross Sedge, Lupine	50(P)2 CP-S1-11	1 (2)	Moderate

SOIL CHARACTERISTICS OF MODAL SITES AND LANDTYPE DESCRIPTIONS

Soil - Any and all loose, naturally occurring, unconsolidated, weathered material on the earth's surface resting on solid, consolidated, unweathered bedrock, regardless of origin, mode of formation, or type of weathering or deposition. Generally includes any material that may be manipulated by handtools or heavy equipment without the need of blasting, except soft, unweathered bedrock.

Depth of Soil to Bedrock - Distance from soil surface to consolidated, unweathered bedrock. Depth is in inches.

Very shallow - Less than 10 inches.

Shallow - 10 to 20 inches.

Moderately deep - 20 to 40 inches.

Deep - 40 to 60 inches.

Very deep - Greater than 60 inches.

Depth to Restrictive Layer in the Soil - Distance from soil surface to a layer in the soil that is highly restrictive to drainage, water transmission or root growth. Usually this is a discontinuity or stratification layer, but it may be bedrock. If it is bedrock, depth must be the same as recorded under depth to bedrock. A restrictive layer is generally not a genetic soil horizon, except in old soils that have developed claypan, hardpan, or cemented horizons. Depth is in inches.

Litter - Total depth in inches of decomposed and undecomposed organic matter.

Soil Layer - Each soil layer is a homogeneous layer of soil material. Soil layers are described when soil characteristics change significantly and have definite effects on management. Each layer may result from stratification or soil formation processes.

Soil Layer Thickness - Thickness of each soil layer in inches.

Soil Layer Thickness Classes

Thin - Less than 10 inches.

Moderately thick - 20 to 40 inches.

Thick - 40 to 60 inches.

Very thick - Greater than 60 inches.

Color - Stated in narrative Munsell notations for each soil layer. Colors are taken of moist crushed soil. Mottling is noted, if present.

Texture - Relative proportions of sand (2.0mm.-.05mm.), silt (.05mm.-.002mm.), and clay (less than .002mm.). Standard USDA textural classes are used for each soil layer.

Textural Classes* - These classes apply when general textural terms are used for the profile sketch in the mapping unit descriptions.

Coarse-textured Soils - Sands, loamy sands.

Moderately coarse-textured soils - Sandy loam, fine sandy loam.

Medium-textured soils - Very fine sandy loam, loam, silt loam, silt.

Moderately fine-textured soils - Clay loam, sandy clay loam, silty clay loam.

Fine-textured soils - Sandy clay, silty clay, clay.

Rock Fragment Quantity, Size, and Shape* - Percent by volume occupied by consolidated fragments larger than sand size (larger than 2mm.).

Size Classes - Gravel, 2mm. - 3 inches; cobbles, 3 inches to 10 inches; stones, greater than 10 inches.

Shape Classes - Round, thin, flat, subangular, subround, angular, blocky, etc.

Rock Fragment Classes - Used as an adjective to textural classes. Includes gravel, cobble and stone sizes.

0 - 35 percent - not noted.

35 - 50 percent - gravelly, cobbly or stony.

50 - 80 percent - very gravelly, very cobbly or very stony.

80 percent + - extremely gravelly, extremely cobbly or extremely stony.

Soil Structure* - Includes grade, size and type of structure for each soil layer. If no structure exists, then the soil is massive or single-grained. Concretions are recorded, if present. Applies to aggregate structural units (aggregates and peds).

Grade - Degree of aggregation and expression of the differential between cohesion within aggregates and adhesion between aggregates.

Weak - Indistinct peds, barely observable in place.

Moderate - Distinct peds, moderately durable and evident.

*Standard USDA Handbook 18 Definitions.

Strong - Distinct peds in place, durable.

Size - Refers to size of aggregates according to five size classes and type of structure.

Type - Refer to relative shape of individual aggregates. There are four primary basic shapes.

Platy - Soils particles arranged around a plane; generally horizontal.

Prism-like - Soil particles arranged around a vertical line and bounded by relatively flat surface (Prismatic, Columnar).

Block-like - Soil particles arranged around a point and bounded by flat or rounded surfaces (Angular Blocky, Subangular Blocky).

Spheroidal - Soil particles arranged around a point and bounded by curved or very irregular surface (granular, crumb).

Structureless - No observable aggregation or no definite orderly arrangement of natural lines of weakness.

Massive - The soil material is coherent.

Single Grain - The soil material is incoherent.

Permeability - Water or air movement in and through the soil material. The classes are based on soil texture, soil structure, rock fragment content, porosity, bulk density, and drainage class.

Class

Very Slow - Generally fine-textured soils - clay. Less than 0.5 inch/hr.

Slow - Generally moderately fine-textured soils - clay loams and silty clay loams; 0.5 inch/hr. to 1 inch/hr.

Moderate - Generally medium-textured soils - loams, silt loams; 1 inch/hr. to 5 inches/hr.

Rapid - Generally moderately coarse-textured soils, sandy loams, gravelly loams; 5 inches/hr. to 20 inches/hr.

Very Rapid - Very porous soils. Generally coarse-textured soils - sands and gravels. Greater than 20 inches/hr.

Consistence* - Degree of cohesion and adhesion as indicated by the resistance of the soil aggregate to deformation or rupture under various moisture conditions.

Dry

Loose - Noncoherent.

Soft - Easily crushes to powder or single grain.

Slightly Hard - Easily broken between thumb and forefinger.

Hard - Can be broken in the hands without difficulty, but difficult to break between thumb and forefinger.

Very Hard - Can be broken in hands only with difficulty.

Extremely Hard - Cannot be broken in hands.

Moist

Loose - Noncoherent.

Very Friable - Crushes under gentle pressure.

Friable - Crushes easily under gentle to moderate pressure between thumb and forefinger.

Firm - Crushes under moderate pressure between thumb and forefinger.

Very Firm - Crushes under strong pressure; barely crushable between thumb and forefinger.

Wet

Plasticity is measured by rolling wet soil and observing wire.

Nonplastic - No wire is formable.

Slightly Plastic - Wire forms, but soil mass easily deformed.

Plastic - Wire forms; moderate pressure required to deform soil mass.

Very Plastic - Wire forms; much pressure required to deform soil mass.

*Standard USDA Handbook 18 Definitions.

Soil pH - Intensity of soil acidity or alkalinity expressed on a scale from 1 to 14:

pH	
Extremely acid - Below 4.5	Neutral - 6.5 - 7.3
Strongly acid - 4.6 - 5.5	Slightly alkaline - 7.4 - 8.4
Slightly acid - 5.6 - 6.4	Strongly alkaline - 8.5 - 9.0
	Very strongly alkaline - Above 9.0



TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
1-12	Miscellaneous landtypes are	not rated.									
13	T.28S., R.12E., Sec. 29, NE1/4, SW1/4	48+	48+	0	A 0-11 A&C 11-21 C 21-31 IIC 31-48+	Brown Black-Brown Brown Dark Brown	Clay Loam Clay Loam - Loamy Coarse Sand Loamy Coarse Sand Clay Loam	- Gravel Gravel -	- Pumice Pumice -	- 20 5 -	1/ N.A. N.A. N.A. N.A.
14	T.28S., R.12E., Sec. 24, SW1/4, NE1/4	62+	62+	0	A 0-6 C ₁ 6-36 C ₂ 36-62+	Dark Brown Dark Brown Very Dark Grayish Brown	Fine Loamy Sand Fine Loamy Sand Very Fine Loamy Sand	- - - -	- - - -	- - - -	N.A. N.A. N.A. N.A.
16	T.39S., R.21E., Sec. 25, SE1/4 NE1/4	40+	16	0.2	A 0-5 B ₁ 5-8 B ₂ 8-16 B _{2g} 16-27 C _g 27-40+	Very Dark Grayish Brown Very Dark Gray Black Very Dark Gray With Yellowish Brown Mottles Mottles of Brown Yellowish Brown, and Very Dark	Clay Loam Silty Clay Loam Silty Clay Silty Clay Loam Silty Clay Loam	- - - - -	- - - - -	- - - - -	N.A. N.A. N.A. N.A. N.A.

1/ Not Applicable

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
1-12	Miscellaneous	landtypes are not rated.								
13	A 0-11	Moderate	Medium	Granular	Moderate	Soft	Friable	Slightly Plastic	6.4	Unit contains an intermittent hardpan at a depth of 20 to 45 inches.
	A&C 11-21	Single Grain	-	-	Moderate-	Loose-Soft	Loose-	Nonplastic-	6.7	
	C 21-31	Moderate	Medium	Granular	Very Rapid		Friable	Slightly Plastic	6.8	
	IIC 31-48+	Weak	Fine	Sbky 2/ →	Rapid	Loose	Loose	Nonplastic	6.8	
14	A 0-6	Weak	Coarse	Platy	Rapid	Soft	Very Friable	Nonplastic	6.8	C ₁ is slightly brittle and very weakly cemented.
	C ₁ 6-36	Weak	Coarse	Platy	Rapid	Slightly Hard	Firm	Nonplastic	7.4	
	C ₂ 36+62+	Very Weak	Medium	Sbky	Rapid	Soft	Loose	Nonplastic	7.4	
16	A 0-5	Weak and Moderate	Fine and Coarse	Granular and Platy	Moderate	Soft to Hard	Friable to Firm	Slightly Plastic	5.8	Surface 2 inches compacted from grazing.
	B ₁ 5-8	Strong	Fine and Very Fine	Granular and Sbky	Slow	Very Hard	Firm	Plastic	6.0	
	B ₂ 8-16	Strong	Fine	Sbky	Very Slow	Extremely Hard	Very Firm	Very Plastic	6.3	
	B _{2g} 16-27	Strong	Medium	Sbky	Very Slow	Very Hard	Firm	Plastic	6.7	
	C _g 27-40+	Moderate to Strong	Coarse	Sbky	Very Slow	Very Hard	Firm	Plastic	6.9	

2/ Subangular Blocky

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
17	T.40S., R.16E., Sec. 13, SW1/4, NW1/4	65+	65+	0	A ₁ 0-2	Black	Silt Loam	-	-	-	N.A.
					A ₃ 2-11	Black	Silty Clay Loam	-	-	-	N.A.
					B ₂ 11-28	Black	Silty Clay	-	-	-	N.A.
					B ₂ 28-39	Black	Silty Clay Loam	-	-	-	N.A.
					C ₃ 39-65+	Very Dark or Dark Grayish Brown	Clay Loam	-	-	-	N.A.
18	T.37S., R.13E., Sec. 27, NW1/4, SE1/4	40+	11	0	A ₁ 0-8	Black	Silt Loam	-	-	-	N.A.
					A ₃ 8-11	Black	Silty Clay Loam	-	-	-	N.A.
					B ₁ 11-16	Very Dark Gray	Silty Clay Loam	-	-	-	N.A.
					B ₂₁ 16-23	Very Dark Grayish Brown	Silty Clay Loam	-	-	-	N.A.
					B ₂₂ 23-40+	Very Dark Gray	Silt Loam	-	-	-	N.A.
19	T.32S., R.13E., Sec. 16, NW1/4, SE1/4	37+	37+	0	A ₁ 0-4	Dark Brown	Sandy Loam	Gravel	Subround and Irregular	5	N.A.
					AC 4-9	Strong Brown	Sandy Loam	Gravel	Subround and Irregular	10	N.A.
					C ₁ 9-23	Dark Reddish Brown	Very Gravelly Loam	Gravel	Subround and Irregular	70	Very Gravelly
					C ₂ 23-37+	Dark Reddish Brown	Very Gravelly Loam	Gravel	Subround and Irregular	60	Very Gravelly

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
17	A ₁ 0-2	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.0	Subsoil may contain a hardpan and sand or gravel lenses locally.
	A ₂ 2-11	Strong	Very Fine	Sbky	Moderate	Hard	Firm	Plastic	6.5	
	B ₂ 11-28	Strong	Medium	Sbky	Slow	Extremely Hard	Very Firm	Very Plastic	7.5	
	B ₃ 28-39	Strong	Coarse	Sbky	Slow	Very Hard	Firm	Plastic	7.5	
	C ₃ 39-65+	Weak	Coarse	Sbky	Slow	Hard	Firm	Plastic	7.5	
18	A ₁ 0-8	Strong	Medium	Granular	Moderate	Slightly Hard	Friable	Slightly Plastic	5.5	Sand and gravel lenses occur locally.
	A ₃ 8-11	Strong	Fine	Sbky	Moderate	Hard	Firm	Plastic	6.5	
	B ₁ 11-16	Weak	Coarse	Platy → Sbky	Slow	Very Hard	Firm	Plastic	6.3	
	B ₂₁ 16-23	Moderate	Fine	Sbky	Very Slow	Very Hard	Firm	Plastic	6.8	
	B ₂₂ 23-40+	Moderate	Medium	Prismatic	Very Slow	Slightly Hard	Friable	Slightly Plastic	7.6	
19	A ₁ 0-4	Moderate	Fine	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.7	
	AC 4-9	Weak	Fine	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.7	
	C ₁ 9-23	Weak	Fine	Sbky	Rapid	Slightly Hard	Very Friable	Slightly Plastic	6.7	
	C ₂ 23-37+	Weak	Fine	Sbky	Rapid	Slightly Hard	Very Friable	Slightly Plastic	7.0	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
20	T.38S., R.14E., Sec. 9, SE1/4, NE1/4	32+	7	0	A ₁ 0-3	Black	Silty Clay Loam	-	-	-	N.A.
					A ₃ 3-7	Black	Silty Clay	-	-	-	N.A.
					B ₂₁ 7-11	Black	Clay	-	-	-	N.A.
					B ₂₂ 11-17	Black	Clay	-	-	-	N.A.
					B ₃ 17-32+	Black	Silty Clay	-	-	-	N.A.
22	T.38S., R.13E., Sec. 15, NW1/4, SW1/4	17+	9	0	A 0-2	Dark Brown	Sandy Loam	-	-	-	N.A.
					B 2-9	Dark Brown	Clay Loam	Gravel	Subround	2	N.A.
					B _x 9-14	Light Olive Brown and Dark Brown	Silty Clay Loam ^{1/}	Gravel	Subround	25	N.A.
					C _x 14-17+	Dark Yellowish Brown	Duripan	-	-	-	N.A.
23	T.31S., R.13E., Sec. 14, SE1/4, NE1/4	35+	35+	0.5	A ₁ 0-4	Very Dark Gray	Loam	Gravel	Angular, Irregular	30	N.A.
					AC 4-8	Very Dark Gray-ish Brown	Gravelly Loam	Gravel	Angular, Irregular	40	Gravelly
					C ₁ 8-14	Dark Brown	Gravelly Loam	Gravel	Angular, Irregular	50	Gravelly
					C ₂ 14-35+	Brown	Gravelly Loam	Gravel	Angular, Irregular	50	Gravelly
24	T.41S., R.16E., Sec. 12, SW1/4, SW1/4	30+	18	0	A 0-7	Very Dark Gray-ish Brown	Silty Clay Loam	-	-	-	N.A.
					B ₁ 7-11	Very Dark Gray	Silty Clay Loam	-	-	-	N.A.
					B ₂ 11-18	Very Dark Gray-ish Brown	Silty Clay	-	-	-	N.A.
					C _{1x} 18-24	Brown	Loam (Duripan)	-	-	-	N.A.
					C _{2x} 24-30+	Dark Brown	Loam (Duripan)	-	-	-	N.A.

^{1/} Texture is finer than typical.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
20	A ₁ 0-3	Moderate	Fine	Granular Sbky	Slow	Hard	Firm	Plastic	6.5	High shrink--swell. Soil cracks to three feet in summer when dry.
	A ₃ 3-7	Strong	Fine	Sbky	Slow	Very Hard	Very Firm	Very Plastic	6.6	
	B ₂₁ 7-11	Strong	Fine		Very Slow	Extremely Hard	Very Firm	Very Plastic	7.0	
	B ₂₂ 11-17	Moderate Strong	Very Coarse Coarse	Prismatic→ Sbky	Very Slow	Extremely Hard	Very Firm	Very Plastic	7.3	
	B ₃ 17-32+	Moderate Moderate	Very Coarse Coarse	Prismatic→ Sbky	Slow	Very Hard	Very Firm	Very Plastic	7.6	
22	A 0-2	Weak Weak	Coarse Medium	Platy→ Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.5	C _x is a strongly cemented duripan.
	B 2-9	Weak Moderate	Coarse Medium	Platy→ Granular	Moderate	Slightly Hard	Friable	Plastic	6.8	
	B 9-14	Weak	Coarse	Platy	Slow	Very Hard	Firm	Plastic	6.6	
	C _x 14-17+	Massive	-	-	Very Slow	Extremely Hard	Extremely Firm	-	6.6	
23	A ₁ 0-4	Weak	Medium	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.5	May have a duripan locally.
	AC 4-8	Weak	Fine	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.3	
	C ₁ 8-14	Weak	Fine	Granular, Sbky	Rapid	Soft	Very Friable	Slightly Plastic	6.8	
	C ₂ 14-35+	Weak	Fine	Sbky	Rapid	Slightly Hard	Friable	Slightly Plastic	6.8	
24	A 0-7	Moderate	Fine	Granular	Moderate	Hard	Firm	Plastic	6.8	C horizon is a duripan.
	B ₁ 7-11	Weak Strong	Coarse Medium	Platy→ Granular	Slow	Hard	Firm	Plastic	7.0	
	B ₂ 11-18	Strong	Medium	Blocky	Slow	Very Hard	Very Firm	Very Plastic	7.5	
	C _{1x} 18-24	Moderate	Coarse	Platy	Very Slow	Extremely Hard	Extremely Firm	-	8.0	
	C _{2x} 24-30+	Moderate	Coarse	Platy	Very Slow	Extremely Hard	Extremely Firm	-	8.0	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
25	T.33S., R.15E., Sec. 36, SW1/4, SE1/4	57+	51	0	A 0-14	Dark Reddish Brown	Clay Loam	-	-	-	N.A.
					B 14-36	Dark Brown	Clay Loam	-	-	-	N.A.
					C ₁ 36-51	Dark Reddish Gray, Dark Brown Mottles	Clay Loam	-	-	-	N.A.
					C _x 51-57+	Dark Reddish Gray, Dark Brown Mottles	Loam (Hardpan)	-	-	-	N.A.
26	T.38S., R.15E., Sec. 1, SE1/4, SW1/4	67+	21	1	A 0-9	Dark Reddish Brown	Loam	Gravel	Subround Angular	5	N.A.
					B 9-21	Dark Reddish Brown	Clay Loam	Gravel	Subround Angular	8	N.A.
					C _x 21-67+	Reddish Brown	Gravelly Clay Loam	Gravel, Cobble	Subround Angular	40	Gravelly
27	T.41S., R.22E., Sec. 17, SW1/4, SE1/4	36+	36+	0.25	A 0-9	Dark Brown	Clay Loam	Gravel	Subround Sub-angular	15	N.A.
					B 9-21	Dark Brown	Clay Loam	Gravel	Subround Sub-angular	20	N.A.
					C 21-36+	Strong Brown	Gravelly Clay Loam	Gravel, Cobble	Subround Sub-angular	35	Gravelly
28	T.40S., R.18E., Sec. 23, SW1/4, SE1/4	13	5	0	A 0-5	Dark Brown	Very Stony Clay Loam	Gravel-Stone	Subround	60	Very Stony
					B 5-11	Dark Reddish Brown	Silty Clay-Clay	Gravel-Stone	Subround	10	N.A.
					C 11-13	Dark Reddish Brown	Clay Loam	Gravel-Stone	Subround	25	N.A.
					R 13+ (Basalt)						

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
25	A 0-14	Moderate	Medium	Granular, Sbky	Moderate	Soft	Friable	Slightly Plastic	6.5	
	B 14-36	Moderate	Fine	Granular, Sbky	Moderate	Hard	Firm	Plastic	6.7	
	C ₁ 36-51	Moderate	Medium	Sbky	Slow	Hard	Firm	Plastic	6.8	
	C _x 51-57+	Moderate	Fine	Platy	Slow	Very Hard	Very Firm	-	6.8	
26	A 0-9	Weak	Medium	Granular, Sbky	Moderate	Soft	Very Friable	Slightly Plastic	6.5	
	B 9-21	Weak	Fine	Granular, Sbky	Slow	Hard	Friable	Plastic	6.7	
	C _x 21-67+	Weak	Fine	Subangular, Massive	Slow	Very Hard	Very Firm	-	6.8	
27	A 0-9	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.5	
	B 9-21	Moderate	Fine	Sbky	Moderate	Hard	Friable	Plastic	6.6	
	C 21-36+	Weak-Moderate	Fine	Sbky	Moderate	Hard	Friable	Plastic	6.6	
28	A 0-5	Weak-Moderate	Medium	Granular	Slow	Hard	Firm	Plastic	6.5	Lower subsoil is commonly silica cemented.
	B 5-11	Strong	Coarse	Prismatic → Sbky	Very Slow	Extremely Hard	Very Firm	Very Plastic	6.3	
	C 11-13	Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	6.3	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
29	T.31S., R.16E., Sec. 29, NW1/4, NE1/4	28+	19	0	A 0-12	Dark Reddish Brown	Loam	Gravel-Stone	Subround	20	N.A.
					B ₁ 12-19	Dark Reddish Brown	Clay Loam	Gravel-Stone	Subround	30	N.A.
					B ₂ 19-24	Dark Reddish Brown	Silty Clay	Gravel-Stone	Subround	30	N.A.
					C 24-28+	Dark Reddish Brown	Silty Clay	Gravel-Stone	Subround	40	Stony
30A	T.27S., R.13E., Sec. 31, NE1/4, NW1/4	20	11	0	A 0-11	Very Dark Gray	Clay Loam	Gravel-Stone	Subround, Angular	25	N.A.
					B 11-18	Dark Brown	Silty Clay-Clay	Gravel-Stone	Subround, Angular	30	N.A.
					C 18-20	Dark Brown	Very Stony Silty Clay Loam	Gravel-Stone	Subround, Angular	50	Very Stony
					R 20 (Tuff)						
34A	T.37S., R.13E., Sec. 4, SW1/4, SE1/4	28	28	1	A 0-4	Dark Reddish Brown	Loam	Gravel	Subround	5	N.A.
					B ₁ 4-12	Dark Reddish Brown	Loam-Clay Loam	Gravel	Subround	10	N.A.
					B ₂ 12-23	Dark Reddish Brown	Stony Clay Loam	Gravel-Stone	Subround, Angular	40	Stony
					C 23-28	Dark Reddish Brown	Stony Silty Clay Loam	Gravel-Stone	Subround, Angular	40	Stony
					R 28						

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (CONT.)

Land Type No.	Soil Layer & Thickness (in.)	Structure			Permeability	Consistence				pH	Remarks
		Grade	Size	Type		Dry	Moist	Wet			
29	A 0-12	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.7		
	B ₁ 12-19	Weak	Fine	Granular, Sbky	Moderate	Slightly Hard	Friable	Plastic	6.5		
	B ₂ 19-24	Weak	Fine	Sbky	Slow	Very Hard	Very Firm	Very Plastic	6.6		
	C 24-28+	Moderate-Strong	Medium	Sbky	Slow	Very Hard	Very Firm	Very Plastic	6.6		
30A	A 0-11	Weak	Fine	Granular	Slow	Soft	Very Friable	Plastic	6.5	Lower subsoil is commonly silica cemented.	
	B 11-18	Strong	Medium	Sbky	Very Slow	Extremely Hard	Very Firm	Very Plastic	6.7		
	C 18-20	Weak	Medium	Sbky	Slow	Hard	Firm	Plastic	6.5		
	R 20 (Tuff)										
34A	A 0-4	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.2	Horizonation is weak.	
	B ₁ 4-12	Weak	Fine	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.2		
	B ₂ 12-23	Weak-Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	6.2		
	C 23-28	Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	6.5		
	R 28										

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TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
35	T.31S., R.15E., Sec. 21, SW1/4, NE1/4	44+	44+	0.5	A 0-4	Dark Reddish Brown	Loam	Gravel	Subround	2 ^{1/}	N.A.
					B ₁ 4-14	Dark Reddish Brown	Clay Loam	Gravel-Stone	Subround, Angular	4	N.A.
					B ₂ 14-38	Dark Reddish Brown - Brown	Silty Clay Loam	Gravel-Stone	Subround, Angular	5	N.A.
					C 38-44+	Dark Yellowish Brown	Clay Loam	Gravel-Stone	Subround, Angular	10	N.A.
36	T.29S., R.14E., Sec. 28, NE1/4, SW1/4	22	22	1	A 0-5	Dark Reddish Brown	Loam	Gravel-Stone	Irregular, Subround	30	N.A.
					B ₁ 5-12	Dark Reddish Brown	Cobbly Clay Loam	Gravel-Stone	Irregular, Subround	50	Cobbly
					B ₂ 12-17	Dark Reddish Brown	Cobbly Silty Clay Loam	Gravel-Stone	Irregular, Subround	50	Cobbly
					C 17-22	Dark Reddish Brown	Cobbly Silty Clay Loam	Gravel-Stone	Irregular, Subround	60	Very Cobbly
					R 22 (Tuff, Cinders)						
37A	T.31S., R.16E., Sec. 6, SW1/4, SE1/4	25	25	1	A 0-7	Dark Reddish Brown	Sandy Loam	Gravel-Stone	Subround	20	N.A.
					B ₁ 7-19	Dark Reddish Brown	Loam	Gravel-Stone	Subround	30	N.A.
					B ₂ 19-25	Dark Reddish Brown	Stony Clay Loam	Gravel-Stone	Subround, Irregular	40	Stony
					R 25						

1/ Typically is stony to very stony.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
35	A 0-4	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.5	Horizonation is weak.
	B ₁ 4-14	Weak	Medium Fine	Granular, Sbky	Slow	Slightly Hard	Friable	Plastic	6.5	
	B ₂ 14-38	Moderate	Medium Fine	Granular Sbky	Slow	Hard	Firm	Plastic	6.5	
	C 38-44+	Moderate	Medium Fine	Granular Sbky	Slow	Hard	Firm	Plastic	6.5	
36	A 0-5	Moderate	Medium Fine	Granular, Sbky	Moderate	Soft	Very Friable	Slightly Plastic	6.6	Surface is very cobbly.
	B ₁ 5-12	Weak	Medium Fine	Granular, Sbky	Slow	Hard	Firm	Plastic	6.5	
	B ₂ 12-17	Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	6.6	
	C 17-22	Strong	Fine	Sbky	Slow	Hard	Firm	Plastic	6.7	
	R 22(Tuff Cinders)	Moderate-Strong								
37A	A 0-7	Weak	Medium Fine	Granular, Sbky	Rapid	Soft	Very Friable	Slightly Plastic	6.4	Horizonation is weak.
	B ₁ 7-19	Weak	Medium Fine	Granular, Sbky	Moderate	Soft	Very Friable	Slightly Plastic	6.3	
	B ₂ 19-25	Weak	Fine	Sbky	Slow	Hard	Firm	Plastic	6.3	
	R 25	Moderate-Strong								

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
38	T.30S., R.14E., Sec. 22, SW1/4, SW1/4	30	03	1.5	A 0-3	Dark Reddish Brown	Sandy Loam	Gravel-Stone	Subround, Angular	20	N.A.
					B ₁ 3-7	Dark Reddish Brown	Loam	Gravel-Stone	Subround, Angular	20	N.A.
					B ₂ 7-18	Dark Reddish Brown	Clay Loam	Gravel-Stone	Subround, Angular	20	N.A.
					C 18-30	Dark Reddish Brown	Stony Silty Clay Loam	Gravel-Stone	Subround, Angular	50	Very Stony
					R 30 (Tuff)						
39	T.31S., R.15E., Sec. 15, NE1/4, NE1/4	28+	20	2	A 0-3	Dark Reddish Brown	Loam	Gravel-Stone	Subround, Angular	20	N.A.
					B ₁ 3-10	Dark Reddish Brown	Clay Loam	Gravel-Stone	Subround, Angular	20	N.A.
					B ₂ 10-20	Dark Reddish Brown	Stony Clay Loam	Gravel-Stone	Subround, Angular	35	Stony
					C 20-28+	Dark Reddish Brown	Stony Silty Clay	Gravel-Stone	Subround, Angular	35	Stony
40B	T.37S., R.16E., Sec. 27, SW1/4, SW1/4	37	37	0.5	A ₁ 0-4	Dark Brown	Sandy Loam	Gravel	Angular	5	N.A.
					AC 4-9	Dark Brown	Sandy Loam	Gravel	Angular	10	N.A.
					C ₁ 9-22	Brown	Gravelly Sandy Loam	Gravel	Angular, Sub-round	35	Gravelly
					C ₂ 22-37	Yellowish Brown	Very Gravelly Loamy Sand	Gravel	Angular, Sub-round	70	Very Gravelly
					R 37 (Rhyolite)						

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
38	A 0-3	Weak	Coarse	Platy →	Rapid	Soft	Very Friable	Slightly Plastic	6.4	Horizonation is weak.
	B ₁ 3-7	Weak	Medium	Granular	Moderate	Slightly Hard	Friable	Slightly Plastic	7.2	
	B ₂ 7-18	Moderate	Medium	Granular, Sbky	Slow	Hard	Firm	Plastic	6.7	
	C 18-30	Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	6.8	
	R 30 (Tuff)	Moderate	Fine							
39	A 0-3	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.2	Horizonation is weak.
	B ₁ 3-10	Weak	Fine	Granular, Sbky	Slow	Slightly Hard	Friable	Plastic	6.5	
	B ₂ 10-20	Moderate	Fine	Granular, Sbky	Slow	Hard	Firm	Plastic	6.8	
	C 20-28+	Moderate	Medium	Sbky	Slow	Very Hard	Very Firm	Very Plastic	6.8	
40B	A ₁ 0-4	Weak	Fine	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.8	
	AC 4-9	Weak	Medium	Granular, Sbky	Rapid	Soft	Very Friable	Slightly Plastic	6.7	
	C ₁ 9-22	Weak	Fine	Sbky	Rapid	Soft	Very Friable	Nonplastic	6.6	
	C ₂ 22-37	Weak	Fine	Sbky	Very Rapid	Soft	Very Friable	Nonplastic	6.8	
	R 37 (Rhyolite)									

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
41A	T.38S., R.17E., Sec. 5, NW1/4, SW1/4	36+	36+	0.5	A ₁ 0-3	Very Dark Gray	Sandy Loam	Gravel	Angular, Sub-round	5	N.A.
					AC 3-10	Dark Grayish Brown	Sandy Loam	Gravel	Angular, Sub-round	20	N.A.
					C ₁ 10-23	Dark Grayish Brown	Gravelly Loamy Sand	Gravel	Angular, Sub-round	35	Gravelly
					C ₂ 23-36	Yellowish Brown	Very Gravelly Loamy Sand	Gravel, Cobble	Angular, Sub-round	60	Very Gravelly
42	T.38S., R.18E., Sec. 2, NW1/4, NW1/4	47+	47+	0.25	A 0-5	Very Dark Grayish Brown	Sandy Loam	Gravel	Angular	3	N.A.
					C ₁ 5-25	Dark Brown	Sandy Loam	Gravel, Cobble	Angular	5	N.A.
					C ₂ 25-47+	Dark Brown	Very Gravelly Sandy Loam	Gravel, Cobble	Angular	80	Very Gravelly
43	T.38S., R.22E., Sec. 6, SE1/4, NW1/4	32+	32+	0.25	A ₁ 0-6	Very Dark Grayish Brown	Gravelly Sandy Loam	Gravel, Cobble	Irregular, Sub-round	35	Gravelly
					AC 6-13	Dark Brown	Gravelly Loamy Sand	Gravel, Cobble	Irregular, Sub-round	40	Gravelly
					C 13-32+	Yellowish Brown	Very Gravelly Loamy Sand	Gravel, Cobble	Irregular, Sub-round	50	Very Gravelly

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
41A	A ₁ 0-3	Weak	Fine	Granular	Rapid	Loose	Loose	Nonplastic	6.8	
	AC 3-10	Single Grain	Medium	Sbky	Rapid	Loose	Loose	Nonplastic	6.5	
	C ₁ 10-23	Weak	Medium	Sbky	Very Rapid	Loose	Loose	Nonplastic	6.6	
	C ₂ 23-36	Single Grain	Medium	Sbky	Very Rapid	Loose	Loose	Nonplastic	6.6	
42	A 0-5	Single Grain	Medium	Granular	Rapid	Soft-Loose	Very Friable	Nonplastic	-	
	C ₁ 5-25	Weak	Medium	Sbky	Rapid	Soft	Very Friable	Nonplastic	-	
	C ₂ 25-47+	Very Weak	Medium	Sbky	Rapid	Soft	Very Friable	Nonplastic	-	
43	A ₁ 0-6	Weak	Medium	Granular	Rapid	Soft	Very Friable	Nonplastic	6.0	
	AC 6-13	Single Grain	Fine	Sbky	Very Rapid	Loose	Loose	Nonplastic	6.2	
	C 13-32+	Weak	Fine	Sbky	Very Rapid	Loose	Loose	Nonplastic	5.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
44	T.38S., R.22E., Sec. 5, SW1/4, NW1/4	36+	36+	0	A ₁ 0-10	Gray	Very Gravelly Sandy Loam	Gravel	Angular	50	Very Gravelly
					AC 10-16	Very Dark Grayish Brown	Very Gravelly Sandy Loam	Gravel	Angular	50	
					C 16-36	Very Dark Grayish Brown	Very Gravelly Loamy Sand	Gravel, Cobble	Angular	60	
50	T.39S., R.21E., Sec. 18, NW1/4, SW1/4	17	10	0.25	A 0-5	Dark Brown	Silty Clay Loam	-	-	-	N.A.
					B 5-10	Dark Brown	Silty Clay	Gravel	Subround	3	
					C 10-17	Dark Reddish Brown	Clay	Gravel	Subround	1	
51	T.41S., R.18E., Sec. 6, NW1/4, SW1/4	38	4	0.5	R 17 (Tuff)						
					A 0-4	Dusky Red	Silty Clay	Gravel	Subround	2	
					B 4-21	Dark Reddish Brown	Clay	Gravel	Subround	3	
53	T.40S., R.18E., Sec. 19, SE1/4, NE1/4	10	10	0	C 21-38	Dusky Red-Dark Reddish Brown	Gravelly Silty Clay Loam	Gravel	Angular	40	Gravelly
					R 38 (Tuff)						
56A	T.37S., R.12E., Sec. 11, NE1/4, SW1/4	26	26	0	A 0-8	Dark Brown	Loam	-	-	-	N.A.
					B ₁ 8-12	Dark Brown	Clay Loam	-	-	-	
					B ₂ 12-22	Dark Brown	Silty Clay Loam	-	-	-	
56A					C 22-26	Brown	Clay Loam	Gravel-Stone	Subround	25	N.A.
					R 26 (Tuff)						

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
44	A ₁ 0-10	Single Grain Weak	- Medium	- Granular	Rapid	Loose	Loose	Nonplastic	6.3	
	AC 10-16	Single Grain Weak	- Medium	- Granular	Rapid	Loose	Loose	Nonplastic	6.3	
	C 16-36	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.4	
50	A 0-5	Moderate	Medium	Granular	Slow	Hard	Firm	Plastic	5.5	Lower subsoil may contain a duripan. Soil cracks deeply.
	B 5-10	Moderate	Medium	Sbky	Slow	Very Hard	Very Firm	Very Plastic	5.7	
	C 10-17	Moderate	Medium	Sbky	Very Slow	Extremely Hard	Very Firm	Very Plastic	6.2	
	R 17 (Tuff)									
51	A 0-4	Moderate	Medium	Granular, Sbky	Slow	Hard	Firm	Plastic	7.0	Soils crack deeply during summer.
	B 4-21	Moderate Weak, Moderate	Medium	Sbky	Very Slow	Extremely Hard	Very Firm	Very Plastic	6.7	
	C 21-38	Weak	Fine, Medium	Sbky	Slow	Hard	Firm	Plastic	7.2	
	R 38 (Tuff)									
53	A 0-4	Weak	Medium	Granular	Moderate	Slightly Hard	Friable	Slightly Plastic	6.5	Lower subsoil may contain a duripan.
	C 4-10	Weak	Fine	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.5	
	R 10 (Tuff)									
56A	A 0-8	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	7.0	
	B ₁ 8-12	Moderate	Medium	Granular	Slow	Slightly Hard	Friable	Plastic	7.0	
	B ₂ 12-22	Strong	Medium	Sbky	Slow	Hard	Firm	Plastic	7.0	
	C 22-26	Moderate	Medium	Sbky	Slow	Hard	Firm	Plastic	7.0	
	R 26 (Tuff)									

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
57	T.37S., R.16E., Sec. 8, SE1/4, NW1/4	29+	29+	0	A ₁ 0-8	Very Dark Grayish Brown	Sandy Loam	Gravel, Cobble	Subround, Angular	25	N.A.
					AC 8-13	Dark Brown	Loam	Gravel, Cobble	Subround, Angular	25	N.A.
					C 13-29	Dark Yellowish Brown	Gravelly Clay Loam	Gravel-Stone	Subround, Angular	35	Gravelly
60	T.35S., R.19E., Sec. 34, SW1/4, NW1/4	24	18	0	A 0-10	Black	Loam	Gravel, Cobble	Angular	30	N.A.
					B 10-18	Dark Brown	Cobbly Silty Clay Loam	Cobble	Angular	45	Cobbly
					C 18-24	Dark Brown	Very Cobbly Silty Clay	Gravel, Cobble	Angular	60	Very Cobbly
					R 24						
61	T.35S., R.18E., Sec. 2, NE1/4 NW1/4	110+	110+	0	A 0-11	Black	Loam	-	-	-	N.A.
					B 11-26	Black	Loam	-	-	-	N.A.
					C ₁ 26-62	Very Dark Grayish Brown	Sandy Loam	-	-	-	N.A.
					C ₂ 62-110	Dark Brown	Clay Loam	-	-	-	N.A.
62B	T.38S., R.18E., Sec. 13, NW1/4, SW1/4	37	8	0.5	A 0-8	Very Dark Grayish Brown	Silt Loam	Gravel	Subround	5	N.A.
					B 8-23	Dark Brown	Silty Clay	Gravel	Subround	15	N.A.
					C 23-37	Dark Yellowish Brown	Cobbly Silty Clay Loam	Cobble	Subround	40	Cobbly
					R 37 (Tuff, Breccia)						
63B	T.37S., R.18E., Sec. 4, SW1/4, NW1/4	45+ ¹ / ₂	45+	1	A 0-5	Dark Brown	Sandy Loam	-	-	-	N.A.
					B 5-25	Dark Brown	Sandy Loam	-	-	-	N.A.
					C 25-45+	Brown	Sandy Loam	Gravel	Subround	10	N.A.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)		Structure			Permeability	Consistence				Remarks
			Grade	Size	Type		Dry	Moist	Wet	pH	
57	A	0-8	Weak	Medium	Granular	Rapid	Soft	Very Friable	Slightly Plastic	7.5	
	AC	8-13	Weak	Medium	Granular, Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	7.5	
	C	13-29	Weak	Fine	Sbky	Slow	Hard	Firm	Plastic	7.5	
60	A	0-10	Weak	Fine	Granular, Sbky	Moderate	Soft	Friable	Slightly Plastic	7.0	
	B	10-18	Weak	Medium	Sbky	Slow	Hard	Firm	Plastic	7.4	
	C	18-24	Weak	Medium	Sbky	Slow	Very Hard	Very Firm	Very Plastic	7.4	
	R	24		Coarse							
61	A	0-11	Weak	Medium	Sbky	Moderate	Soft	Very Friable	Slightly Plastic	-	
	B	11-26	Weak	Coarse	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	-	
	C ₁	26-62	Weak	Coarse	Sbky	Rapid	Soft	Very Friable	Slightly Plastic	-	
	C ₂	62-110	Weak	Coarse	Sbky	Slow	Hard	Firm	Plastic	-	
62B	A	0-8	Moderate	Medium	Granular	Moderate	Soft	Friable	Slightly Plastic	6.5	
	B	8-23	Moderate	Medium	Sbky	Slow	Very Hard	Very Firm	Very Plastic	6.2	
	C	23-37	Moderate	Medium	Sbky	Slow	Hard	Firm	Plastic	6.3	
	R	37 (Tuff Breccia)									
63B	A	0-5	Weak	Fine	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.8	
	B	5-25	Weak	Fine	Sbky	Rapid	Slightly Hard	Friable	Slightly Plastic	6.8	
	C	25-45+	Weak	Medium	Sbky	Rapid	Hard	Friable	Slightly Plastic	7.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
64	T.29S., R.13E., Sec. 35, NW1/4, NE1/4	30+	30+	1	A ₁ 0-1	Very Dark Grayish Brown	Loam	Gravel	Subround, Angular	5	N.A.
					A ₃ 1-5	Dark Brown	Loam	Gravel	Subround, Angular	25	N.A.
					B ₁ 5-14	Dark Yellowish Brown	Sandy Loam	Gravel	Subround, Angular	30	N.A.
					B ₂ 14-21	Dark Brown	Loam	Gravel	Subround, Angular	30	N.A.
					C 21-30+	Dark Brown	Very Gravelly Loam	Gravel	Subround, Angular	60	Very Gravelly
66	T.38S., R.18E., Sec. 2, NW1/4, NW1/4	45+	34	1	A 0-7	Dark Brown	Sandy Loam	Gravel, Cobble	Subround, Flat	25	N.A.
					B 7-34	Dark Yellowish Brown	Gravelly Sandy Loam	Gravel, Cobble	Subround, Flat	40	Gravelly
					C _x 34-45+	Dark Brown	Very Gravelly Loam	Gravel, Cobble	Subround, Flat	50	Very Gravelly
67B	T.37S., R.18E., Sec. 8, NW1/4, SE1/4	50	12	1	A ₁ 0-6	Very Dark Gray	Silt Loam	-	-	-	N.A.
					A ₃ 6-12	Grayish Brown	Silty Clay Loam	-	-	-	N.A.
					B 12-32	Light Yellowish Brown	Silty Clay	-	-	-	N.A.
					C 32-50	Olive	Silt Loam	-	-	-	N.A.
68B	T.36S., R.19E., Sec. 9, SW1/4, SW1/4	38	38	2	R 50 (Tuff)						
					A ₁ 0-1	Very Dark Grayish Brown	Sandy Loam	Gravel	Angular	1	N.A.
					AC 1-18	Dark Brown	Loamy Sand	Gravel	Subround	3	N.A.
					C 18-38	Brown	Gravelly Loamy Sand	Gravel	Subround, Angular	35	Gravelly
					R 38 (Breccia)						

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (in.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
64	A ₁ 0-1	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.0	
	A ₃ 1-5	Weak	Fine	Granular	Moderate	Soft	Very Friable	Slightly Plastic	6.5	
	B ₁ 5-14	Weak	Fine	Granular	Rapid	Slightly Hard	Friable	Slightly Plastic	6.5	
	B ₂ 14-21	Moderate	Medium	Granular, Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.8	
	C 21-30+	Moderate	Fine	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	7.0	
66	A 0-7	Weak	Medium	Granular	Rapid	Soft	Very Friable	Slightly Plastic	6.5	C horizon is strongly cemented.
	B 7-34	Moderate	Medium	Sbky	Rapid	Slightly Hard	Friable	Slightly Plastic	7.0	
	C _x 34-45+	Moderate	Very Coarse	Platy	Slow	Very Hard	Very Firm	-	6.3	
67B	A ₁ 0-6	Moderate	Fine	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	-	
	A ₃ 6-12	Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	-	
	B 12-32	Weak	Coarse	Sbky	Very Slow	Very Hard	Very Firm	Very Plastic	-	
	C 32-50	Moderate	Coarse	Sbky	Moderate	Hard	Friable	Slightly Plastic	-	
68B	A ₁ 0-1	Weak	Medium	Granular	Rapid	Soft	Very Friable	Slightly Plastic	5.5	
	AC 1-18	Weak	Medium	Sbky	Very Rapid	Soft-Loose	Very Friable-Loose	Nonplastic	6.5	
	C 18-38	Weak	Medium	Sbky	Very Rapid	Soft	Very Friable	Nonplastic	7.0	
	R 38 (Breccia)									

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
70	T.37S., R.18E., Sec. 6, NW1/4, SW1/4	40+	40+	1	A 0-5	Very Dark Gray (Mottled)	Silt Loam	-	-	-	N.A.
					B 5-35	Black	Silt Loam	-	-	-	N.A.
					C 35-40+	Grayish Brown (Mottled)	Silty Clay Loam	-	-	-	N.A.
74C	T.38S., R.18E., Sec. 3, NW1/4, NE1/4	50	50	0.5	A ₁ 0-4	Very Dark Grayish Brown	Gravelly Loamy Sand	Gravel, Cobble	Subround, Flat	35	Gravelly
					AC 4-11	Dark Grayish Brown	Very Cobbly Loamy Sand	Gravel, Cobble	Subround, Flat	50	Very Cobbly
					C ₁ 11-25	Brown	Very Cobbly Loamy Sand	Cobble, Stone	Subround, Flat	50	Very Cobbly
					C ₂ 25-50	Grayish Brown	Very Cobbly Loamy Sand	Cobble, Stone	Subround, Flat	50	Very Cobbly
					R 50 (Breccia)						
76B	T.36S., R.18E., Sec. 15, SW1/4, SW1/4	45	45	1	A ₁ 0-2	Very Dark Gray	Sandy Loam	Gravel, Cobble	Angular	10	N.A.
					AC 2-15	Dark Grayish Brown	Very Cobbly Loamy Sand	Gravel, Cobble	Angular, Flat	60	Very Cobbly
					C ₁ 15-29	Brown	Very Cobbly Sandy Loam	Gravel, Cobble	Angular, Flat	60	Very Cobbly
					C ₂ 29-45	Brown	Very Cobbly Sandy Loam	Gravel, Cobble	Angular, Flat	50	Very Cobbly
					R (Breccia)						
77B	T.34S., R.13E., Sec. 20, SW1/4 SW1/4	40+	40+	1	A ₁ 0-8	Dark Brown	Loamy Sand	Gravel	Angular	15	N.A.
					AC 8-12	Brown	Loamy Sand	Gravel	Angular	20	N.A.
					C 12-22	Yellowish Brown	Sand	Gravel	Angular	25	N.A.
					IIC 22-40+	Brown	Very Gravelly Sandy Loam	Gravel	Angular	70	Very Gravelly

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
70	A 0-5	Weak	Fine	Granular	Slow	Slightly Hard	Friable	Slightly Plastic	-	Poorly drained.
	B 5-35	Weak	Fine	Granular	Very Slow	Hard	Friable	Slightly Plastic	-	
	C 35-40+	Moderate	Medium	Sbky	Very Slow	Very Hard	Firm	Plastic	-	
74C	A ₁ 0-4	Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	7.8	
	AC 4-11	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	7.3	
	C ₁ 11-25	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.3	
	C ₂ 25-50	Single Grain	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.6	
	R 50 (Breccia)	Weak	Fine	Sbky						
76B	A ₁ 0-2	Very Weak	Medium	Granular	Rapid	Loose	Loose	Slightly Plastic	6.5	
	AC 2-15	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.3	
	C ₁ 15-29	Very Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	7.4	
	C ₂ 29-45	Single Grain	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	7.6	
77B	A ₁ 0-8	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	7.0	
	AC 8-12	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	8.0	
	C 12-22	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.7	
	IIC 22-40+	Weak	Medium	Granular	Rapid	Soft	Friable	Nonplastic	7.7	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
78	T.34S., R.12E., Sec. 23, NE1/4, SW1/4	34+	34+	0-1	A ₁ 0-2	Very Dark Grayish Brown	Loamy Sand	Gravel	Angular, Subround	5	N.A.
					AC 2-8	Dark Brown	Loamy Coarse Sand	Gravel	Angular, Subround	10	N.A.
					C ₁ 8-14	Yellowish Brown	Coarse Sand	Gravel	Subround	15	N.A.
					C ₂ 14-21	Light Yellowish Brown	Coarse Sand	Gravel	Subround	25	N.A.
					IIC 21-34+	Dark Brown	Extremely Gravelly Loamy Sand	Gravel, Cobble	Angular	80	Extremely Gravelly
79	T.34S., R.16E., Sec. 27, SE1/4, NW1/4	32+	32+	1	A ₁ 0-3	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					AC 3-6	Dark Brown	Loamy Sand	-	-	-	N.A.
					C 6-13	Dark Yellowish Brown	Loamy Sand	-	-	-	N.A.
					IIC 13-32+	Yellowish Brown	Very Gravelly Sandy Loam	Gravel	Angular	70	Very Gravelly
80A	T.34S., R.17E., Sec. 18, NE1/4, SW1/4	31+	31+	0.25	A 0-3	Very Dark Grayish Brown	Loamy Sand	Gravel	Flat	20	N.A.
					C 3-19	Brown	Sand	Gravel	Flat	25	N.A.
					IIC 19-31+	Yellowish Brown	Gravelly Sandy Loam	Gravel, Cobble	Flat, Angular	45	Gravelly
81	T.28S., R.13E., Sec. 19, SE1/4, NW1/4	30	23	0	AC 0-15	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					C 15-23	Brown	Loamy Sand	-	-	-	N.A.
					IIB 23-30	Brown	Very Stony Silty Clay	Cobble, Stone	Subround	70	Very Stony

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
78	A ₁ 0-2	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.5	
	AC 2-8	Weak	Coarse	Granular	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C ₁ 8-14	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C ₂ 14-21	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	IIC 21-34+	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.8	
79	A ₁ 0-3	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.4	
	AC 3-6	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.4	
	C 6-13	Very Weak	Fine	Sbky	Very Rapid	Loose	Loose	Nonplastic	6.5	
	IIC 13-32+	Single Grain	-	-	Rapid	Soft	Very Friable	Nonplastic	6.8	
80A	A 0-3	Very Weak	Medium	Granular	Very Rapid ^{1/}	Soft	Very Friable	Nonplastic	6.5	
	C 3-19	Very Weak	Fine	Sbky	Very Rapid	Loose-Soft	Loose-Very Friable	Nonplastic	6.8	
	IIC 19-31+	Weak	Medium	Granular	Rapid	Soft	Very Friable	Nonplastic	6.0	
81	AC 0-15	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C 15-23	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	IIB 23-30	Moderate	Fine	Sbky	Slow	Very Hard	Very Firm	Very Plastic	7.0	

1/ Water Repellent when dry.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
82	T.34S., R.12E., Sec. 21, SW1/4, NE1/4	33+	33+	1	A ₁ 0-4	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					AC 4-10	Dark Brown	Loamy Sand	Gravel	Subround	5	N.A.
					C 10-26	Brown	Sand	Gravel	Subround	25	N.A.
					IIC 26-33+	Dark Brown	Gravelly Clay Loam	Gravel	Gravel	40	Gravelly
83	T.28S., R.11E., Sec. 16, SW1/4, SE1/4	40+	36	0.5	A 0-9	Very Dark Grayish Brown, Dark Brown	Loamy Sand	Gravel	Pumice	10	N.A.
					C 9-28	Light Gray	Coarse Sand	Gravel	Pumice	10	N.A.
					IIC 28-36	Dark Grayish Brown, Dark Yellowish Brown	Silty Clay Loam	Gravel	Subround	10	N.A.
					IIC _x 36-40+	Dark Brown	Sandy Loam	-	-	-	N.A.
84	T.34S., R.14E., Sec. 5, NW1/4, SE1/4	44+	44+	2	A ₁ 0-3	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					AC 3-7	Dark Brown	Loamy Sand	-	-	-	N.A.
					C ₁ 7-14	Yellowish Brown	Loamy Sand	Gravel	Pumice	2	N.A.
					C ₂ 14-35	Yellowish Brown	Sand	Gravel	Pumice	2	N.A.
					IIB 35-44+	Dark Yellowish Brown	Clay Loam	Gravel, Cobble	Subround	5 ^{1/}	N.A.
85	T.35S., R.12E., Sec. 3, NE1/4, NW1/4	32+	32+	3	A ₁ 0-4	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					AC 4-10	Dark Brown	Loamy Coarse Sand	Gravel	Subround	5	N.A.
					C 10-26	Brown	Loamy Sand	Gravel	Subround	5	N.A.
					IIC 26-32+	Dark Yellowish Brown	Clay Loam	Gravel	Subround	20 ^{1/}	N.A.

1/ Less stony than typical.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (in.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
82	A ₁ 0-4	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.2	
	AC 4-10	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.3	
	C 10-26	Single Grain	-	-	Rapid	Loose	Loose	Nonplastic	6.3	
	IIC 26-33+	Moderate	Fine	Sbky	Slow	Hard	Friable	Plastic	6.5	
83	A 0-9	Very Weak	Medium	Granular, Sbky	Slow	Soft	Very Friable	Nonplastic	5.5	C _x is strongly cemented. Soil is poorly drained.
	C 9-28	Very Weak	Fine	-	Slow	Loose	Loose	Nonplastic	6.8	
	IIC 28-36	Single Grain	-	-	Very Slow	Hard	Firm	Plastic	6.7	
	IIC _x 36-40+	Weak	Medium	Subangular	Very Slow	Extremely Hard	Extremely Firm	-	6.7	
84	A ₁ 0-3	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.5	
	AC 3-7	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.7	
	C 7-14	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C ₁ 14-35	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.4	
	IIB 35-44+	Moderate	Fine	Sbky	Slow	Hard	Friable	Plastic	7.0	
85	A ₁ 0-4	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.5	
	AC 4-10	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.5	
	C 10-26	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.8	
	IIC 26-32+	Weak	Fine	Sbky	Slow	Hard	Friable	Plastic	6.7	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
86	T.33S., R.16E., Sec. 17, SE1/4, SW1/4	36+	25	1.5	A ₁ 0-6	Dark Brown	Loamy Sand	Gravel-Stone	Subround	10	N.A.
					AC 6-17	Brown	Loamy Sand	Gravel-Stone	Subround	20	N.A.
					IIB 17-25	Brown	Stony Clay Loam	Gravel-Stone	Subround	40	Stony
					IIC 25-36+	Dark Reddish Brown	Stony Silty Clay	Gravel-Stone	Subround	40	Stony
87	T.34S., R.12E., Sec. 9, NW1/4, SE1/4	32+	32+	1-3	A ₁ 0-4	Very Dark Grayish Brown, Dark Brown	Loamy Sand	-	-	-	N.A.
					AC 4-13	Dark Yellowish Brown	Loamy Coarse Sand	Gravel	Pumice	10	N.A.
					C 13-25	Dark Yellowish Brown, Yellowish Brown	Sand	Gravel	Pumice	25	N.A.
					IIC 25-36+	Dark Brown	Clay Loam	Gravel	Subround Angular	10 ^{1/}	N.A.
88B	T.33S., R.16E., Sec. 30, NW1/4, SE1/4	40+	40+	0.5	A 0-5	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					C 5-17	Brown	Loamy Sand	-	-	-	N.A.
					IIB 17-35	Dark Brown	Stony Loam	Gravel-Stone	Subround	50	Stony
					IIC 35-40+	Dark Brown	Very Stony Loam	Gravel-Stone	Subround	60	Very Stony
89A	T.34S., R.17E., Sec. 30, SE1/4, NE1/4	40+	40+	0.5	A 0-4	Dark Brown	Loamy Sand	Gravel	Subround	7	N.A.
					C 4-22	Dark Yellowish Brown	Loamy Sand	Gravel	Angular	10	N.A.
					IIC 22-40+	Dark Yellowish Brown	Stony Clay Loam	Gravel-Stone	Angular	50	Stony

^{1/} Less stony than typical.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
86	A ₁ 0-6	Very Weak	Medium	Granular, Sbky	Very Rapid	Loose	Loose	Nonplastic	6.5	
	AC 6-17	Weak	Fine							
	AC 6-17	Very Weak	Medium	Granular, Sbky	Very Rapid	Loose	Loose	Nonplastic	6.5	
	IIB 17-25	Very Weak	Fine							
IIC 25-36+		Moderate	Fine	Sbky	Slow	Hard	Friable	Plastic	6.7	
		Strong	Fine	Sbky	Slow	Very Hard	Very Firm	Very Plastic	6.7	
87	A ₁ 0-4	Very Weak	Medium	Granular	Very Rapid	Loose-Soft	Loose-Very Friable	Nonplastic	6.5	
	AC 4-13	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.0	
	C 13-25	Single Grain	-		Very Rapid	Loose	Loose	Nonplastic	6.3	
	IIC 25-36+	Weak	Fine	Sbky	Slow	Hard	Friable	Plastic	6.6	
88B	A 0-5	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.3	
	C 5-17	Single Grain	-		Very Rapid	Loose	Loose	Nonplastic	6.7	
	IIB 17-35	Moderate	Fine	Granular, Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.0	
	IIC 35-40+	Moderate	Fine	Granular, Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.5	
89A	A 0-4	Very Weak	Medium	Sbky	Very Rapid	Loose	Loose	Nonplastic	6.0	
	C 4-22	Single Grain	-		Very Rapid	Loose	Loose	Nonplastic	6.3	
	IIC 22-40+	Weak	Fine	Sbky	Slow	Hard	Friable	Plastic	6.3	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
90	T.34S., R.15E., Sec. 15, NW1/4, NE1/4	30+	30+	0.5	A ₁ 0-2	Very Dark Grayish Brown	Loamy Sand	Gravel	Subround, Flat	5	N.A.
					AC 2-4	Dark Brown	Loamy Sand	Gravel	Subround, Flat	5	N.A.
					C 4-19	Dark Yellowish Brown	Loamy Sand	Gravel	Subround, Flat	3	N.A.
					IIB 19-30+	Dark Brown	Gravelly Clay Loam	Gravel-Stone	Subround, Angular	50	Gravelly
92	T.30S., R.12E., Sec. 28, NW1/4, NW1/4	32+	32+	1	A ₁ 0-3	Very Dark Grayish Brown	Loamy Sand	Gravel	Pumice	5	N.A.
					AC 3-11	Dark Brown, Yellowish Brown	Loamy Sand	Gravel	Pumice	20	N.A.
					C 11-18	Pale Brown, Yellowish Brown, Brownish Yellow	Gravelly Coarse Sand	Gravel	Pumice	40	Gravelly
					IIC 18-32+	Brown	Very Gravelly Sandy Loam	Gravel	Angular	60	Very Gravelly
93A	T.25S., R.12E., Sec. 25, NE1/4, SE1/4	36+	36+	2	A ₁ 0-4	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					AC 4-16	Dark Grayish Brown, Very Pale Brown	Loamy Coarse Sand	Gravel	Pumice	30	N.A.
					C 16-31	Light Gray	Coarse Sand	Gravel, Cobble	Subround	10	N.A.
					IIC 31-36+	Dark Brown	Very Cobbly Clay Loam	Gravel, Cobble	Subround	70	Very Cobbly
94A	T.25S., R.11E., Sec. 8, SE1/4, NW1/4	52+	52+	2	A ₁ 0-2	Very Dark Gray	Loamy Sand	Gravel	Pumice	10	N.A.
					AC 2-11	Dark Grayish Brown	Loamy Sand	Gravel	Pumice	30	N.A.
					C ₁ 11-30	Brownish Yellow, Very Pale Brown	Gravelly Coarse Sand	Gravel	Pumice	50	Gravelly
					C ₂ 30-52	Very Pale Brown, Light Gray	Coarse Sand	Gravel	Pumice	30	N.A.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
90	A ₁ 0-2	Very Weak	Medium	Granular	Rapid	Loose	Loose	Nonplastic	6.0	
	AC 2-4	Very Weak	Medium	Granular	Rapid	Loose-Soft	Loose-Very Friable	Nonplastic	6.3	
	C 4-19	Very Weak	Medium	Granular	Rapid	Loose	Loose	Nonplastic	6.4	
	IIB 19-30+	Moderate	Fine	Sbky	Slow	Hard	Friable	Plastic	6.0	
92	A ₁ 0-3	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.2	
	AC 3-11	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.8	
	C 11-18	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	7.0	
	IIC 18-32+	Single Grain	-	-	Moderate	Soft	Friable	Slightly Plastic	6.2	
93A	A ₁ 0-4	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.7	
	AC 4-16	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.7	
	C 16-31	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.8	
	IIC 31-36+	Moderate	Fine	Sbky	Slow	Hard	Firm	Plastic	7.0	
94A	A ₁ 0-2	Very Weak	Coarse	Blocky	Very Rapid	Loose	Loose	Nonplastic	6.5	
	AC 2-11	Very Weak	Coarse	Blocky	Very Rapid	Loose	Loose	Nonplastic	6.5	
	C ₁ 11-30	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C ₂ 30-52	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.5	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
95	T.27S., R.11E., Sec. 32, NW1/4, SE1/4	72+	72+	1	A ₁ 0-2	Very Dark Grayish Brown	Loamy Sand	Gravel	Pumice	20	N.A.
					AC 2-7	Dark Brown	Loamy Sand	Gravel	Pumice	30	N.A.
					C ₁ 7-14	Yellow	Extremely Gravelly Coarse Sand	Gravel	Pumice	90	Extremely Gravelly
					C ₂ 14-35	Light Gray, Pale Yellow	Gravelly Coarse Sand	Gravel	Pumice	40	Gravelly
					IIC 35-72+	Dark Brown	Loamy Sand ^{1/}	-	-	-	N.A.
96B	T.26S., R.11E., Sec. 32, SE1/4, NW1/4	56+	56+	0.5	A ₁ 0-1	Very Dark Grayish Brown	Loamy Sand	Gravel	Pumice	20	N.A.
					AC 1-4	Dark Brown	Gravelly Loamy Sand	Gravel	Pumice	50	Gravelly
					C ₁ 4-22	Yellow	Extremely Gravelly Coarse Sand	Gravel	Pumice	80	Extremely Gravelly
					C ₂ 22-50	Light Gray, Black, Yellow	Coarse Sand	Gravel	Pumice	30	N.A.
					IIC 50-56+	Dark Brown	Cobbly Loam	Gravel-Stone	Subround, Angular	50	Cobbly
97B	T.25S., R.11E., Sec. 34, NW1/4, SE1/4	51+	51+	0.5	A ₁ 0-1	Very Dark Gray	Loamy Sand	-	-	-	N.A.
					AC 1-9	Dark Grayish Brown	Gravelly Loamy Sand	Gravel	Pumice	35	Gravelly
					C ₁ 9-26	Yellow, Pale Yellow	Very Gravelly Coarse Sand	Gravel	Pumice	50	Very Gravelly
					C ₂ 26-44	White, Pale Yellow, Black	Coarse Sand	Gravel	Pumice	10	N.A.
					IIC 44-51+	Dark Brown	Gravelly Clay Loam	Gravel	Subround	35	Gravelly

^{1/} Not typical

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (In.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
95	A ₁ 0-2	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.5	IIC is brittle.
	AC 2-7	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.5	
	C ₁ 7-14	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.8	
	C ₂ 14-35	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	IIC 35-72+	Massive	-	-	Moderate	Hard	Firm	Nonplastic	6.5	
96B	A ₁ 0-1	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.5	
	AC 1-4	Very Weak	Medium	Granular	Very Rapid	Loose	Loose	Nonplastic	6.8	
	C ₁ 4-22	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C ₂ 22-50	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	IIC 50-56+	Moderate	Fine	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.5	
97B	A ₁ 0-1	Very Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	5.5	
	AC 1-9	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.5	
	C ₁ 9-26	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.8	
	C ₂ 26-44	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	6.8	
	IIC 44-51+	Moderate	Fine	Sbky	Slow	Firm	Friable	Plastic	6.0	

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE

Land Type No.	Location of Modal Site	Depth to Bedrock (in.)	Depth to Restrictive Layer (in.)	Litter (in.)	Soil Layer and Thickness (in.)	Color (Moist)	Texture	Rock Fragments			Rock Fragment Class
								Size	Shape	%	
98	T.26S., R.12E., Sec. 31, SE1/4, NW1/4	44+	44+	1	A ₁ 0-2	Very Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					AC 2-5	Dark Yellowish Brown	Loamy Sand	Gravel	Pumice	20	N.A.
					C ₁ 5-21	Brownish Yellow, Very Pale Brown	Very Gravelly Coarse Sand	Gravel	Pumice	70	Very Gravelly
					C ₂ 21-38	Light Gray, Yellow, Black	Coarse Sand	-	-	-	N.A.
					IIC 38-44+	Dark Brown	Gravelly Loam	Gravel	Subround	35	Gravelly
99	T.28S., R.12E., Sec. 13, NE1/4, SW1/4	50+	24	1	A 0-3	Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					C ₁ 3-24	Dark Grayish Brown	Loamy Sand	-	-	-	N.A.
					C _x 24-50+	Dark Grayish Brown	Loamy Fine Sand	-	-	-	N.A.

TABLE OF SOIL CHARACTERISTICS OF MODAL SITE (Cont.)

Land Type No.	Soil Layer & Thickness (in.)	Structure			Permeability	Consistence				Remarks
		Grade	Size	Type		Dry	Moist	Wet	pH	
98	A ₁ 0-2	Weak	Medium	Granular	Very Rapid	Soft	Very Friable	Nonplastic	6.5	
	A ₂ 2-5	Very Weak	Fine	Sbky	Very Rapid	Loose	Loose	Nonplastic	6.5	
	C ₁ 5-21	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	C ₂ 21-38	Single Grain	-	-	Very Rapid	Loose	Loose	Nonplastic	7.0	
	IIC 38-44+	Weak	Fine	Sbky	Moderate	Slightly Hard	Friable	Slightly Plastic	6.5	
99	A 0-3	Very Weak	Coarse	Platy	Rapid	Soft	Very Friable	Nonplastic	6.5	C _x is strongly cemented, brittle, and dense. C ₁ is weakly cemented.
	C ₁ 3-24	Weak	Coarse	Platy	Moderate	Soft	Very Friable	Nonplastic	7.0	
	C _x 24-50+	Moderate	Coarse	Platy	Slow	Very Hard	Very Firm	Nonplastic	7.5	

BEDROCK CHARACTERISTICS

These terms apply to the Table of Bedrock Characteristics of Mapping Units which follows:

Bedrock - Consolidated, competent rock which upon weathering produces loose or unconsolidated soil material. In terminology of soil horizon designation, bedrock is designated at the "R" layer. Bedrock material usually requires ripping and/or blasting. Includes soft materials that are unweathered such as some tuffs and cinders which can be bladed.

Composition - Bedrock components and percentage. (Example: Basalt (50), tuff (40), breccia (10).)

Color - Color is in narrative terms for fresh, unweathered surfaces.

Hardness - Relative rating based on ease of breaking rock with geology hammer:

Hard - Rock cannot be broken or only with great difficulty.

Moderately hard - Rock can readily be broken with hammer but not by hand.

Soft - Rock can be broken by hand.

Degree of Fracturing - Based on the number or frequency of fractures and joints in a rock unit:

Highly fractured - Entire rock unit is completely dissected by fractures and joints less than 1 foot apart.

Moderately fractured - Fractures divide rock unit into units or blocks generally from 1 to 5 feet apart.

Slightly fractured - Only occasional fractures noted.

Massive - No fractures or very few fractures noted.

Fracture System - Pattern which the rock fractures follow. Example: horizontal, platy, vertical, blocky, random, etc.

Competency - Relative inherent strength of rock as it occurs on the landscape, based on degree of weathering, fracturing, hardness, stability, and failures observed:

Competent - No failures within rock unit observed. Rocks of unit are stable and have strong resistance to mass movement.

Moderately Competent - Some failures are noted. Rocks of the unit are moderately stable and have some resistance to mass movement.

Incompetent - Failures are common to rock unit. Rocks of the unit are soft, deeply weathered, and have high potential for mass movement.

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
1	Basalt, andesite, rhyolite, breccia, tuff, and mudflows	Dark gray, light gray, brown, and reddish brown	Soft to hard	Massive to high		Competent to incompetent	Highly variable due to wide range of rock types. Talus areas and rock outcrops are common.
2	Basalt, andesite, rhyolite, breccias, tuff, and mudflows	Dark gray, light gray, brown, and reddish brown	Soft to hard	Massive to high		Competent to incompetent	Highly variable due to wide range of rock types. Talus areas and rock outcrops are common.
3	Basalt, andesite, rhyolite, and breccia	Dark gray, light gray, brown, and reddish brown	Moderately hard to hard	Moderate to massive		Incompetent	Mass movement occurs as rock falls and rock slides. Outcrops and talus areas dominate the unit.
4	Breccias (40), tuff (40), and basalt (20)	Brown, yellowish brown, and dark gray	Moderately hard to soft	Massive to slight		Moderately competent to incompetent	Mass movement occurs as debris slides. Rock outcrops and talus areas are common.
6	Basalt (40), andesite (40), rhyolite (10), and breccia (10)	Dark gray, light gray, and brown	Hard to moderately hard	Moderate to massive		Moderately competent to incompetent	Talus areas and rock outcrops dominate the unit.
7	1/ NR						
8	Andesite (30), basalt (30), rhyolite (20), and tuff (20)	Dark gray, light gray, and brown	Hard to soft	High to massive	Blocky, platy, or random	Competent to moderately competent	Rock outcrops are common.

1/ Not rated due to soil depth and position in the landscape.

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
9	Basaltic cinders (100)	Reddish brown	Moderately hard	High	Blocky	Competent	Parent material is usually unconsolidated.
10	Basaltic cinders (100)	Reddish brown	Moderately hard	High	Blocky	Competent	Parent material is usually unconsolidated.
11	Rhyolite (70) and basalt (30)	Light gray and dark gray	Moderately hard to hard	High to moderate	Platy or blocky	Competent	
12-19	NR						
20	Basalt (50) and tuff (50)	Dark gray and reddish brown	Hard to soft	Massive to high	Blocky or massive	Competent	
22	Tuffaceous sedimentary rock (40), rhyolite-dacite ash-flow tuff (40), and breccia (20)	Brown, yellowish brown, and light gray	Soft to moderately hard	Massive to moderate	Blocky or massive	Competent	
23	Rhyolite-dacite ash-flow tuff (40), tuffaceous sedimentary rock (40), and breccia (20)	Brown, yellowish brown, and light gray	Soft to moderately hard	Massive to moderate	Blocky or massive	Competent	

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
24	Basalt (50) and tuff (50)	Dark gray and reddish brown	Hard to soft	Massive to high	Blocky or massive	Competent	
25	NR						
26	Basalt (40), andesite (20), and tuff (40)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky or massive	Competent	Bedrock is rarely exposed.
27	Andesite (40), basalt (30), and tuff (30)	Dark gray and reddish brown	Hard to soft	High to massive	Platy, blocky, or massive	Competent	
28	Basalt (40), tuff (50), and andesite (10)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	Bedrock is usually within 1.5 feet of the surface and is often exposed.
29	Basalt (40), tuff (50), and andesite (10)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy or massive	Competent	
30A	Basalt (40), tuff (50), and andesite (10)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	Bedrock is normally within two feet of the surface.
30B	Basalt (40), tuff (50), and andesite (10)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy or massive	Competent	Basalt ledge rock outcroppings and talus areas are common.

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
34A 34B 34C	Basalt (50) and tuff (50)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky or massive	Competent	Some units include platy, andesitic bedrock.
35	Basalt (40), tuff (50), and andesite (10)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	
36	Cinders (70) and tuff (30)	Reddish brown	Moderately hard to soft	High to slight	Blocky or random	Competent	
37A 37B 37C	Basalt (40), tuff (50), and andesite (10)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	
38	Basalt (40), tuff (50), and andesite (10)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	
39	Basalt (40), tuff (40), and andesite (20)	Dark gray or reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	
40A 40B 40C	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Vertical, often foliated and platy	Competent	May have inclusions of andesite, welded tuff and rhyolitic breccias. Composite cone.
41A 41B 41C	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Vertical often foliated and platy	Competent	May have inclusions of andesite, welded tuff and rhyolitic breccias. Composite cone.

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
42	NR						
43	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Vertical, often foliated and platy	Competent	Composite cone. May have inclusions of welded tuff, andesite and breccias.
44	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Vertical, often foliated and platy	Competent	Composite cone. May have inclusions of welded tuff, andesite and breccias.
50	Tuff (100)	Yellowish brown or reddish brown	Soft	Massive	Massive	Competent	Bedrock within 20 inches of the soil surface. Weathers rapidly when exposed.
51	Tuff (90) and basalt (10)	Reddish brown	Soft	Massive	Massive	Competent	Basalt rock outcrops common.
53	Tuff (100)	Yellowish brown	Soft	Massive	Massive	Competent	Bedrock is within 20 inches of the surface. Weathers rapidly when exposed.
56A 56B	Breccia (40), tuff (30), and tuffaceous sedimentary rock (30)	Brown or yellowish brown	Soft to moderately hard	Massive	Massive	Competent	Contains inclusions of localized basalt and rhyolite.
57	Breccia (40), tuff (40), and mudflows	Brown or yellowish brown	Moderately hard to soft	Massive	Massive	Moderately competent	Contains inclusions of localized rhyolite and

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
60	Breccia (60), tuff (20), and tuffaceous sandstone (20)	Reddish brown, yellowish brown, or olive	Moderately hard to soft	High to massive	Random to massive	Moderately competent	
61	NR						
62A 62B	Tuffaceous sedimentary rock (40), tuff (40), and breccia (20)	Yellow, brown, gray, and reddish brown	Soft	Massive	Massive	1/ Competent Moderately competent- incompetent	Rocks are soft and deeply weathered.
63A 63B	Rhyolite-dacite ash-flow tuff (70) and breccia (30)	Brown and yellowish brown	Soft to moderately hard	Massive	Massive	Competent	Bedrock weathers and fractures rapidly when exposed.
64	Rhyolite ash-flow tuff (50), lacustrine tuffaceous sandstone (40), ashy diatomite (10)	Brown, yellowish brown, and dark gray	Soft	Massive	Massive	Competent	
66	NR						
67A 67B 67C	Tuffaceous sedimentary rock (40), tuff (40), and breccia (20)	Yellow, brown, gray, and reddish brown	Soft	Massive	Massive	Competent Moderately competent Incompetent	Rocks are soft and deeply weathered.
68A 68B 68C	Rhyolite-dacite ash-flow tuff (70) and breccias (30)	Yellow, brown, green, and pink	Soft to moderately hard	Massive	Massive	Competent Competent Moderately competent	Exposed rock weathers and fractures rapidly.

1/ Multiple ratings apply to corresponding slope categories.

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
70	NR						
74A 74B 74C	Rhyolitic breccia (100)	Light gray	Moderately hard	High	Platy	Competent	Tuff, welded tuff, and andesite may occur locally.
76A 76B	Rhyolitic breccia (100)	Light gray	Moderately hard	High	Platy	Competent	Tuff, welded tuff, and andesite may occur locally.
77A 77B	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Vertical, often foliated, and platy	Competent	May have inclusions of welded tuff, obsidian, breccias, and basalt.
78	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Vertical, often foliated, and platy	Competent	May have inclusions of welded tuff, obsidian, breccias, and basalt.
79	Rhyolite (70), basalt or andesite (20), and tuff (10)	Light gray to dark gray	Moderately hard	High	Platy	Competent	May have inclusions of breccias and welded tuff.
80A 80B	Rhyolite (90) and tuff (10)	Light gray	Moderately hard	High	Platy	Competent	May have inclusions of andesite and breccia.
81	Basalt (50) and tuffs (50)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky or massive	Competent	Basalt ledge rock outcrops common.

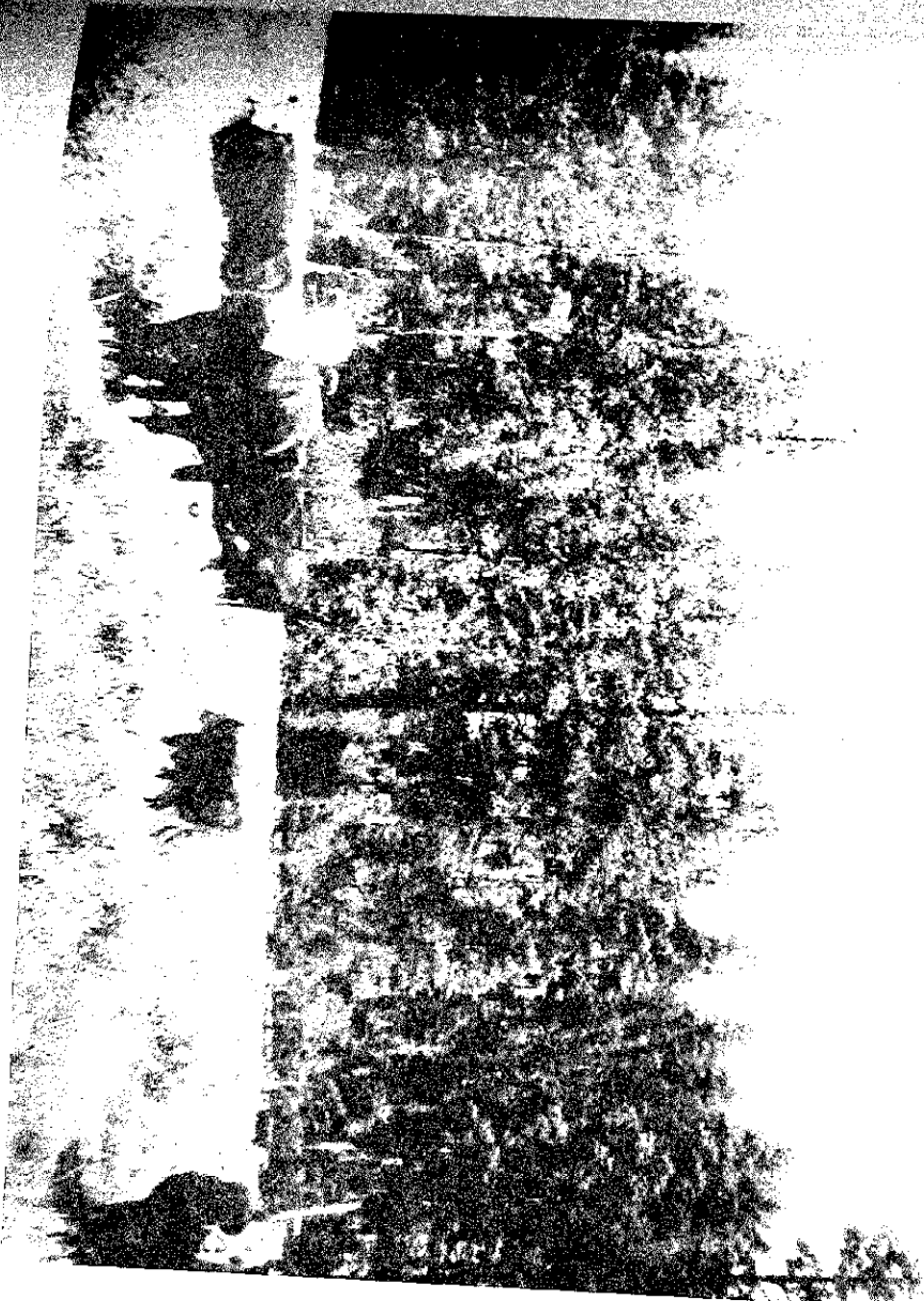
TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
82-83	NR						
84	Basalt (50) and tuff (50)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky or massive	Competent	
85	Basalt (50) and tuff (50)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky or massive	Competent	
86	Basalt (40), tuff (50), and andesite (10)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	
87	Basalt (50) and tuff (50)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky or massive	Competent	May have inclusions of platy andesite.
88A 88B 88C	Basalt (40), tuff (40), and andesite (20)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	
89A 89B 89C	Andesite (30), tuff (40) and basalt (30)	Dark gray and reddish brown	Hard to soft	High to massive	Platy, blocky, or massive	Competent	
90	NR						
91	Basalt (40), tuff (40), and andesite (20)	Dark gray and reddish brown	Hard to soft	High to massive	Platy, blocky, or massive	Competent	

TABLE OF BEDROCK CHARACTERISTICS

Land-type No.	Kind	Color (fresh surface)	Hardness	Degree of Fracturing	Fracture System	Competency	Remarks
92	Andesite (30), tuff and breccia (40), and basalt (30)	Dark gray and reddish brown	Hard to soft	High to massive	Platy, blocky, or massive	Competent	Has inclusions of mudflows and rhyolite.
93A 93B	Basalt (40), tuff (50), and andesite (10)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	May have inclusions of breccias and mudflows.
94A 94B	Basalt (40), tuff (50), and andesite (10)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	May have inclusions of breccias and mudflows.
95	NR						
96A 96B	Basalt (40), tuff (50), and andesite (10)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	May have inclusions of breccias and mudflows.
97A 97B	Basalt (40), tuff (40), and andesite (20)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	May have inclusions of breccias and mudflows.
98	Basalt (30), tuff (40), andesite (20), and rhyolite (10)	Dark gray and reddish brown	Hard to soft	High to massive	Blocky, platy, or massive	Competent	May have inclusions of breccias and mudflows.
99	NR						

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Management Interpretations

This section contains terms and definitions used in compiling information on four tables on management interpretations. These are: (1) TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY; (2) TABLE OF INTERPRETATIONS FOR ENGINEERING; (3) TABLE OF INTERPRETATIONS FOR RECREATION; and (4) TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT.



TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

This table presents erosion and hydrologic interpretations. Interpretations for erosion include the two major kinds of erosion-surface and mass movement. Surface erosion pertains only to soil loss by runoff and overland flow. Mass movement pertains to all types of soil and bedrock movement which occurs below the soil surface such as landslips, slumps, slides, rockfall, and land flow.

Natural Stability and Type of Mass Movement

This rating is based on the relative stability of the mapping units as they occur in the natural state. This includes any movement or loss by all types of deep-seated failures. Type of movement includes slumps, slides, rockfall, landflows, and landslips.

- I. Very Stable - No evidence of failure.
- II. Stable - Occasional failures are observed.
- III. Moderately Stable - Several failures are observed.
- IV. Unstable - Many failures are observed.
- V. Very Unstable - Entire area shows evidence of recent and past failures.

Expected Mass Movement as a Result of Man's Activities

This rating indicates the expected mass movement resulting from man's activities as compared to stability under natural conditions. Ratings are based on soil and bedrock characteristics, slopes, revegetation potential, and effects of timber removal, road construction, and fire.

Unchanged - The expected mass movement is relatively unchanged from that of the natural state.

Increased - The expected mass movement is greater than that of the natural state.

Greatly Increased - The expected mass movement is much greater than that of the natural state.

Surface Soil Erosion Potential (Sheet)

This rating is based on expected losses of surface soil by sheet erosion when all vegetative cover is removed. Factors considered in making the ratings are soil characteristics, slope gradient and length, hydrologic characteristics of the soil and bedrock, and climate.

Low - Little loss of soil materials is expected but some minor sheet erosion may occur.

Moderate - Some loss of surface soil materials can be expected. Sheet erosion can be determined by some soil pedestals and observable accumulation of soil materials along the upslope edge of rocks and debris. At this level of erosion there is a possible fertility loss.

High - Considerable loss of surface soil materials can be expected. Sheet erosion is indicated by frequent occurrence of soil pedestals and considerable accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a probable fertility loss.

Severe - Large loss of surface soil material can be expected. Sheet erosion loss is exhibited by numerous soil pedestals and extensive accumulation of soil materials along the upslope edge of rocks and debris. This is accompanied by a fertility loss.

Soil Erosion Potential (Rill & Gully)

This rating is based on expected soil losses by rill and gully erosion when all vegetative cover is removed. It rates potential soil losses as a result of management activities which concentrate water-such as landings, spur roads, and skidtrails. Factors considered in making the ratings are soil characteristics, slope gradient and length, and climate.

Low - Little loss of soil materials is expected. Some minor rill erosion may occur.

Moderate - Some loss of surface soil materials can be expected. Rill erosion and some small gullies may occur.

High - Considerable loss of surface soil materials can be expected. Rill erosion and numerous small gullies are evidence that considerable loss from erosion is occurring.

Severe - Large loss of surface soil material can be expected in the form of many large gullies and/or numerous small gullies.

Compaction hazard

This interpretation refers to the relative ease soils of the landtypes can be compacted when wet or moist. (Compaction, as used here, is defined as the point at which the soil macroscopic pore space is reduced by one-half, or more, or when the bulk density is increased by twenty percent, or more, above the natural state.) Factors considered include: Texture, structure, coarse fragments, position, drainage, and precipitation. Several units are rated according to season of use.

Low - Factors indicate a low risk of soil compaction. These soils will compact only under the right moisture conditions.

Moderate - Factors indicate a moderate risk of soil compaction.

High - Factors indicate a high risk of soil compactions.

Displacement Hazard

This interpretation rates the landtypes as to the ease with which its soil material can be loosened and moved. Mixing and displacement can be done by hoof, foot, vehicular, or log traffic. Factors considered are soil texture, soil structural strength, bulk density, organic matter, slope gradient, and coarse fragments.

Low - Factors indicate that these soils are not easy to loosen and/or displace.

Moderate - Factors indicate that these soils are moderately easy to loosen and/or displace.

High - Factors indicate that these soils are easy to loosen and/or displace.

Water Yield Class

This interpretation is an indication of the rate and amount of water yield expected from each soil. It is based on factors such as soil characteristics, infiltration rates, permeability, slope, climate, vegetation, and drainage patterns.

Class I - These soils have a high water detention storage capacity and a low rate of runoff. Little water is yielded to peak flows until detention storage capacity is exceeded or unless the soils are initially saturated or frozen. They are important in sustaining high base flow due to a relatively large volume of water held in detention storage.

Class II - These soils have a moderate water detention storage capacity and a moderate rate of runoff. Water contributes to both peak flows and base flow.

Class III - These soils have a low water detention storage capacity and a high rate of runoff. The storage capacity is low and easily exceeded with most of the water contributing to peak flow. Little water is yielded to sustain base flow.

Hydrologic Group

This interpretation is a grouping of soils into four classes, indicating the general infiltration and water movement ability of the soil and bedrock materials. This method of ratings has been developed by the Soil Conservation Service. The four groups are the standard SCS groupings and definitions.

Group A - Soils having high infiltration rates, even when thoroughly wetted, consisting chiefly of deep, well to excessively drained sands and/or gravel. These soils have a high rate of water transmission and would result in a low runoff potential.

Group B - Soils have moderate infiltration rates when thoroughly wetted, consisting chiefly of moderately deep to deep, moderately well to well drained soils, with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C - Soils having slow infiltration rates when thoroughly wetted, consisting chiefly of (1) soils with a layer that impedes the downward movement of water or (2) soils with moderately fine to fine texture and a slow infiltration rate. These soils have a slow rate of water transmission.

Group D - Soils having very slow infiltration rates when thoroughly wetted, consisting chiefly of (1) clay soils with high swelling potential, (2) soils with a high permanent water table, (3) soils with claypan or clay layer at or near the surface, and (4) shallow soils over nearly impervious materials. These soils have a very slow rate of water transmission.

Sediment Yield Potential and Effect on Stream Turbidity

This interpretation indicates the potential for water sedimentation and pollution from sand, silt, and clay particles following timber harvest, road construction, or livestock use. Factors considered in making ratings are soil texture and structure, drainage patterns, landform, climate, and position in the landscape.

Low - Sedimentation levels of silt and clay particles are not expected to be significant following management activities. Soils are generally coarse or moderately coarse-textured and will have little effect on stream turbidity.

Moderate - Sedimentation levels may be significantly increased following management activities with moderate loss of water quality and damage to fisheries. Soils are generally medium-textured and will have a moderate impact on stream turbidity.

High - Sedimentation levels are expected to be high following management activities. Soils are generally fine to moderately fine-textured. Streams become turbid and there is considerable loss of water quality and damage to fisheries.

Mineral Soil Exposure (%)

This interpretation gives the recommended maximum percent of mineral soil exposed as a result of a management activity. This percentage is intended to serve as a guide to protect the soil from wind and water erosion. The remaining surface ground cover may consist of litter, slash, ground cover vegetation, or low-growing reproduction. The percentages are based on surface soil erosion potential.

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land- Type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compac- tion Hazard	Displace- ment Hazard	Water Yield Class	Hydro- logic Group	Sedimenta- tion Yield Potential	Mineral Soil Exposure (%)
Miscellaneous landtypes 1-8		and 11-12 are not rated due to highly variable characteristics.								
9	Very Stable	Unchanged	Moderate	Moderate	Moderate	Low	I	A	Moderate	40
10	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	30
13	N.A.	N.A.	Moderate	High	High	High	II	D	High	0
14	N.A.	N.A.	Low	High	Low-Moderate	Moderate	I	B	Low	5
16	N.A.	N.A.	Moderate	High	High	High	II	D	High	0
17	N.A.	N.A.	Moderate	High	Moderate	Low	I	B	High	0
18	N.A.	N.A.	Moderate	High	High	High	II	D	High	0
19	N.A.	N.A.	Low	Moderate	Low	Low	II	A	Low	5
20	N.A.	N.A.	Moderate	Low	High	Low	I	D	N.A. (Closed Basin)	0
22	N.A.	N.A.	Moderate	Low	Moderate	Low	III	C	Moderate	0
23	N.A.	Unchanged	Low	Low	Low	Low	II	B	Low	30
24	N.A.	N.A.	Moderate	Low	High	Low	I	C	N.A. (Closed Basin)	0
25	N.A.	N.A.	Moderate	Moderate	High	Moderate-High	II	C	Moderate	0
26	Very Stable	Unchanged	Moderate	Moderate	High	Low	II	C	Moderate	20

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land-type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compaction Hazard	Displacement Hazard	Water Yield Class	Hydrologic Group	Sedimentation Yield Potential	Mineral Soil Exposure (%)
27	Very Stable	Unchanged	Moderate	Moderate	High	Low	II	B	Moderate	20
28	Very Stable	Unchanged	High	High	Low-Summer High-Winter	Low	III	D	High	0
29	Very Stable	Unchanged	Moderate	Moderate	High	Low	II	C	Moderate	5
30A	Very Stable	Unchanged	High	Moderate-High	Low-Summer High-Winter	Low	III	C	High	0
30B	Very Stable	Unchanged	High	High	Low	Low	III	C	High	0
34A	Very Stable	Unchanged	Low	Low	High	Low	II	B	Low	50
34B	Stable-Rotational Slumps	Unchanged	Low-Moderate	Low-Moderate	High	Low	II	B	Low-Moderate	35
34C	Stable-Rotational Slumps	Unchanged	Moderate	Moderate	High	Moderate	II	B	Moderate	20
35	Very Stable	Unchanged	Low	Low	High	Low	II	B	Low	50
36	Very Stable	Unchanged	Low	Low	Low	Low	II	B	Low	50
37A	Very Stable	Unchanged	Low	Low	High	Low	II	B	Low-Moderate	35
37B	Stable-Rotational Slumps	Unchanged	Low-Moderate	Low-Moderate	High	Low	II	B	Moderate	20
37C	Stable-Rotational Slumps	Unchanged	Moderate	Moderate	High	Moderate	II	B	Moderate	20
38	Very Stable	Unchanged	Low-Moderate	Low	High	Low	II	B	Low	50
39	Very Stable	Unchanged	Low	Low	High	Low	II	B	Low	50

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land-type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compaction Hazard	Displacement Hazard	Water Yield Class	Hydrologic Group	Sedimentation Yield Potential	Mineral Soil Exposure (%)
40A	Very Stable	Unchanged	Low	Low	Low	Moderate	I	A	Low	40
40B	Very Stable	Unchanged	Moderate	Moderate-High	Low	High	I	A	Low	25
40C	Very Stable	Unchanged	High	Severe	Low	High	I	A	Moderate	10
41A	Very Stable	Unchanged	Low	Low	Low	Low-Moderate	I	A	Low	40
41B	Very Stable	Unchanged	Moderate	Moderate-High	Low	Moderate-High	I	A	Low	25
41C	Very Stable	Unchanged	High	High Severe	Low	High	I	A	Moderate	10
42	Very Stable	Unchanged	Moderate	Moderate	Moderate	Moderate	II	B	Low	30
43	Very Stable	Unchanged	Moderate-High	Moderate-High	Low	High	I	A	Low	25
44	Very Stable	Unchanged	Moderate-High	Moderate-High	Low	High	I	A	Low	10
50	Very Stable	Unchanged	High	High	Low-Summer High-Winter	Low	III	D	High	0
51	Very Stable	Unchanged	High	High	Low-Summer High-Winter	Low	III	D	High	0
53	Very Stable	Unchanged	High	High	Low	Low	III	D	Moderate	0
56A	Very Stable	Unchanged	Moderate	Moderate	Moderate	Low	II	B	Low	20
56B	Very Stable	Unchanged	High	High	Moderate	Moderate	II	B	Moderate	10
57	Moderately Stable-Rockslides, Rotational Slumps	Increased	Low-High	Moderate-High	Moderate	Moderate-High	III	B	Moderate-High	0

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land-type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compaction Hazard	Displacement Hazard	Water Yield Class	Hydrologic Group	Sedimentation Yield Potential	Mineral Soil Exposure (%)
60	Moderately Stable-Rotational Slumps, Debris Slides	Increased	High	High	Low-Summer High-Winter	Low	II	C	High	5
61	Stable-Debris Slides	Increased	Moderate-High	Moderate-High	High	Low	II	B	High	0
62A	Stable-Rotational Slumps	Increased	Moderate	Low	High	Low	II	D	High	40
62B	Moderately Stable to Very Unstable-Rotational Slumps	Increased-Greatly Increased	High	Low-Moderate	High	Low	II	D	High	30
63A	Very Stable	Unchanged	Low	Low	Moderate	Low	II	B	Low	40
63B	Stable-Rotational Slumps	Unchanged	Moderate	Moderate	Moderate	Moderate	II	B	Low-Moderate	30
64	Very Stable	Unchanged	Low	Low	Moderate	Low	II	B	Low	40
66	Stable-Debris Slide	Increased	Moderate	High	Moderate	Moderate	II	C	Moderate	20
67A	Stable-Rotational Slumps	Increased	Moderate	Low	High	Low	II	D	High	40
67B	Moderately Stable-Very Unstable Rotational Slumps	Increased-Greatly Increased	High	Low-Moderate	High	Low	II	D	High	30
67C	Moderately Stable-Very Unstable-Rotational Slumps	Increased Greatly Increased	Severe	Moderate	High	Low	II	D	High	20

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land-type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compaction Hazard	Displacement Hazard	Water Yield Class	Hydrologic Group	Sedimentation Yield Potential	Mineral Soil Exposure (%)
68A	Very Stable	Unchanged	Low	Low	Low	Low	II	B	Low	40
68B	Stable-Rotational Slumps	Unchanged	Moderate	Moderate	Low	Moderate	II	B	Low	30
68C	Stable to Moderately Stable-Rotational Slumps	Increased	High	High	Low	High	II	B	Moderate	10
70	N.A.	N.A.	Moderate	Moderate	High	High	II	D	High	0
74A	Very Stable	Unchanged	Low	Low-Moderate	Low	Moderate	I	A	Low	40
74B	Very Stable	Unchanged	Moderate	High	Low	High	I	A	Low	30
74C	Very Stable	Unchanged	High	Severe	Low	High	I	A	Moderate	10
76A	Very Stable	Unchanged	Low	Low-Moderate	Low	Moderate	I	A	Low	40
76B	Very Stable	Unchanged	Moderate	High	Low	High	I	A	Low	30
77A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	40
77B	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	25
78	Very Stable	Unchanged	Low-Moderate	High	Low	High	I	A	Low	10
79	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	20-40
80A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	40
80B	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	25
81	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	C	Low	5

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land-type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compaction Hazard	Displacement Hazard	Water Yield Class	Hydrologic Group	Sedimentation Yield Potential	Mineral Soil Exposure (%)
82	Very Stable	Unchanged	Low	Moderate	Moderate	Moderate	II	B	Low	40
83	Very Stable	Unchanged	Moderate	Moderate	High	High	II	D	Moderate	5
84	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	B	Low	40
85	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	B	Low	40
86	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	B	Low	40
87	Very Stable	Unchanged	Low	Moderate-High	Low	Moderate-High	II	B	Low	30-40
88A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	B	Low	40
88B	Stable-Rotational Slumps	Unchanged	Low	High	Low	High	II	B	Low	30
88C	Stable-Rotational Slumps	Unchanged	Low	Severe	Low	High	II	B	Low	10
89A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	B	Low	40
89B	Stable-Rotational Slumps	Unchanged	Low	High	Low	High	II	B	Low	30
89C	Stable-Rotational Slumps	Unchanged	Low	Severe	Low	High	II	B	Low	10
90	Very Stable	Unchanged	Moderate	Moderate-High	High	High	II	C	Moderate	20
91	Very Stable	Unchanged	Low	Moderate	Low	Moderate	II	B	Low	40
92	Stable-Rotational Slumps	Unchanged	Low	High	Moderate	High	II	C	Low	10-40

TABLE OF INTERPRETATIONS FOR EROSION AND HYDROLOGY

Land-type No.	Natural Stability and Type of Mass Movement	Expected Mass Movement as a Result of Man's Activities	Surface Soil Erosion Potential (Sheet)	Soil Erosion Potential (Rill & Gully)	Compaction Hazard	Displacement Hazard	Water Yield Class	Hydrologic Group	Sedimentation Yield Potential	Mineral Soil Exposure (%)
93A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	50
93B	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	20
94A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	50
94B	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	20
95	Very Stable	Unchanged	Low	Moderate	Moderate	Moderate	I	B	Low	50
96A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	50
96B	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	20
97A	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	50
97B	Very Stable	Unchanged	Low	High	Low	High	I	A	Low	20
98	Very Stable	Unchanged	Low	Moderate-High	Low	High	I-II	A-B	Low	10
99	Very Stable	Unchanged	Low	Moderate	Low	Moderate	I	A	Low	50

TABLE OF INTERPRETATIONS FOR ENGINEERING

Generally the following interpretations and ratings are based on the entire landtype unit including soil, bedrock, and landform. Some interpretations are based only on the soil material or bedrock material.

Unified Classification

Each soil is classified as to its unified classification. Some soils will be classified into one class but most will show a range of classes. Those soils with significant layers of different soil materials will have a classification for each layer designated. The classification has been made for some representative soils by laboratory testing. They are indicated by the use of asterisks. Those soils not tested are classified by comparing their properties to those tested.

Materials Source

Topsoil

This rating evaluates each soil as to its suitability for use as topsoil. It does not specify any particular use of the topsoil. Ratings are based on soil characteristics.

Suited - Soil texture ranges from sandy loam to clay loam; gravel content is less than 35 percent and soil layer is at least 3 feet thick. Slopes range from 0 to 15 percent.

Unsuited- This rating indicates the soils do not satisfy the requirements specified under "suited." However, soils rated "unsuited" may still satisfy a particular requirement. See the "Table of Soil Characteristics" for soil texture, thickness, and gravel content.

Sand/Gravel

This interpretation indicates the suitability of each soil as a possible source of sand and/or gravel. It does not indicate the kind or quality of sand or gravel or refer to any specific use.

Suited - This rating indicates that sand and/or gravel is present and the following conditions are satisfied: There is a layer present which is composed of 80 percent, by volume, of sand and/or gravel. This layer is at least 4 feet thick.

Unsuited- This rating indicates that sand and/or gravel is generally not present in amounts which satisfy the requirements under "suited." However, soils rated "unsuited" may still satisfy a particular requirement. See the "Table of Soil Characteristics" for soil depth and gravel content.

Clay

This rating indicates the suitability of each soil as a possible source of clay. It does not indicate the kind or quality of clay or refer to any specific use.

Suited - This rating indicates that the soil is a possible source of clay. Soils with this rating have texture ranges from silty clay loam to clay and are at least two feet thick. Gravel content is less than 35 percent.

Unsuited- Soils with this rating generally are not good sources for clay.

Road Rock

This interpretation indicates the general stability of rock when used as road rock for base course or wearing surface. These ratings are based on rock hardness, density, and susceptibility to weathering and breakdown. Soils are not rated when depth to bedrock is greater than six feet.

Unsuited- Rock is soft and breaks down rapidly under logging traffic.

Poor - Rock is only moderately hard and breaks down easily under logging traffic, usually in one or two years time.

Fair - Rock is hard and dense but tends to break down under logging traffic after about two to four years use.

Good - Rock is hard, dense, and resists breakdown under logging traffic.

Cutbank and Ditch Erosion Potential

This interpretation indicates the potential for subsoil erosion by running water on each soil. Subsoil refers to that material lying between the surface layers and bedrock. It includes erosion which takes place along road ditches and on cutslopes. Rating is of soil material only and does not apply when cutbank or ditch is in bedrock. Factors considered in making ratings are field observations, texture and structure of subsoil materials, permeability, and climate.

Low - Factors indicate that little or no subsoil erosion is likely to occur.

Moderate- Factors indicate that the subsoils have moderate erosion potential.

High - Factors indicate that the subsoils are likely to erode severely.

Susceptibility to Cutbank Sloughing and Raveling

This rating evaluates each unit for its susceptibility to sloughing or raveling after excavation. Ratings are given only for those units occurring on slopes over 15 percent. Factors include soil and bedrock characteristics, frost action, climate, and potential for revegetation.

- Low - Sloughing and/or raveling is a minor problem requiring occasional road maintenance.
- Moderate - Sloughing and/or raveling causes some damage. Annual road maintenance is usually adequate.
- High - Sloughing and raveling occur at a rate that often plugs culverts and fills inside ditches. Frequent road maintenance with heavy equipment is required.

Probability of Cutbank Failures

This interpretation indicates the probability of failures in cutbanks following road construction or excavation. Failures are considered to be at least 5 cubic yards of material in volume. Ratings are based on cutbanks of at least 5 feet in height and refer to more than a 50-percent chance for failures.

- I. Very Stable - Little probability of cutbank failures.
- II. Stable - Probability of only occasional failures per mile of road cutbank.
- III. Moderately Stable - Probability of several failures per mile of road cutbank.
- IV. Unstable - Probability of many failures per mile of road cutbank.
- V. Very Unstable - Probability of an extreme number of failures per mile of road cutbank.

Suitability of Fill Slopes to Seeding

This interpretation indicates the probable success of fill slope seeding. Factors considered in making ratings are soil characteristics, elevation, slope, climate, snowpack, and aspect. Ratings are based on current methods and practices of seeding, grass species, and time of seeding.

Poor - Probability of success is low. Seeding generally is not successful and requires special treatments.

Fair - Success is likely on about 50 percent of area treated. Requires one or two followup treatments. Seeding usually becomes well established within two years. Little followup seeding necessary.

Good - Probability of high success. Seeding usually becomes well established within two years. Little followup seeding is necessary.

Limitations to Fill Slope Seeding

This indicates the major limitations to success of cutbank seeding.

Suitability of Cutbank to Seeding

This interpretation indicates the probable success of cutbank seeding. Factors considered in making ratings are soil characteristics, elevation, slope, climate, snowpack, and aspect. Ratings are based on current methods and practices of seeding, grass species, and time of seeding.

Poor - Probability of success is low. Seeding generally is not successful and requires special treatments.

Fair - Success is likely on about 50 percent of area treated. Requires one or two follow-up treatments. Seeding is usually spotty; some areas become easily established while others fail completely.

Good - Probability of high success. Seeding usually becomes well established within two years. Little follow-up seeding necessary.

Suitability for Road Locations

Unsuited - These landtypes have severe limitations for road locations and should be avoided.

Poor - These landtypes have major limitations but limited construction is possible.

Fair - These landtypes are generally suitable for road locations but have minor limitations.

Good - These landtypes are well suited for road locations and have no limitations.

Considerations for Road Location and Construction

This column indicates the major considerations for road location and construction through each landtype. The rating evaluates the impact of road construction on other resources and/or road construction problems likely to be encountered.

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
Miscellaneous	landtypes 1-8 and 11-12	are not rated due to variable characteristics					
9	GP	Unsuited	Unsuited	Unsuited	Poor	Moderate	Low
10	SM GP	Unsuited	Unsuited	Unsuited	Poor	Moderate	Moderate
13	ML-SM SM	Unsuited	Unsuited	Unsuited	N.A.	Moderate	N.A.
14	SM	Unsuited	Unsuited	Unsuited	N.A.	Moderate	N.A.
16	ML	Suited- Unsuited	Unsuited	Unsuited- Suited	N.A.	Moderate	N.A.
17	CH*	Unsuited- Suited	Unsuited	Suited- Unsuited	N.A.	Moderate	N.A.
18	ML	Unsuited- Suited	Unsuited	Unsuited- Suited	N.A.	Moderate	N.A.
19	SM GM	Unsuited	Suited	Unsuited	N.A.	Low	N.A.
20	CH	Unsuited	Unsuited	Suited	Unsuited or Good 1/	Low	N.A.
22	SM-ML	Unsuited	Unsuited	Unsuited	Unsuited	Low	N.A.
23	SM-GM	Unsuited	Unsuited	Unsuited	Unsuited	Low	N.A.

1. Samples tested by Fremont N.E. Soil Materials Lab.
2. Rating due to interbedded layers.

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
9	Very Stable	Poor-Fair	Gravelly Soils	Poor	Gravelly Soils, Low Fertility, Bedrock	Poor	Cone-Shaped Landforms, Slopes
10	Very Stable	Poor-Fair	Gravelly Soils Raveling, Low Fertility	Poor	Gravelly Soils, Raveling, Bedrock, Low Fertility	Poor	Cone-Shaped Landforms, Slopes
13	N.A.	Good	Wet Soils	N.A.	N.A.	Unsuited	Meadow, High Water Table, Low Bearing Capacity
14	N.A.	Good	Pumice Soils	N.A.	N.A.	Poor	Meadow, Seasonally Wet
16	N.A.	Good	Wet Soils	N.A.	N.A.	Unsuited	Meadow, High Water Table, Low Bearing Capacity
17	N.A.	Fair	Exposed Sites	N.A.	N.A.	Poor	Seasonally Wet, Adjacent Streams
18	N.A.	Good	Wet Soils	N.A.	N.A.	Unsuited	Meadow, High Water Table, Low Bearing Capacity
19	N.A.	Fair	Exposed Sites	N.A.	N.A.	Poor	Adjacent Streams
20	N.A.	Fair-Poor	Soil Texture	N.A.	N.A.	Poor	Seasonally Flooded, High Shrink-Swell
22	N.A.	Poor	Droughty Soils	N.A.	N.A.	Fair	Adjacent Streams
23	N.A.	Fair	Coarse Fragment Content	N.A.	N.A.	Fair	Adjacent Streams

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
24	ML*	Unsuited	Unsuited	Suited-Unsuited	Unsuited or Good <u>1</u> /	Low	N.A.
25	ML*-GM	Suited-Unsuited	Unsuited	Unsuited	N.A.	Moderate	Low
26	SMu*-GM	Suited-Unsuited	Unsuited	Unsuited	N.A.	Moderate	Low
27	SMu*-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Moderate	Low
28	CH*-GC	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	High	N.A.
29	SM-ML-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Moderate	Low
30A	CL-CH	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	High	Low
30B	CL-CH-GC						
34A 34B 34C	SMu* SMu-GM SMu-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low Low-Moderate Moderate	Low Low Moderate

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
24	N.A.	Poor	Soil Texture and Structure	N.A.	N.A.	Poor	Seasonal High Water Table
25	N.A.	Good	Some High Elevations, Wetness	Good	Some High Elevations	Poor	Poor Draining, Low Bearing, Capacity
26	Very Stable	Good	Gravelly and Cobbly Soils	Fair	Hardpan in Subsoil	Fair	Restricted Drainage
27	Very Stable	Fair	Some High Elevations, Gravelly and Cobbly Soils	Poor-Fair	Bedrock, Low Fertility, Coarse Fragment Content	Fair-Poor	Slopes, Depth to Bedrock
28	N.A.	Poor	Droughty Soils, Stoniness	N.A.	N.A.	Poor	Shallow Soils, High Runoff
29	Very Stable	Good	Stoniness, Elevation	Fair	N.A.	Fair	Restricted Drainage
30A	Very Stable	Poor	Stoniness, Low Fertility, Droughty Soils	N.A.	N.A.	Poor	Stoniness, Shallow Soils
30B				Poor	Shallow and Droughty Soils, Bedrock	Unsuited	Rock Outcrops, Slopes, Shallow Soils
34A 34B	Very Stable Stable	Fair Fair	Stoniness Stoniness, Aspect	Poor Poor	Stoniness Bedrock, Low Fertility, Aspect, Stoniness	Good Fair	Stoniness Moderately Steep Slopes, Bedrock
34C	Stable	Fair	Stoniness, Aspect	Poor	Bedrock, Low Fertility, Aspect, Stoniness	Poor	Steep Slopes, Bedrock

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
35	SM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low	Low
36	SM-GM	Unsuited	Unsuited	Unsuited	Poor-Unsuited	Low	Low
37A	SMu*-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
37B	SM-GM					Moderate	Moderate
37C	SM-GM					Low-Moderate	Low
38	SMd*-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low	Low
39	SM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low	Low
40A	GMu*	Unsuited	Unsuited	Unsuited	Fair	Low	Low
40B	GM-SM					Moderate-High	Moderate-High
40C	GM-SM					High	Moderate-High
41A	SMd*	Unsuited	Unsuited	Unsuited	Fair	Low	Low
41B	GM-SM					Moderate-High	Moderate-High
41C	GM-SM					High	Moderate-High

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
35	Very Stable	Fair	Stoniness	Poor	Stoniness	Good	Stoniness
36	Very Stable	Poor-Fair	Coarse Fragments	Poor	Coarse Fragments	Good	Stoniness
37A	Very Stable	Fair-Good	Stoniness, Some High Elevations	Fair	Stoniness	Good	Stoniness
37B	Stable			Poor-Fair	Bedrock, Low Fertility, Stoniness	Fair	Moderately Steep Slopes, Bedrock
37C	Stable			Poor-Fair	Bedrock, Low Fertility, Stoniness	Poor	Steep Slopes, Bedrock
38	Very Stable	Fair	Stoniness	Fair-Poor	Stoniness, Bedrock, Low Fertility	Fair-Good	Stoniness
39	Very Stable	Fair-Good	Stoniness	Fair	Stoniness-Low Fertility	Good	Stoniness
40A	Very Stable	Fair	Gravelly and Droughty Soils Southerly Aspect; Low Fertility	Fair	Gravelly and Droughty Soils	Good	-
40B		Poor-Fair		Poor	Gravelly and Droughty Soils, Bedrock	Fair	Moderately Steep Slopes, Bedrock, Visual Impact
40C		Poor-Fair		Poor	Gravelly and Droughty Soils, Bedrock	Poor	Steep Slopes, Bedrock, Visual Impact
41A	Very Stable	Fair-Good	Gravelly and Droughty Soils, Low Fertility	Fair	Gravelly and Droughty Soils	Good	-
41B		Fair		Poor	Gravelly and Droughty Soils, Bedrock, Low Fertility	Fair	Moderately Steep Slopes, Bedrock, Visual Impact
41C		Fair		Poor		Poor	Steep Slopes, Bedrock, Visual Impact

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
42	SM-GM	Unsuited	Unsuited	Unsuited	N.A.	Moderate	Moderate
43	SMu*-GM	Unsuited	Unsuited	Unsuited	Fair	Moderate-High	Moderate-High
44	GM-SM	Unsuited	Unsuited	Unsuited	Fair	Moderate-High	Moderate-High
50	CH-MH	Unsuited	Unsuited	Unsuited	Unsuited	High	Low
51	CH	Unsuited	Unsuited	Suited	Unsuited	High	Low
53	SM	Unsuited	Unsuited	Unsuited	Unsuited	High	Low
56A	CL*	Unsuited	Unsuited	Unsuited	Poor-Unsuited	Moderate	Low
56B	CL-ML-GM	Unsuited	Unsuited	Unsuited	Poor-Unsuited	High	Low
57	GP-GM-SM	Unsuited	Unsuited	Unsuited	Unsuited-Poor	Low-High	Moderate-High
60	CL-ML-GC	Unsuited	Unsuited	Unsuited-Suited	Unsuited-Poor	High	Low-Moderately

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
42	Very Stable	Fair-Good	Gravelly Soils	Fair-Good	Gravelly Soils	Fair-Poor	Locally a Hardpan and Perched Water Table
43	Very Stable	Poor-Fair	High Elevations, Gravelly and Droughty Soils, Low Fertility	Poor	Bedrock, Low Fertility, High Elevations	Poor	Slopes, Visual Impact, Bedrock, High Elevations
44	Very Stable	Poor	High Elevations, Exposure, Low Fertility, Gravelly and Droughty Soils	Poor	Bedrock, Low Fertility, High Elevations, Exposure	Poor	Slopes, Bedrock, High Elevations, Visual Impact
50	Very Stable	Poor	Shallow and Droughty Clay Soils	Poor	Bedrock, Shallow Clay Soils	Poor	Shallow Soils, High Runoff
51	Very Stable	Poor	Clay Soils, Low Elevations	Poor	Low Elevations, Bedrock, Clay Soils	Poor	Very Plastic Soils
53	Very Stable	Poor	Shallow and Droughty Soils	Poor	Bedrock, Shallow and Droughty Soils	Poor	Shallow Soils, High Runoff
56A	Very Stable	Poor-Fair	Droughty Soils	Poor	Droughty Soils	Good	-
56B	Very Stable	Poor	Aspect, Gravelly and Droughty Soils	Poor	Bedrock, Aspect Gravelly Soils	Fair	Slopes, Bedrock
57	Moderately Stable	Poor	Shallow Soils, Aspect, Stoniness	Poor	Bedrock, Aspect Stoniness	Unsuited	Steep Slopes, Rock Outcrops, Shallow Soils
60	Moderately Stable	Poor-Fair	Droughty Soils, Low Elevations, Aspect, Stoniness	Poor	Bedrock, Aspect, Droughty Soils	Poor	Stability, Bedrock, Dissected Slopes

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
61	ML-SM	Suited	Unsuited	Unsuited	N.A.	Moderate-High	Low
62A	MH-CL-CH	Unsuited	Unsuited	Suited	Unsuited	Low	Low
62B	MH-CL-CH					Low-Moderate	Low
63A	SM	Suited-Unsuited	Unsuited	Unsuited	Unsuited-Poor	Low	Low
63B	SMd*	Unsuited				Moderate	Moderate
64	SMd*-GM	Suited-Unsuited	Unsuited	Unsuited	Unsuited-Poor	Low	Low
66	SM-GM	Unsuited	Unsuited	Unsuited	N.A.	High	Low
67A	MH-CL	Unsuited	Unsuited	Suited	Unsuited	Low	Low
67B	MH*-CL-CH					Low-Moderate	Low
67C	MH-CH-CL					Moderate	Moderate

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
61	Stable	Good	Some Low Elevations	Fair-Good	Some Low Elevations	Poor	Wet Spots
62A	Stable	Fair	Plastic Soils, Some Low Elevations Plastic Soils, Aspect	Fair	Plastic Soils	Fair	Plastic Soils
62B	Moderately Stable	Fair-Poor		Poor	Bedrock, Aspect, Plastic Soils, Low Fertility	Poor	Plastic Soils, Dissected Slopes
63A	Very Stable	Fair	Some Low Elevations Aspect, Soil Raveling	Fair	Low Elevations	Good	-
63B	Stable	Fair		Poor	Bedrock, Aspect, Low Fertility	Fair	Bedrock, Dissected Slopes
64	Very Stable	Fair	Low Elevations	Fair	Low Elevations	Good	-
66	Stable	Good	Gravelly Soils	Fair-Poor	Hardpan in Subsoil	Fair-Poor	Restricted Drainage, Wet Spots
67A	Stable	Fair-Good	Plastic Soils, Some High Elevations	Good	Plastic Soils	Fair	Plastic Soils
67B	Moderately Stable-Very Unstable			Fair-Poor	Plastic Soils, Bedrock	Poor	Dissected Slopes, Stability
67C	Moderately Stable-Very Unstable			Fair-Poor	Plastic Soils, Bedrock	Poor-Unsuited	Steep and Dissected Slopes, Plastic Soils, Stability

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Gutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
68A	SM	Suited-Unsuited	Unsuited	Unsuited	Unsuited-Poor	Low	Low
68B	SMd*	Unsuited				Moderate	Moderate
68C	SM	Unsuited				High	Moderate-High
70	ML-CL-OL	Unsuited	Unsuited	Unsuited	Unsuited	N.A.	N.A.
74A	SM-GM	Unsuited	Unsuited	Unsuited	Fair	Low	Low
74B	SM-GM					Moderate-High	Moderate-High
74C	SMd*-GM					High	Moderate-High
76A	SM-GM	Unsuited	Unsuited	Unsuited	Fair	Low	Low
76B	SMd*-GM					Moderate-High	Moderate-High

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
68A	Very Stable	Fair-Good	Some High Elevations and Droughty Soils	Good	Droughty Soils	Good	-
68B	Stable			Fair-Poor	Bedrock, Low Fertility, Droughty Soils	Fair	Bedrock, Dissected Slopes
68C	Stable-Moderately Stable			Poor-Fair		Poor	Bedrock, Steep and Dissected Slopes
70	N.A.	Good	Poor Soil Drainage	N.A.	N.A.	Unsuited	High Water Table, Low Bearing Capacity
74A	Very Stable	Fair-Good	Droughty Soils	Fair	Gravelly and Droughty Soils	Good	-
74B		Fair	Gravelly and Droughty Soils, Low Fertility	Poor	Gravelly and Droughty Soils, Low Fertility, Bedrock	Fair	Visual Impact, Bedrock, Dissected Slopes
74C		Fair		Poor		Poor	Bedrock, Steep and Dissected Slopes, Visual Impact
76A	Very Stable	Fair	Gravelly and Droughty Soils, Low Fertility, Southerly Aspect	Fair	Gravelly and Droughty Soils	Good	-
76B		Poor-Fair		Poor	Gravelly and Droughty Soils, Low Fertility, Bedrock, Southerly Exposure	Fair	Bedrock, Dissected Slopes, Visual Impact

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential <u>2/</u>	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
77A	SM	Unsuited	Unsuited	Unsuited	Fair	Low-Moderate	Low
	SM-GM					Moderate-High	High
77B	SMd*-SW	Unsuited	Unsuited	Unsuited	Fair	Moderate-High	Moderate-High
	SM-GM					Moderate-High	Moderate-High
78	SM-SW	Unsuited	Unsuited	Unsuited	Fair	Low-High	Moderate-High
	SM-GM					Low-High	Moderate-High
79	SM-SW	Unsuited	Unsuited	Unsuited	Fair	Low-Moderate	Low
	SM-GM					Low-Moderate	Low
80A	SM-SW	Unsuited	Unsuited	Unsuited	Fair	Moderate-High	High
	SM-GM					Moderate-High	High
80B	SM-SW	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1/</u>	Low	Low
	SM-GM					Low	Low
81	SM	Unsuited	Unsuited	Unsuited	N.A.	Low	Low
	CL-CH-GM					Low	Low
82	SM-SW	Unsuited	Unsuited	Unsuited	N.A.	Moderate	N.A.
	SM-ML					Moderate	N.A.
83	SM-SW	Unsuited	Unsuited	Unsuited	N.A.	Low-Moderate	Low
	SM-ML					Low-Moderate	Low
84	SM-SW	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1/</u>	Low-Moderate	Low
	SM-ML					Low-Moderate	Low

of erosion potential ratings are due to wide differences in soil characteristics of pumiceous and

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
77A	Very Stable	Fair	Ashy Soils, Low Fertility,	Fair	Ashy Soils, Low Fertility	Good	Ashy Soils
77B	Very Stable	Fair	Soil Raveling	Poor	Bedrock, Ashy and Gravelly Soils, Low Fertility	Fair-Poor	Ashy Soils, Dissected Slopes
78	Very Stable	Poor	Southerly Aspect, Droughty and Ashy Soils, Low Fertility	Poor	Southerly Aspect, Droughty and Ashy Soils, Bedrock	Poor-Unsuited	Ashy Soils, Steep and Dissected Slopes
79	Very Stable	Fair	Ashy Soils, Some High Elevations	Fair-Poor	Ashy Soils, Low Fertility, Bedrock	Good-Fair	Ashy Soils, Moderately Steep Slopes
80A	Very Stable	Poor-Fair	Ashy Soils, Low Fertility, Frost Heaving	Poor	Low Fertility, Ashy Soils, Bedrock, Frost Heaving	Good	Ashy Soils
80B						Fair-Poor	Moderately Steep Slopes, Ashy Soils
81	Very Stable	Poor	Ashy Soils, Low Fertility, Droughty	N.A.	N.A.	Fair	Rock Outcrops, Stoniness
82	Very Stable	Fair-Good	Ashy Soils, Low Fertility, Frost Pocket	N.A.	N.A.	Fair	Seasonal High Water Table, Ashy Soils
83	N.A.	Good	Wet Soils, Frost Pocket	N.A.	N.A.	Unsuited	High Water Table, Low Bearing Capacity
84	Very Stable	Fair	Ashy Soils, Low Elevations, Low Fertility	Fair	Ashy Soils, Low Fertility, Stony Subsoils	Good	Ashy Surface Soils, Stony Buried Soils

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
85	SM-SW SM-ML	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
86	SM-SW SM-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
87	SM-SW SM-ML	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-High	Low-Moderate
88A	SMd*-SW SM-ML-GM	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
88B						Low-High	Moderate-High
88C						Moderate-High	High
89A	SM-SW SM-GM-ML	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
89B						Low-High	Moderate-High
89C						Moderate-High	High
90	SM-SW SM-ML	Unsuited	Unsuited	Unsuited	N.A.	Moderate	Low-Moderate
91	SM-SW SM-GM-ML	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
85	Very Stable	Fair	Ashy Soils, Low Fertility	Fair	Ashy Soils, Low Fertility, Stony Subsoils	Good	Ashy Surface Soils, Stony Buried Soils
86	Very Stable	Fair	Ashy Soils, Low Fertility, Frost Heaving	Fair	Ashy Soils, Low Fertility, Stony Subsoils	Good	Ashy Surface Soils, Stony Buried Soils
87	Very Stable	Fair	Ashy Soils, Low Fertility	Fair-Poor	Ashy Soils, Low Fertility, Stony Subsoils, Bedrock	Fair-Good	Ashy Surface Soils, Stony Buried Soils
88A	Very Stable	Fair-Good	Ashy Soils, Low Fertility Frost Heaving	Fair-Good	Ashy Soils, Low Fertility	Good	Ashy Surface Soils
88B	Stable	Fair		Fair-Poor	Ashy Surface Soils, Low Fertility, Stony Subsoils, Bedrock	Fair-Poor	Ashy Surface Soils, Stony Subsoils, Bedrock, Slopes
88C	Stable	Fair		Poor		Unsuited	
89A	Very Stable	Fair-Poor	Ashy Surface Soils, Low Fertility, High Elevations, Frost Heaving	Fair-Poor	Ashy Soils, Low Fertility	Fair	Ashy Surface Soils
89B	Stable	Poor-Fair		Poor	Ashy Surface Soils, Low Fertility, Stony Subsoils, Bedrock	Poor	Ashy Surface Soils, Stony Subsoils, Bedrock, Slopes
89C	Stable	Poor		Poor		Unsuited	
90	Very Stable	Good	Ashy Surface Soils, Some High Elevations, Frost Heaving	Good-Fair	Ashy Surface Soils, Low Fertility, Frost Heaving	Fair-Poor	Seasonal High Water Table
91	Very Stable	Fair	Ashy, Surface Soils, Frost Heaving, Low Fertility	Fair	Ashy Surface Soils, Low Fertility, Frost Heaving	Good	Ashy Surface Soils, Stony Subsoils

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
92	SM-SW SM-GM-ML	Unsuited	Unsuited	Unsuited	Unsuited-Good <u>1</u> /	Moderate-High	Low-High
93A	SM-SW	Unsuited	Unsuited	Unsuited	Unsuited or Good	Low-Moderate	Low
93B	GM-SM-ML					Low-High	Moderate-High
94A	SM-SW SP	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
94B	SM-ML-GM					Low-High	Moderate-High
95	SM-SW SP* SM-ML	Unsuited	Unsuited	Unsuited	N.A.	Moderate	Low
96A	SM-SW SP	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
96B	SM-ML-GM					Low-High	Moderate-High
97A	SM-SW SP	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-Moderate	Low
97B	SM-ML-GM					Low-High	Moderate-High

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
92	Stable	Poor-Fair	High Elevations, Low Fertility, Ashy Soils, Frost Heaving	Poor	High Elevations, Low Fertility, Frost Heaving, Bedrock	Good-Poor	Ashy Soils, Some Steep Slopes
93A	Very Stable	Poor-Fair	Pumice Soils, Low Fertility, Low Elevations	Poor-Fair	Pumice Soils, Low Fertility, Stony Subsoils, Low Fertility, Pumice Soils	Fair	Pumice Soils
93B		Poor		Poor		Fair-Poor	Pumice Soils, Moderately Steep Slopes, Soil Raveling
94A	Very Stable	Poor-Fair	Pumice Soils, Low Fertility	Poor-Fair	Pumice Soils, Low Fertility, Pumice Soils, Stony Subsoils, Low Fertility	Fair	Pumice Soils
94B		Poor		Poor		Poor	Pumice Soils, Moderately Steep Slopes, Soil Raveling
95	Very Stable	Fair	Pumice Soils, Low Fertility, Frost Pocket	N.A.	N.A.	Fair	Pumice Soils, Seasonal High Water Table
96A	Very Stable	Fair-Poor	Pumice Soils, Low Fertility	Poor-Fair	Pumice Soils, Low Fertility, Pumice Soils, Low Fertility, Stony Subsoils	Fair	Pumice Soils
96B		Poor		Poor		Poor	Pumice Soils, Moderately Steep Slopes, Soil Raveling
97A	Very Stable	Fair-Poor	Pumice Soils, Low Fertility, Frost Heaving	Poor-Fair	Pumice Soils, Low Fertility, Pumice Soils, Low Fertility, Stony Subsoils	Fair	Pumice Soils
97B						Poor	Soil Raveling, Pumice Soils, Moderately Steep Slopes

TABLE OF INTERPRETATIONS FOR ENGINEERING

Land Type No.	Unified Classification	MATERIALS SOURCE				Cutbank and Ditch Erosion Potential	Susceptibility to cutbank Sloughing and Ravelling
		Topsoil	Sand/Gravel	Clay	Road Rock		
98	SM-SW SP SM-GM-ML	Unsuited	Unsuited	Unsuited	Unsuited or Good <u>1</u> /	Low-High	Low-Moderate
99	SMd* SM-ML	Unsuited	Unsuited	Unsuited	N.A.	Low-Moderate	Low

TABLE OF INTERPRETATIONS FOR ENGINEERING (Cont.)

Land Type No.	Probability of Cutbank Failures	Fill Slopes		Cutbanks		Suitability for Road Locations	Considerations for Road Location and Construction
		Suitability to Seeding	Limitations to Seeding	Suitability to Seeding	Limitations to Seeding		
98	Very Stable	Poor	High Elevations, Low Fertility, Frost Heaving, Pumice Soils	Poor	High Elevations, Low Fertility, Frost Heaving, Pumice Soils	Poor-Unsuited	Fragile Sites, Pumice Soils
99	Very Stable	Fair-Good	Ashy Soils, Frost Pocket	N.A.	N.A.	Good	Ashy Soils

TABLE OF INTERPRETATIONS FOR RECREATION

Interpretations for recreation pertain primarily to recreation development. They are based on soil and bedrock properties, drainage, landform and vegetation. Factors such as aesthetics and accessibility are not considered when making these ratings. The following interpretations are some most generally needed for planning recreation developments.

Land Suitability for Recreation Area Development

This rating is based on soil and bedrock characteristics and topographic features of each unit as related to recreation development such as campground and picnic sites. Factors important to this interpretation are soil depth, texture, structure, permeability, drainage, topography, and susceptibility to flooding.

Unsuited - This rating indicates that soils and/or topography are of a nature which would prohibit recreation development without extensive modification.

Low - These soil units have major limitations to recreation development, but limited development is feasible.

Moderate - This rating indicates that the soil unit is generally suitable for recreation development, but has minor limitations.

High - These soils are particularly well suited for recreation development. Generally they have no limitations.

Landtype Limitations for Recreation Development

This indicates the major landtype limitations to recreation development.

Soil and Site Damage Susceptibility

This interpretation applies to recreational areas after development. Each soil that is suitable or can be made suitable for campground development is rated for its susceptibility to damage of soil and/or site by normal recreation use. Site includes vegetation as well as soil conditions. Factors used in determining ratings include erosion potential, soil compactibility, and vegetative growth potential.

Low - These soils resist compaction and have low erosion potential. The native vegetation is hardy and not readily destroyed. These soils will withstand and hold up well under continual use.

Moderate - These soils are not readily compacted or eroded and vegetative types are somewhat hardy. In general, these soils and site can sustain continual use, but require some rehabilitation.

High - These soils are fragile and easily damaged and have vegetation that is not hardy, easily damaged and generally herbaceous. Under normal use, the the vegetation will very likely be destroyed, the soil compacted and/or eroded to such a degree that periodic nonuse and major rehabilitation will be required.

Susceptibility to Dustiness

This interpretation pertains only to the soils suitable for recreation development, and applies primarily to unsurfaced roads within recreation areas.

Low - Factors indicate dust will not be a problem.

Moderate - Under normal conditions, dust will not be a problem, but under heavy use and droughty conditions dust very likely will be a problem.

High - Factors indicate dust will be problem. Dust abatement measures are necessary under normal conditions and use.

Susceptibility to Muddiness

This interpretation pertains only to the soils suitable or those that can be made suitable for recreation development. This interpretation rates each soil as to its susceptibility to becoming muddy. The rating is limited to the surface soil under normal conditions. Factors include soil characteristics, climate and drainage.

Low - Muddiness is not likely to be a problem. Factors indicate soils are not susceptible to muddiness.

Moderate - Soils become muddy at times for short periods occasionally causing problems. Road rock is usually necessary.

High - Soils are very likely to become muddy and stay muddy for long periods. Road rock is necessary. Campground closure may be necessary during wet periods.

Suitability for Sewage Filter Field

This interpretation evaluates the soil as to its suitability as a sewage filter field. Ratings are based on soil depth, texture, permeability, drainage and slope. Only those soils suitable for recreation development are rated. On-site investigation is necessary before design or installation of a filter system.

Poor - These soils have properties which make them poorly suited as sewage filter fields. Sewage filter disposal in these soils would be ineffective and create major problems.

Moderate - These soils have properties which limit their use as a sewage filter field. They require a large filter area for adequate drainage which limits the capacity of the campground.

Well - These soils are well suited to sewage filter use and offer only minor limitations, if any.

Soil Limitation to Sewage Filter Field Use

This indicates the major limitations to sewage filter field use.

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
1	Unsuited	Steep Slopes, Talus, Rock Outcrops	N.A.	N.A.	N.A.	Unsuited	Steep and Rocky Slopes, Shallow Soils
2	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Rock Outcrops
3	Unsuited	Rock Outcrops, Talus, No Soil	N.A.	N.A.	N.A.	Unsuited	No Soil, Rockiness
4	Unsuited	Steep Slopes, Shallow Soils, Talus	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Shallow Soils
6	Unsuited	Rock Outcrops, Shallow Soils, Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Shallow Soils, Steep Slopes, Rock Outcrops
7	Variable	Variable	Variable	Variable	Variable	Unsuited	Variable
8	Unsuited	Steep Slopes, Loose Soils, Rock Outcrops, Cold Sites	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Rock Outcrops
9	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
10	Unsuited	Steep Slopes, Loose Pumice Soils	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
11	Low	Shallow Soils, Slopes, Sparse Vegetation, Exposure	High	Low	Low	Unsuited	Shallow Soils, Steep Slopes
12	Unsuited	Wetness	N.A.	N.A.	N.A.	Unsuited	High Water Table
13	Unsuited	High Water Table, Low Soil Bearing Capacity, Compaction	N.A.	N.A.	N.A.	Unsuited	High Water Table

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
14	Unsuited	Seasonal High Water Table, Soil Compaction	N.A.	N.A.	N.A.	Unsuited	Seasonal High Water Table
16	Unsuited	Poor Soil Drainage, Low Soil Bearing Capacity	N.A.	N.A.	N.A.	Unsuited	Poor Soil Drainage
17	Low	Seasonally Wet, Compaction, Lack of Tree Cover	High	Low	High	Unsuited	Water Table, Soil Texture
18	Unsuited	Poor Soil Drainage, Low Soil Bearing Capacity	N.A.	N.A.	N.A.	Unsuited	High Water Table
19	Low-Moderate	Potential Flood Hazard, Fragile Ground Cover	Moderate	Low	Low	Unsuited	Gravelly Subsoil, Water Table
20	Unsuited	Seasonal Flooding, Clay Soils, Restricted Drainage	N.A.	N.A.	N.A.	Unsuited	Soil Texture, Poor Drainage
22	Low	Droughty, Fragile Ground Cover, Lack of Overstory	High	Low	Moderate	Unsuited	Soil Depth, Duripan in Subsoil
23	Moderate	Soil Depth, Hardpan Locally	Low	Low	Low	Poor	Soil Depth, Hardpan Locally
24	Unsuited	Seasonal Flooding, Poor Drainage, Hardpan	N.A.	N.A.	N.A.	Unsuited	Soil Drainage, Hardpan, Soil Texture
25	Unsuited	Soil Drainage, Hardpan Locally	N.A.	N.A.	N.A.	Unsuited	Poor Drainage

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
26	Low	Drainage, Some Wet Spots	High	Low	High	Unsuited	Poor Drainage Hardpan
27	Low	Steep Slopes, No Overstory, Sensitive Ground Cover	High	Low	High	Poor	Slopes, Soil Depth
28	Unsuited	Stoniness, Soil Depth and Texture	N.A.	N.A.	N.A.	Unsuited	Shallow Soils
29	Low	Poor Soil Drainage, Perched Water Table, Soil Texture	High	Low	High	Unsuited	Poor Drainage, Soil Texture
30A	Low	Stoniness, Shallow Soils	High	Low	High	Unsuited	Shallow and Stony Soils
30B	Unsuited	Rock Outcrops, Slopes	N.A.	N.A.	N.A.	Unsuited	Shallow and Stony Soils, Slopes
34A	Moderate	Stoniness, Soil Texture	Moderate	Low	Moderate	Poor	Stoniness, Soil Depth
34B	Low	Stoniness, Slopes	Moderate	Low	Moderate	Unsuited	Stoniness, Soil Depth, Slopes
34C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Soil Depth
35	Moderate	Stoniness, Depth to Bedrock	Moderate	Low	Moderate	Poor	Depth to Bedrock, Stoniness

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
36	Low	Stoniness, Fragile Ground Cover	Moderate	Low	Low	Unsuited	Stoniness, Soil Depth
37A	Moderate	Stoniness, Soil Depth and Texture	Moderate	Low	Moderate	Poor	Depth to Bedrock, Stoniness
37B	Low	Slopes, Stoniness	Moderate	Low	Moderate	Unsuited	Soil Depth, Slopes, Stoniness
37C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Soil Depth
38	Low-Moderate	Soil Depth and Texture, Stoniness	Moderate	Low	Moderate	Poor	Soil Depth, Stoniness, Slopes
39	Low	Depth to Bedrock, Soil Texture, Stoniness	Moderate	Low	Moderate	Poor	Soil Depth and Texture
40A	Moderate	Loose Soils and Droughty Sites	Moderate	Moderate	Low	Moderate	Soil Depth and Texture
40B	Low	Slopes, Loose and Erosive Soils	High	Moderate	Low	Unsuited	Slopes, Soil Depth and Texture
40C	Unsuited	Steep Slopes, Loose and Erosive Soils	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
41A	Moderate	Loose Soils	Moderate	Moderate	Low	Moderate	Soil Depth and Texture
41B	Low	Slopes, Loose and Erosive Soils	High	Moderate	Low	Unsuited	Slopes, Soil Depth and Texture
41C	Unsuited	Steep Slopes, Loose and Erosive Soils	N.A.	N.A.	N.A.	Unsuited	Steep Slopes

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
42	Moderate	Some Wet Spots and Moderate Slopes	Moderate	Low	Low	Moderate	Wet Spots, Localized Hardpan, Slopes
43	Low	Cold Sites, Loose and Erodible Soils, Slopes	High	Moderate	Low	Poor	Slopes, Depth to Bedrock
44	Low	Cold and Exposed Sites, Loose and Erodible Soils	High	Moderate	Low	Poor	Slopes, Depth to Bedrock
50	Unsuited	Shallow Soils, Clay Soils, Sparse Vegetation	N.A.	N.A.	N.A.	Unsuited	Soil Depth and Texture
51	Unsuited	Clay Soils	N.A.	N.A.	N.A.	Unsuited	High Clay Content
53	Unsuited	Shallow Soils, Sensitive Ground Cover	N.A.	N.A.	N.A.	Unsuited	Depth to Bedrock
56A	Low	Depth to Bedrock, Droughy, Exposed Mineral Soil	High	Low	Low	Unsuited	Depth to Bedrock
56B	Unsuited	Slopes, Depth to Bedrock	N.A.	N.A.	N.A.	Unsuited	Slopes, Depth to Bedrock
57	Unsuited	Steep Slopes, Rock Outcrops, Shallow Soils	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Rock Outcrops, Shallow Soils

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
60	Unsuited	Slopes, Soil Textures, Sensitive Ground Cover	N.A.	N.A.	N.A.	Unsuited	Soil Texture, Slopes, Depth to Bedrock
61	Low	Wet Spots, Exposed Mineral Soil, Sensitive Ground Cover	High	Low	High	Poor	Wet Spots, Moderate Slopes
62A	Low	Clay Soils, Depth to Bedrock	High	Low	High	Unsuited	Clay Soils, Depth to Bedrock
62B	Low	Slopes, Soil Texture	High	Low	High	Unsuited	Slopes, Clay Soils, Depth to Bedrock
63A	Moderate	Depth to Bedrock	Low	Moderate	Low	Poor	Depth to Bedrock
63B	Low	Slopes, Depth to Bedrock	Moderate	Moderate	Low	Unsuited	Slopes, Depth to Bedrock
64	Moderate	Depth to Bedrock	Low	Moderate	Low	Poor	Depth to Bedrock
66	Low	Hardpan in Subsoil, Slopes, Wet Spots, Restricted Drainage	Moderate	Low	Moderate	Poor	Slopes, Restricted Drainage, Hardpan in Subsoil
67A	Low	Clay Soils, Depth to Bedrock	High	Low	High	Unsuited	Clay Soils, Depth to Bedrock
67B	Low	Slopes, Clay Soils, Depth to Bedrock	High	Low	High	Unsuited	Slopes, Clay Soils, Depth to Bedrock
67C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes, Clay Soils

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
68A	Moderate	Depth to Bedrock	Low	Moderate	Low	Poor	Depth to Bedrock
68B	Low	Depth to Bedrock, Slopes	Moderate	Moderate	Low	Unsuited	Depth to Bedrock, Slopes
68C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
70	Unsuited	High Water Table, Low Soil Bearing Capacity	N.A.	N.A.	N.A.	Unsuited	High Water Table
74A	Moderate	Loose and Sandy Soils, Depth to Bedrock	Moderate	Moderate	Low	Poor	Sandy Soils, Depth to Bedrock
74B	Low	Loose and Sandy Soils, Slopes, Depth to Bedrock	High	Moderate	Low	Unsuited	Sandy Soils, Slopes, Depth to Bedrock
74C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
76A	Moderate	Loose and Sandy Soils, Depth to Bedrock, Droughty	Moderate	Moderate	Low	Poor	Sandy Soils, Depth to Bedrock
76B	Low	Loose and Sandy Soils, Slopes, Depth to Bedrock, Droughty	High	Moderate	Low	Unsuited	Sandy Soils, Slopes, Depth to Bedrock
77A	Moderate	Loose and Dusty Soils, Soil Displacement	Moderate	High	Low	Moderate	Coarse and Ashy Soils, Depth to Bedrock
77B	Unsuited	Slopes, Loose and Dusty Soils, Soil Displacement	N.A.	N.A.	N.A.	Unsuited	Slopes, Coarse and Ashy Soils

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
78	Unsuited	Loose and Dusty Soils, Slopes, Lack of Ground Cover, Soil Displacement	N.A.	N.A.	N.A.	Unsuited	Slopes, Coarse and Ashy Soils, Depth to Bedrock
79	Low	Slopes, Loose Soils, Soil Displacement	High	High	Low	Poor	Slopes, Coarse and Ashy Soils
80A	Low	Loose and Dusty Soils, Cold Sites, Soil Displacement	High	High	Low	Moderate	Coarse and Ashy Soils, Cold Sites
80B	Unsuited	Slopes, Cold Sites, Soil Displacement	N.A.	N.A.	N.A.	Unsuited	Slopes, Ash Soils, Depth to Bedrock
81	Low	Droughty Site, Rock Outcrops, Loose and Dusty Soils, Stoniness	High	High	Low	Unsuited	Depth to Bedrock
82	Low	Frost Pocket, Loose and Dusty Soils, Restricted Drainage	High	High	Low	Poor	Seasonal High Water Table
83	Unsuited	High Water Table, Low Soil Bearing Capacity, Compaction	N.A.	N.A.	N.A.	Unsuited	High Water Table
84	Low	Loose and Dusty Soils, Soil Displacement	High	High	Low	Moderate	Depth to Bedrock, Subsoil Stoniness
85	Low	Loose and Dusty Soils, Soil Displacement	High	High	Low	Moderate	Depth to Bedrock, Subsoil Stoniness
86	Low	Soil Displacement, Loose and Dusty Soils	High	High	Low	Moderate	Depth to Bedrock, Subsoil Stoniness

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
87	Unsuited-Low	Slopes, Loose and Dusty Soils	High	High	Low	Unsuited	Slopes, Depth to Bedrock
88A	Moderate	Loose and Dusty Soils, Soil Displacement	High	High	Low	Moderate	Depth to Bedrock, Subsoil Stoniness
88B	Unsuited	Slopes, Soil Displacement	N.A.	N.A.	N.A.	Unsuited	Slopes, Depth to Bedrock
88C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
89A	Low	Cold Sites, Loose and Dusty Soils, Soil Displacement	High	High	Low	Moderate	Depth to Bedrock, Subsoil Stoniness
89B	Unsuited	Slopes, Soil Displacement	N.A.	N.A.	N.A.	Unsuited	Slopes, Soil Displacement
89C	Unsuited	Steep Slopes	N.A.	N.A.	N.A.	Unsuited	Steep Slopes
90	Low	Cold Sites, Soil Drainage, Some Wet Spots, Loose Soils	High	Moderate	Low	Unsuited	Restricted Soil Drainage, Wet Spots
91	Low	Soil Displacement, Loose and Dusty Soils	High	High	Low	Moderate	Depth to Bedrock, Subsoil Stoniness
92	Unsuited-Low	Slopes, Loose Soils, High Elevations	High	High	Low	Unsuited	Slopes, Depth to Bedrock, Cold Sites
93A	Low	Loose and Dusty Pumice Soils, Soil Displacement, Dry Sites	High	High	Low	Moderate	Depth to Bedrock
93B	Unsuited	Slopes, Loose and Dusty Pumice Soils	N.A.	N.A.	N.A.	Unsuited	Slopes, Depth to Bedrock

TABLE OF INTERPRETATIONS FOR RECREATION

Land Type No.	Landtype Suitability for Recreation Area Development	Landtype Limitations for Recreation Development	Soil and Site Damage Susceptibility	Susceptibility to Dustiness	Susceptibility to Muddiness	Suitability for Sewage Filter Field	Soil Limitations to Sewage Filter Field Use
94A	Low	Loose and Dusty Soils, Soil Displacement	High	High	Low	Moderate	Coarse Pumice Soils
94B	Unsuited	Slopes, Loose and Dusty Soils	N.A.	N.A.	N.A.	Unsuited	Slopes, Coarse Pumice Soils
95	Low	Coarse Pumice Soils, Soil Displacement, Frost Pockets, Seasonally Perched Water Table	High	High	Low	Poor	Seasonal Water Table, Coarse Pumice Soils
96A	Low	Soil Displacement, Coarse Pumice Soils, Dusty Soils	High	High	Low	Moderate	Coarse Pumice Soils
96B	Unsuited	Slopes, Coarse Pumice Soils	N.A.	N.A.	N.A.	Unsuited	Slopes, Coarse Pumice Soils
97A	Low	Coarse and Dusty Pumice Soils, Soil Displacement	High	High	Low	Moderate	Coarse Pumice Soils
97B	Unsuited	Slopes, Coarse and Loose Pumice Soils	N.A.	N.A.	N.A.	Unsuited	Slopes, Coarse Pumice Soils
98	Unsuited	Very Fragile Sites, Lack of Ground Cover Vegetation, Cold Sites, Loose Pumice Soils	N.A.	N.A.	N.A.	Unsuited	Depth to Bedrock, Coarse Pumice Soils
99	Moderate	Restricted Drainage, Hardpan in Subsoil	High	High	Low	Poor	Restricted Drainage, Hardpan

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Interpretation for Timber Management are of two types. One type includes interpretations that directly affect timber management, such as "Potential for Regeneration." The other type indicates the effect on soils and other resources from timber harvest activities.

Susceptibility to Sedge or Grass Competition

This indicates the susceptibility of mapping units to revegetate naturally by sedges or grass following timber harvest.

Low - Indicates the potential for sedge or grass competition is insignificant.

Moderate - Indicates that some sedge or grass competition will occur.

High - Indicates that sedge or grass competition will have a major impact on seedlings.

Potential for Regeneration

This interpretation indicates the potential for each landtype unit to regenerate at a minimum level of stocking as set by the Forest Service. Factors included in this interpretation are soil characteristics, climate, aspect, elevation, frost potential, brush competition, and tree species--includes planted stock and natural regeneration.

Low - This rating indicates the potential for regeneration is low. Probability of success is very limited. Major regeneration problems can be expected and reseeding or replanting may be required throughout the area. Several years may elapse before an adequate stocking level is achieved.

Moderate - This rating indicates that some problems will be encountered in attaining a satisfactory stocking level. Usually regeneration is spotty and some replanting will be necessary.

High - This rating indicates that regeneration has a high probability of success. Few problems should be encountered in attaining good stocking levels.

Limitations to Regeneration

This indicates the major landtype limitations to regeneration of planted stock and naturals.

Suitability for Tractor Logging

This interpretation rates the landtypes for suitability to logging by conventional skidding equipment (tract-type and rubber tired).

Good - These landtypes are generally well suited for tractor logging but may have some restrictions at certain times of the year.

Fair - These landtypes are generally suited for tractor logging but some unavoidable impacts will occur.

Poor - These landtypes are generally not suited for tractor logging and major impacts may occur.

Unsuited - These limitations have severe limitations for tractor logging and unacceptable damage will occur.

Slopes (%) Unsuited for Tractor Logging

This interpretation lists the slopes in percent, at which a landtype is unsuited for tractor logging with conventional equipment. Tractor logging on slopes listed will generally result in unacceptable levels of damage to the soil resource.

Potential Soil and Water Impacts from Various Timber Harvest Methods

This interpretation indicates the susceptibility of soil and water resources to damage from various timber harvest methods. Each landtype is evaluated as to the potential impact from each of the following harvest methods: Tractor logging, cable (no suspension), and cable (partial suspension). The evaluation of potential impact includes soil and water resource damages from timber removal, spur roads, landings, and other activities that may be associated with the harvest method being evaluated. The evaluations are based on a full operating season. Damage is caused to soils by creating soil disturbance which may destroy soil structure, cause compaction, and increase erosion. This may affect other resources through loss of production, lower water quality and yield, and loss of fisheries. The most important factors to consider in making these ratings are wetness of soil, soil texture and structure, percentage of coarse fragments, slope, drainage, and climate.

Low - This rating indicates that the impacts to the soil and water resources are minor. Little or no soil damage is expected.

Moderate - This rating indicates that the impacts to the soil and water resources are moderate. Soil and water resources are expected to incur moderate damage.

High - This rating indicates that the impacts to the soil and water resources are major. Excessive damage to soil and water resources is likely to occur.

Type of Damage Expected During and Subsequent to Timber Harvest Operations

This indicates the type of soil and water resource damage expected on each soil from the various harvest methods.

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
1	N.A. ^{1/}	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
2	Variable	Variable	Steep Slopes, Local Stoniness and Rock Outcrops	Unsuited-Poor	Variable	High	Soil Dis., ^{2/} Stream Sedimentation	High	Soil Gouging, Dis., Gulley Erosion	Moderate	Soil Gouging Dis.
3	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
4	N.A.	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
6	N.A.	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
7	High	Variable	Variable	Unsuited	N.A.	High	Compaction, Dis., Sedimentation	N.A.	N.A.	N.A.	N.A.
8	High	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
9	Variable	Variable	Cindery Soils, some South Aspects	Fair	40+	Moderate	Soil Dis., Erosion	Moderate	Soil Gouging, Dis.	Low	Soil Gouging Dis.
10	Variable	Variable	Ash and Pumice Soils, some South Aspects	Fair-Unsuited	30+	Moderate-High	Soil Dis., Gulley Erosion	Moderate-High	Soil Gouging, Dis.	Low	Soil Gouging Dis.
Landtypes 11, 12, 13, 14, 16, 17, 18, 19, 20, 22, 24, and 25 are nonforested.											

^{1/} Not applicable^{2/} Displacement

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
23	Moderate	Low	Droughty and Gravelly Soils, Hardpan Locally	Good	N.A.	Low	Soil Compaction	N.A.	N.A.	N.A.	N.A.
26	Moderate-High	High	Stone Content, Hardpan in Subsoil	Fair	N.A.	Moderate	Compaction	N.A.	N.A.	N.A.	N.A.
27	N.A.	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
28	N.A.	N.A.	Scabflat	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
29	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
30A 30B	N.A.	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
34A	Moderate	Low	Stony Soils, Some Low Elevations, Competition	Good	N.A.	Low	Compaction	N.A. ^{3/}	N.A.	N.A.	N.A.
34B			Stony Soils, Southerly Aspect, Moderately Steep Slopes, Competition	Fair-Good	N.A.	Low-Moderate	Compaction, Soil Dis.	Low	Soil Gouging, Gulley Erosion	Low	Soil Gouging
34C			Stony Soils, Southerly Aspect, Competition, Steep Slopes	Poor-Unsuited	45+	High	Compaction, Soil Dis.	Moderate	Soil Gouging, Gulley Erosion	Low	Soil Gouging

^{3/} Landtypes with 0 to 15 percent slopes (A) are not rated for cable logging.

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
35	High	Low	Stony Soils, Some Low Elevations, Idaho Fescue	Good	N.A.	Low	Compaction	N.A.	N.A.	N.A.	N.A.
36	Moderate	Low	Cindery Soils	Good	N.A.	Low	Compaction	N.A.	N.A.	N.A.	N.A.
37A	Moderate	Moderate	Stony Soils	Good	N.A.	Low	Compaction	Low	Soil Gouging, Gulley Erosion	Low	Soil Gouging
37B			Stony Soils, Moderately Steep Slopes	Fair-Good	N.A.	Low-Moderate	Compaction, Soil Dis.				
37C			Stony Soils, Steep Slopes	Poor-Unsuited	45+	High	Compaction, Soil Dis.				
38	Moderate	Moderate	Stony Soils	Good	N.A.	Low	Compaction	N.A.	N.A.	N.A.	N.A.
39	Moderate-High	Moderate-Low	Long-Stolon Sedge, Stony Soils	Good	N.A.	Low	Compaction	N.A.	N.A.	N.A.	N.A.
40A	Moderate-High	Low	Droughty Soils, Southerly Aspect, High Gravel Content, Low Fertility, Slopes	Good-Fair	N.A.	Low-Moderate	Soil Dis. High Visual Impact	Moderate-High	Soil Gouging, Dis., Gulley Erosion	Low	Soil Gouging
40B				Fair-Unsuited	30+	Moderate-High					
40C				Unsuited	All	High				Low-Moderate	Soil Gouging

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
41A	Moderate	Moderate	Droughty Soils, High Gravel Content, Low Fertility Slopes	Good-Fair	N.A.	Low-Moderate	Soil Dis., High Visual Impact	Moderate-High	Soil Gouging, Dis., Gulley Erosion	Low	Soil Gouging
41B				Fair-Unsuited	35+	Moderate-High					
41C				Unsuited	All	High				Low-Moderate	Soil Gouging
42	Moderate-High	High	Cobbly Soils, Local Hardpan	Fair	N.A.	Moderate	Compaction, Soil Dis.	N.A.	N.A.	N.A.	N.A.
43	Moderate	Low	High Elevations, Cobbly Soils, Low Fertility	Fair-Unsuited	35+	Moderate-High	Soil Dis., High Visual Impact	Moderate-High	Soil Gouging, Dis., Gulley Erosion	Low-Moderate	Soil Gouging, Gulley Erosion
Landtypes 44, 50, 51, 53, 56A, 56B, 57, 60, and 61 are nonforested or noncommercial.											
62A	Moderate	Moderate	Plastic Soils, Some Low Elevations, Idaho Fescue	Good-Fair	N.A.	Low-Moderate	Compaction, Puddling, Sedimentation	N.A.	N.A.	N.A.	N.A.
62B	Moderate	Moderate	Plastic Soils, Southerly Aspect, Idaho Fescue	Fair-Unsuited	35+	Moderate-High	Compaction, Soil Dis., Sedimentation, Mass Movement	Low-Moderate	Compaction, Soil Gouging, Gulley Erosion	Low	Compaction, Soil Gouging

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
63A	High	Low	Droughty Soils, Idaho Fescue	Good	N.A.	Low	Soil Dis.	N.A.	N.A.	N.A.	N.A.
63B	High	Low	Droughty Soils, Southerly Aspect, Idaho Fescue	Fair-Unsuitable	35+	Moderate-High	Soil Dis.	Moderate	Compaction, Soil Gouging, Gully Erosion	Low	Soil Gouging
64	High	Low	Idaho Fescue, Low Elevations	Good	N.A.	Low	Compaction	N.A.	N.A.	N.A.	N.A.
66	Moderate-High	High	Gravelly Soils, Hardpan in Subsoil	Fair	N.A.	Moderate	Compaction	N.A.	N.A.	N.A.	N.A.
67A			Plastic Soils	Fair-Good	N.A.	Low-Moderate	Compaction, Puddling, Sedimentation	N.A.	N.A.	N.A.	N.A.
67B	Moderate	Moderate	Plastic Soils, Moderately Steep Slopes	Fair-Unsuitable	35+	Moderate-High	Compaction, Soil Puddling, Potential Increase in Mass Movement, Sedimentation	Low-Moderate	Soil Gouging and Compaction, Gully Erosion	Low	Soil Gouging and Compaction
67C			Plastic Soils Steep Slopes	Unsuitable	All	High		Moderate		Low	

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
68A				Good	N.A.	Low		N.A.	N.A.	N.A.	N.A.
68B	Moderate	Moderate	Droughty Soils	Fair-Unsuitable	35+	Moderate-High	Soil Dis. Increased Instability	Moderate	Soil Gouging, Gully Erosion	Low	Soil Gouging, Gully Erosion
68C				Unsuitable	All	High		High		Low-Moderate	
70	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
74A			High Gravel Content, Droughty Soils,	Good-Fair	N.A.	Low-Moderate		N.A.	N.A.	N.A.	N.A.
74B	Moderate	Moderate	High Gravel Content, Droughty Soils, Slopes	Fair-Unsuitable	35+	Moderate-High	Soil Dis. Adverse Visual Impact	Moderate-High	Soil Gouging, Gully Erosion	Low	Soil Gouging, Gully Erosion
74C				Unsuitable	All	High		High		Low-Moderate	
76A	Moderate-High	Low	Droughty Soils High Gravel Content, Southerly Aspect, Competition	Good-Fair	N.A.	Low-Moderate	Soil Dis. Adverse Visual Impact	N.A.	N.A.	N.A.	N.A.
76B				Fair-Unsuitable	30+	Moderate-High		Moderate-High	Soil Gouging, Gully Erosion	Low	Soil Gouging, Gully Erosion
77A	High	Low	Droughty Soils, Gravelly Subsoils, Competition, Some Low Elevations	Good-Fair	N.A.	Low-Moderate	Soil Dis. and Adverse Visual Impact	N.A.	N.A.	N.A.	N.A.
77B				Fair-Unsuitable	30+	Moderate-High		Moderate-High	Soil Gouging, Gully Erosion	Low	Soil Gouging, Gully Erosion

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
78	Moderate	Low	Droughty Soils, Southerly Aspect, Slopes, Competition	Poor-Unsuitable	25+	High	Soil Dis., Visual Impact	High	Soil Gouging, Gulley Erosion	Moderate	Soil Gouging, Gulley Erosion
79	High	Moderate	High Elevations, Frost Heaving, Long-Stolon Sedge	Fair-Unsuitable	30+	Moderate-High	Soil Dis., Visual Impact	Moderate-High	Soil Gouging, Visual Impact	Low	Soil Gouging
80A	High	Low	High Elevations, Long-Stolon Sedge, Frost Heaving	Fair	N.A.	Moderate	Soil Dis., Visual Impact	N.A.	N.A.	N.A.	N.A.
80B				Fair-Unsuitable	25+	Moderate-High		Moderate-High	Soil Gouging, Dis., Gulley Erosion	Low	Soil Gouging, Gulley Erosion
81	N.A.	N.A.	Noncommercial	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
82	Low	Moderate-High	Frost Heaving, Cold Soils, Frost Pocket	Fair-Good	N.A.	Low-Moderate	Soil Dis., Compaction	N.A.	N.A.	N.A.	N.A.
83	High	High	High Water Table, Frost Pocket	Unsuitable	All	High	Soil Puddling and Compaction	N.A.	N.A.	N.A.	N.A.
84	Moderate-High	Moderate	Plant Competition, Low Elevations	Fair-Good	N.A.	Low-Moderate	Soil Dis.	N.A.	N.A.	N.A.	N.A.
85	Moderate-High	Moderate	Plant Competition	Fair-Good	N.A.	Low-Moderate	Soil Dis.	N.A.	N.A.	N.A.	N.A.
86	Moderate	Moderate-High	Frost Heaving, Competition	Fair-Good	N.A.	Low-Moderate	Soil Dis.	N.A.	N.A.	N.A.	N.A.

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
87	Moderate-High	Low-Moderate	Southerly Aspect, Plant Competition	Fair-Poor	N.A.	Low-High	Soil Dis.	N.A.	N.A.	N.A.	N.A.
88A	Moderate-High	Moderate-Low	Long-Stolon Sedge, Frost Heaving, Some High Elevations, Slopes	Good-Fair	N.A.	Low-Moderate	Soil Dis., Visual Impact	N.A.	N.A.	N.A.	N.A.
88B				Fair-Unsuitable	30+	Moderate-High		Moderate-High	Soil Gouging, Gulley Erosion	Low	Soil Gouging, Gulley Erosion
88C				Unsuitable	All	High		High		Low-Moderate	Erosion
89A	High	Low	Long-Stolon Sedge, Frost Heaving, Cold Soils, Slopes	Fair	N.A.	Moderate	Soil Dis., Adverse Visual Impact	N.A.	N.A.	N.A.	N.A.
89B				Fair-Unsuitable	25+	Moderate-High		Moderate-High	Soil Gouging, Gulley Erosion	Low	Soil Gouging, Erosion
89C				Unsuitable	All	High		High		Low-Moderate	
90	High	Moderate	Plant Competition, Frost Pocket	Fair-Poor	N.A.	Moderate-High	Soil Compaction, Soil Dis.	N.A.	N.A.	N.A.	N.A.
91	High	Low	Long-Stolon Sedge, Frost Heaving, Cold Soils	Fair-Good	N.A.	Low-Moderate	Soil Dis.	N.A.	N.A.	N.A.	N.A.
92	Moderate	Low	Cold Soils, High Elevations, Frost Heaving	Good-Unsuitable	30+	Low-High	Soil Dis., Compaction	Moderate-High	Soil Gouging, Gulley Erosion	Low-Moderate	Soil Gouging, Gulley Erosion
93A	Moderate-High	Low-Moderate	Idaho Fescue, Low Elevations, Pumice Soils, Low Fertility	Fair	N.A.	Moderate	Soil Dis., Visual Impact	N.A.	N.A.	N.A.	N.A.
93B				Poor-Unsuitable	25+	High		Moderate-High	Soil Gouging, Visual Impact, Gulley Erosion	Low	Soil Gouging, Gulley Erosion

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
94A	Moderate-High	Low-Moderate	Idaho Fescue, Pumice Soil, Low Fertility	Fair	N.A.	Moderate	Soil Dis. Visual Impact	N.A.	N.A.	N.A.	N.A.
94B				Poor-Unsuitable	25+	High		Moderate-High	Soil Gouging, Visual Impact, Gulley Erosion	Low	Soil Gouging, Gulley Erosion
95	Low	Low	Frost Pocket, Pumice Soil, Low Fertility	Fair	N.A.	Moderate	Soil Dis. Visual Impact	N.A.	N.A.	N.A.	N.A.
96A	Moderate	Moderate	Pumice Soil, Low Fertility	Fair	N.A.	Moderate	Soil Dis. Visual Impact	N.A.	N.A.	N.A.	N.A.
96B				Poor-Unsuitable	25+	High		Moderate-High	Soil Gouging, Visual Impact, Gulley Erosion	Low	Soil Gouging, Gulley Erosion
97A	Moderate	Moderate	Pumice Soil, Low Fertility	Fair	N.A.	Moderate	Soil Dis. Visual Impact	N.A.	N.A.	N.A.	N.A.
97B				Poor-Unsuitable	25+	High		Moderate-High	Soil Gouging, Adverse Visual Impact, Gulley Erosion	Low	Soil Gouging, Gulley Erosion
98	Low	Low	Cold Pumice Soils, High Elevations, Frost Pocket, Low Fertility	Poor-Unsuitable	15+	High	Soil Dis. Visual Impact	N.A.	N.A.	N.A.	N.A.

TABLE OF INTERPRETATIONS FOR TIMBER MANAGEMENT

Land-type No.	Susceptibility to Sedge or Grass Competition	Potential for Regeneration	Limitations to Regeneration	Suitability for Tractor Logging	Slopes (%) Unsuitable for Tractor Logging	Impact from Tractor Logging	Type of Damage	Impact from Cable (no suspension)	Type of Damage	Impact from Cable (partial suspension)	Type of Damage
99	Moderate-High	Low-Moderate	Idaho Fescue, Low Elevations Hardpan in Subsoil	Good-Fair	N.A.	Low-Moderate	Soil Compaction, Soil Dis.	N.A.	N.A.	N.A.	N.A.

Appendix



Three kinds of soil analysis were performed. The chemical and physical analysis was done by the Soil Testing Laboratory at Oregon State University. The soil materials testing, including the bulk density measurements was done by the Soil Materials Laboratory on the Fremont National Forest.

<u>SOILS #</u>	<u>ACRES</u>	<u>SOILS #</u>	<u>ACRES</u>	<u>SOIL #</u>	<u>ACRES</u>
1	3,161	51	3,594	94A	16,171
2	19,431	53	9,879	94B	957
3	3,610	56A	12,508	95	33,512
4	13,929	56B	6,414	96A	10,244
6	9,423	57	18,686	96B	5,167
7	7,828	60	15,434	97A	17,752
8	3,207	61	2,508	97B	10,122
9	4,635	62A	251	98	15,274
10	6,178	62B	2,424	99	3,594
11	1,923	63A	8,853	283	6,231
12	2,151	63B	8,101	301	10,540
13	5,654	64	11,589	342	9,886
14	2,021	66	1,907	348	17,455
16	9,902	67A	372	350	10,753
17	9,909	67B	1,368	368	4,263
18	6,368	68A	4,415	376	26,263
19	3,876	68B	11,999	377	13,975
20	3,138	68C	1,717	378	4,157
22	7,820	70	524	417	1,307
23	3,199	74A	426	503	18,641
24	3,176	74B	9,643	563	12,691
25	12,356	74C	4,164	568	1,071
26	9,431	76A	342	601	3,655
27	8,154	76B	8,085	623	11,558
28	77,458	77A	8,762	632	3,086
29	7,113	77B	14,963	648	17,747
30A	73,248	78	6,786	675	9,484
30B	7,523	79	8,085	676	722
34A	44,349	80A	9,590	678	3,572
34B	17,653	80B	4,180	684	2,128
34C	1,239	81	8,253	688	9,590
35	17,235	82	5,722	850	8,427
36	1,892	83	8,587	864	7,037
37A	70,201	84	23,983	882	1,596
37B	57,335	85	13,960	892	995
37C	12,045	86	4,483	987	17,227
38	13,488	87	12,820	988	10,897
39	4,294	88A	36,863		
40A	4,126	88B	35,724		
40B	10,563	88C	5,791		
40C	1,261	89A	48,696		
41A	6,588	89B	12,584		
41B	21,756	89C	1,596		
41C	11,353	90	6,125		
42	5,335	91	2,888		
43	6,019	92	426		
44	2,812	93A	23,527		
50	7,250	93B	2,173		
				TOTAL-	1,452,133

LABORATORY ANALYSIS-CHEMICAL^{1/}

Land-type	Depth (in.)	Horizon	pH	P ₂ (ppm)	Extractable cations			SO ₄ (ppm)	NO ₃ -N (ppm)	T.N. (%)	OM (%)	Cation Exchange Capacity (Meg/100g)
					K (ppm)	Ca (Meg/100g)	Mg (Meg/100g)					
17	0-11	A	6.4	14	232	15.3	8.9	3.8	6.19	.15	3.25	29.02
	11-28	B1	6.8	14	116	17.9	9.9	1.40	.52	.14	2.93	31.78
	28-39	B2	7.1	12	100	15.7	9.2	.40	1.26	.05	1.17	27.52
24	0-7	A	6.5	16	250	14.9	9.9	1.4	14.28	.13	1.76	29.11
	7-18	B	6.9	9	88	18.5	9.9	1.8	2.94	.07	1.71	12.59
	18-30	CX	8.5	7	44	30.0	13.0	.20	1.26	.02	.43	38.38
25	0-14	A	6.1	15	232	13.5	4.0	2.4	26.46	.19	4.16	25.46
	14-36	B	6.4	10	106	11.8	4.5	2.8	10.92	.14	3.15	23.82
	36-51	C	6.7	11	222	11.4	4.5	.80	2.20	.09	1.44	21.62
26	0-9	A	6.1	25	310	15.9	6.5	3.0	10.18	.11	3.51	26.09
	9-21	B	6.5	14	180	14.7	6.9	1.2	1.68	.06	1.32	23.90
	21-67	CX	6.6	14	124	11.4	7.2	1.4	.63	.02	.33	22.69
27	0-9	A	5.7	12	330	18.9	5.9	3.8	42.0	.22	5.81	28.55
	9-21	B	6.4	9	116	18.7	7.0	1.6	7.35	.13	2.25	27.81
	21-36	C	6.5	9	64	18.3	7.0	1.0	.42	.09	1.59	26.13
28	0-5	A	6.7	11	116	11.6	6.5	3.0	2.52	.07	1.49	21.53
	5-11	B	6.4	7	96	12.9	7.4	4.6	1.47	.05	.91	30.70
34A	0-4	A	6.3	13	470	17.1	6.3	2.2	1.26	.14	6.58	30.23
	4-9	B1	6.2	10	170	14.3	6.4	2.4	.63	.09	3.07	26.51
	9-18	B2	6.4	9	112	10.1	5.3	1.6	.42	.06	1.43	23.25
	18-26	C	6.5	10	64	12.9	7.4	2.2	.42	.04	.99	24.52
37A	0-7	A	6.2	22	1460	4.3	1.8	3.4	23.52	.10	3.15	20.36
	7-19	B1	6.1	11	572	8.3	3.2	3.4	12.60	.05	1.33	20.59
	19-25	B2	5.9	7	310	10.6	5.0	1.2	6.51	.04	1.33	23.91
38	0-3	A	6.1	56	594	5.0	1.4	1.4	2.31	.07	2.99	16.47
	7-18	B2	7.0	10	960	6.4	3.5	1.2	1.89	.03	.80	18.21
	18-30	C	6.9	13	644	8.1	5.5	1.4	1.26	.02	.96	21.76
40A	0-5	A1	6.2	70	572	11.6	2.6	2.8	30.45	.15	5.44	22.00
	5-15	AC	6.9	58	628	7.9	2.2	1.6	2.52	.09	2.72	14.51
	15-27	C1	6.9	22	392	6.1	2.4	.20	1.68	.05	1.39	12.07

Oregon State University

LABORATORY ANALYSIS-CHEMICAL^{1/}

Land-type	Depth (in.)	Horizon	pH	P (ppm)	Extractable cations			SO ₄ (ppm)	NO ₃ -N (ppm)	T.N. (%)	OM (%)	Cation Exchange Capacity (Meg/100g)
					K (ppm)	Ca (Meg/100g)	Mg (Meg/100g)					
41A	0-10	A1-AC	6.4	32	628	7.7	1.5	1.4	7.56	.08	2.30	13.21
	10-23	C1	6.5	10	672	5.9	1.3	.80	3.99	.04	.38	9.22
	23-36	C2	6.6	15	464	5.6	1.7	.20	.42	.02	.44	8.94
43	0-6	A1	5.7	54	286	4.0	.53	1.80	14.91	.14	6.19	14.37
	6-13	AC	6.1	28	286	3.4	.46	2.0	5.98	.10	3.63	11.47
	13-32	C	6.1	24	432	2.3	.59	1.60	1.26	.02	.80	6.18
56A	0-8	A	6.6	36	504	16.7	3.4	.80	11.44	.10	3.35	23.62
	8-12	B1	6.5	14	456	14.5	5.5	.80	4.20	.07	1.75	22.41
	12-22	B2	6.6	10	326	12.9	6.9	.20	4.93	.04	.82	22.46
63B	0-5	A	6.5	36	672	19.6	6.2	1.8	2.73	.05	1.59	25.51
	5-25	B	6.8	20	388	16.9	6.3	2.4	1.68	.03	1.15	22.74
	25-45	C	7.0	14	204	15.5	11.0	2.2	.63	.01	.16	27.89
64	1-5	A3	6.7	37	672	7.9	1.9	.80	10.08	.06	1.76	14.13
	5-21	B	6.7	32	650	6.2	2.2	.40	1.26	.03	.96	13.71
	21-30	C	6.9	15	614	6.9	4.2	.40	1.26	.02	.59	16.85
67B	0-6	A1	5.9	48	1800	16.5	3.0	2.4	24.15	.15	5.76	45.44
	12-32	B	5.6	28	1640	48.0	8.2	.80	.84	.05	2.35	59.25
	32-50	C	6.1	23	1120	51.0	6.9	2.2	1.05	.02	.66	55.83
68B	0-1	A1	5.9	80	658	5.3	1.3	1.0	1.26	.11	6.03	16.15
	1-18	AC	6.1	53	450	4.5	1.3	.20	.21	.04	1.33	11.14
	18-38	C	6.5	17	336	5.8	1.8	.60	1.05	.02	.69	10.16
74C	0-4	A1	7.2	11	424	8.3	1.6	.60	5.46	.06	2.56	11.09
	4-11	AC	6.9	14	672	8.6	2.0	2.6	1.05	.06	2.24	14.60
	11-25	C1	6.8	15	358	9.7	4.3	1.0	5.88	.08	1.60	19.14
	25-48	C2	6.5	12	146	5.8	1.6	1.0	.73	.01	.59	7.96
76B	0-2	A1	6.2	37	450	7.5	1.7	.60	18.90	.10	4.00	12.82
	2-15	AC	6.9	19	346	5.1	1.5	.40	1.26	.02	.91	8.38
	15-29	C1	6.9	17	106	5.8	2.5	.20	.21	.01	.48	9.17
	29-40	C2	7.1	24	84	6.4	2.8	.20	.42	.01	.43	9.55

^{1/}Soil Testing Lab.-Oregon State University

LABORATORY ANALYSIS-CHEMICAL^{1/}

Land-type	Depth (in.)	Horizon	pH	P (ppm)	Extractable cations			SO ₄ (ppm)	NO ₃ -N (ppm)	T.N. (%)	OM (%)	Cation Exchange Capacity (Meg/100g)
					K (ppm)	Ca (Meg/100g)	Mg (Meg/100g)					
77B	0-12	A	6.8	25	286	7.7	.76	1.8	10.71	.08	5.87	13.76
	12-22	C	7.3	11	204	4.7	.36	.20	2.10	.03	1.28	7.39
	22-40	IIC	7.3	14	398	5.8	.82	.20	.42	.02	1.07	6.97
84	0-3	AI	6.1	46	140	1.8	.53	7.4	5.67	.07	5.33	11.04
	7-14	C1	6.4	27	106	1.6	.25	.20	1.05	.03	1.28	8.52
	14-35	C2	6.6	29	244	2.3	.53	1.2	.73	.01	.85	7.58
88B	0-5	A	6.6	67	198	2.9	.53	2.6	1.26	.06	2.83	13.01
	5-17	C	6.4	30	240	2.9	.46	7.4	.21	.03	1.49	12.73
	17-35	IIB	6.6	11	1160	11.6	2.7	1.4	.84	.05	.75	28.55
89A	2-13	AC	5.9	20	250	2.3	.43	4.0	3.78	.10	4.69	17.78
	13-23	C	6.1	13	304	1.9	.69	5.0	2.10	.06	1.60	13.57
	23-30	IIB	6.1	17	432	5.0	2.0	2.4	1.47	.03	.59	16.85
95	0-7	A	6.1	10	146	2.4	.30	5.6	5.46	.07	4.21	10.90
	7-14	C1	6.6	13	72	.60	.16	.80	1.26	.01	.48	3.84
	14-35	C2	6.4	15	60	.60	.16	.60	.42	.01	.48	4.73
	35-72	IIC	6.6	33	140	1.0	.30	.20	.52	.01	.27	3.56
97B	1-9	AC	6.3	17	174	1.3	.20	1.60	1.05	.04	3.57	9.83
	9-26	C1	6.5	8	76	1.0	.20	.80	1.05	.02	1.39	6.36
	26-44	C2	6.6	15	44	1.2	.10	.40	1.47	.01	.37	5.62
	44-51	IIC	6.3	15	330	3.7	1.9	1.80	.63	.02	.69	12.40
99	0-3	A	6.4	33	398	5.1	2.7	1.0	3.57	.03	.96	11.00
	3-24	C1	7.0	20	388	4.8	4.2	1.0	.63	.02	.53	10.30
	24-50	CX	7.3	17	436	6.1	7.3	.60	.84	.01	.53	16.80

1/ Soil Physics Lab. - Oregon State University

LABORATORY ANALYSIS - PHYSICAL^{1/}

Landtype	Location	Horizon	Depth (in.)	Bulk Density ^{2/} (Gr./Cm. ³)	Percent Moisture by WT. at Tensions of:				
					0.1 ATM.	0.3 ATM.	0.8 ATM.	2.0 ATM.	15.0 ATM.
17	T.40S., R.16E., Sec. 13, SW1/4, NW1/4	A	0-11	1.21	38.55	33.22	28.55	27.61	20.12
		B ₁	11-28	1.06	50.27	42.04	36.33	33.57	24.82
		B ₂	28-39	1.35	43.93	37.96	31.96	30.00	21.24
24	T.41S., R.16E., Sec. 12, SW1/4, SW1/4	A	0-7	1.15	41.79	34.80	29.76	28.12	20.18
		B	7-18	1.45	44.85	37.79	32.33	30.42	22.43
		C _X	18-30	1.17	44.68	37.56	33.59	32.64	26.62
25	T.33S., R.15E., Sec. 36, SW1/4, SE1/4	A	0-14	1.17	34.22	26.45	22.11	20.49	14.37
		B	14-36	1.15	32.31	24.86	20.51	19.00	13.46
		C	36-51	1.03	36.54	27.22	22.76	19.40	13.92
26	T.38S., R.15E., Sec. 1, SE1/4, SW1/4	A	0-9	1.10	39.96	29.90	25.60	24.23	16.26
		B	9-21	1.10	39.23	30.28	25.08	23.40	17.46
		C _X	21-67	1.34	33.70	27.43	25.49	23.23	17.72
27	T.41S., R.22E., Sec. 17, SW1/4, SE1/4	A	0-9	1.23	30.26	23.72	20.96	19.05	12.87
		B	9-21	1.34	29.85	23.90	23.97	18.26	11.94
		C	21-36	1.37	29.89	23.53	20.11	17.96	11.91
28	T.40S., R.18E., Sec. 23, SW1/4, SE1/4	A	0-5	1.34	38.34	31.95	22.35	20.26	13.14
		B	5-11	1.48	55.63	46.62	38.84	38.65	25.77
34A	T.39S., R.22E., Sec. 30, SW1/4, SW1/4	A	0-4	1.20	39.41	31.93	25.87	24.25	16.92
		B ₁	4-9	1.06	36.21	29.55	24.33	23.28	17.57
		B ₂	9-18	1.17	34.20	28.18	23.84	23.55	17.67
		C ²	18-26	1.33	41.13	33.60	29.04	28.52	23.04
37A	T.31S., R.16E., Sec. 6, SW1/4, SE1/4	A	0-7	1.10	34.11	26.32	21.96	18.21	11.58
		B ₁	7-19	1.40	28.77	25.44	22.05	19.76	15.02
		B ₂	19-25	1.10	41.47	33.11	27.44	24.78	20.47

1/ Soil Physics Lab. - Oregon State University

2/ Tested by Fremont N.F. Soil Materials Lab

LABORATORY ANALYSIS - PHYSICAL^{1/}

Landtype	Location	Horizon	Depth (in.)	Bulk Density ^{2/} (Gr./Cm. ³)	Percent Moisture by WT. at Tensions of:				
					0.1 ATM.	0.3 ATM.	0.8 ATM.	2.0 ATM.	15.0 ATM.
38	T.30S., R.14E., Sec. 22, SW1/4, SW1/4	A B ₂ C ²	0-3	1.22	36.37	26.12	23.35	17.35	9.47
			7-18	1.47	25.97	20.95	19.46	16.54	11.45
			18-30	1.51	32.52	26.09	22.95	20.95	16.25
40A	T.30S., R.16E., Sec. 3, SE1/4 SE1/4	A ₁ AC C ₁	0-5	0.96	39.56	28.45	23.55	18.81	12.22
			5-15	1.14	29.78	22.65	16.65	13.97	9.10
			15-27	1.26	21.78	17.66	12.69	10.48	7.47
41A	T.38S., R.17E., Sec. 5, NW1/4, SW1/4	A ₁ -AC C ₁ C ₂	0-10	1.03	29.44	21.36	16.49	12.45	6.56
			10-23	1.19	22.86	18.16	13.66	10.71	6.09
			23-36	1.10	20.48	17.32	13.81	10.82	6.25
43	T.38S., R.22E., Sec. 6, SE1/4, NW1/4	A ₁ AC C	0-6	1.06	41.56	27.85	21.51	14.48	8.33
			6-13	1.08	37.82	23.81	18.37	12.14	6.92
			13-32	1.32	28.32	19.44	16.59	9.09	4.69
56A	T.37S., R.12E., Sec. 11, NE1/4, SW1/4	A B ₁ B ₂	0-8	1.19	35.73	26.20	23.25	18.90	12.81
			8-12	1.24	33.84	25.32	21.69	19.65	14.00
			12-22	1.51	39.00	28.61	23.71	21.00	15.59
63B	T.37S., R.18E., Sec. 4, SW1/4, NW1/4	A B C	0-5	1.18	30.14	19.46	17.65	13.70	8.99
			5-25	1.35	27.38	17.82	14.99	12.46	8.75
			25-45	1.71	27.94	17.70	13.17	12.06	8.92
64	T.29S., R.13E., Sec. 35, NW1/4, NE1/4	A ₃ B ³ C	1-5	1.02	37.38	23.54	17.21	14.61	8.63
			5-21	1.09	37.20	24.72	15.92	13.54	9.14
			21-30	1.50	29.26	21.32	16.86	15.56	11.36
67B	T.37S., R.18E., Sec. 8, NW1/4, SE1/4	A ₁ B ¹ C	0-6	1.07	56.20	46.64	40.17	37.21	26.70
			12-32	1.14	82.82	68.56	59.94	53.60	38.00
			32-50	1.15	85.37	70.70	60.36	55.60	39.25

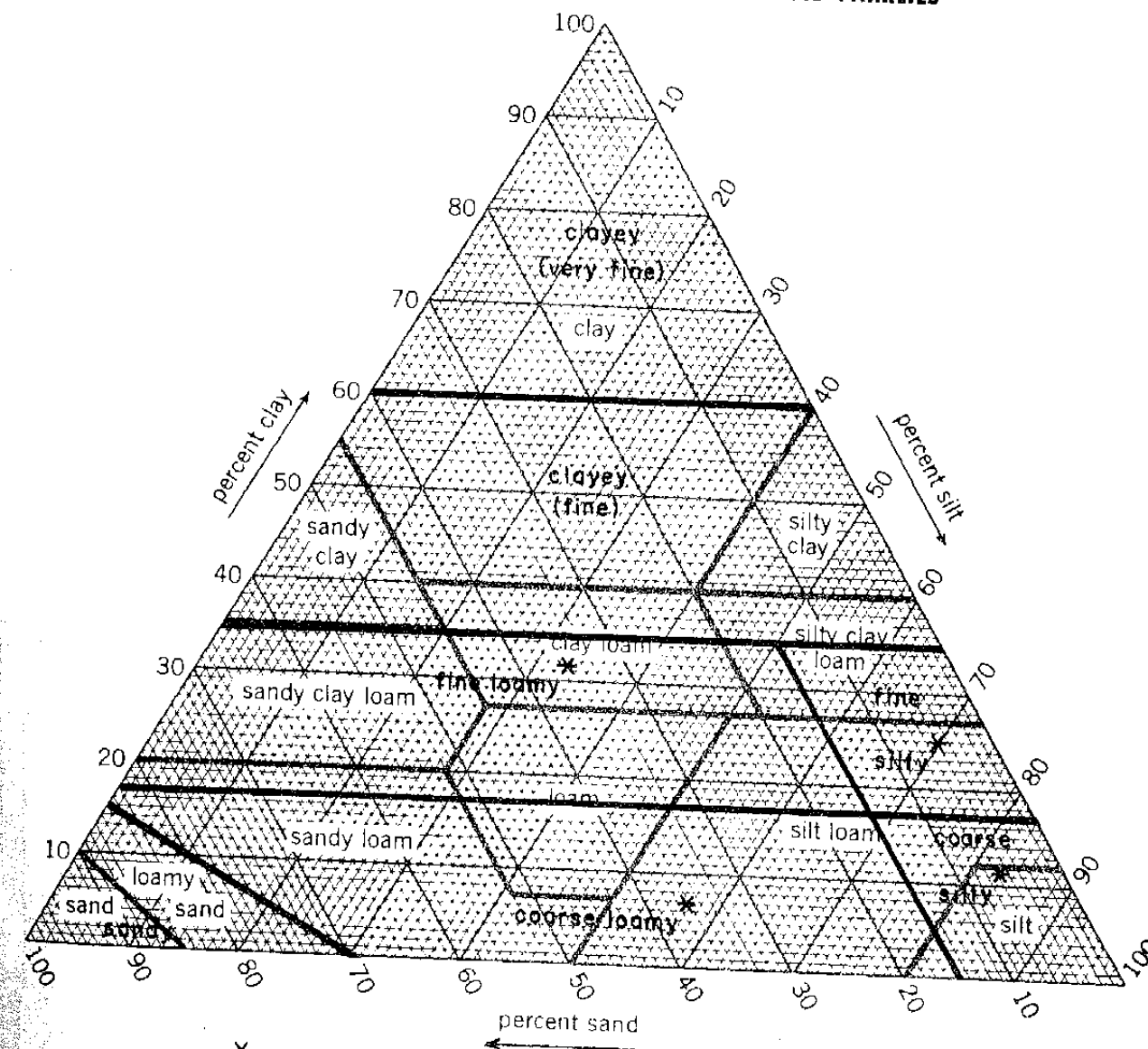
LABORATORY ANALYSIS - PHYSICAL^{1/}

Landtype	Location	Horizon	Depth (in.)	Bulk Density ^{2/} (Gr./Cm. ³)	Percent Moisture by WT. at Tensions of:				
					0.1 ATM.	0.3 ATM.	0.8 ATM.	2.0 ATM.	15.0 ATM.
68B	T.36S., R.19E., Sec. 9, SW1/4, SW1/4	A ₁ AC C	0-1	0.96	36.68	23.13	15.69	13.01	7.82
			1-18	0.98	28.96	17.88	11.83	10.77	6.14
			18-38	1.17	30.04	20.82	14.45	12.60	8.10
74C	T.38S., R.18E., Sec. 3, NW1/4, NE1/4	A ₁ AC C ₁ C ₂	0-4	1.06	24.40	18.40	15.62	13.32	8.00
			4-11	1.19	18.49	14.90	13.44	12.08	7.39
			11-25	1.40	17.60	13.35	12.88	10.61	6.69
			25-48	1.50	18.95	14.91	14.22	11.51	7.27
76B	T.36S., R.18E., Sec. 15, SW1/4, SW1/4	A ₁ AC C ₁ C ₂	0-2	-	34.25	23.27	19.11	13.32	7.31
			2-15	1.20	23.65	17.06	13.69	10.27	5.29
			15-29	1.28	25.91	19.21	16.27	12.13	6.35
			29-40	1.30	27.39	17.81	15.32	11.51	6.31
77B	T.34S., R.13E., Sec. 20, SW1/4, SW1/4	A C IIC	0-12	0.68	40.47	23.91	17.91	12.00	8.16
			12-22	0.75	37.72	18.82	13.69	8.57	5.49
			22-40	1.41	23.85	17.73	16.64	12.04	7.75
84	T.34S., R.14E., Sec. 5, NW1/4, SE1/4	A ₁ C ₁ C ₂	0-3	0.77	37.72	25.42	14.30	11.95	6.43
			7-14	0.84	34.68	20.56	12.58	9.94	5.34
			14-35	0.75	40.66	25.55	11.65	9.58	5.76
88B	T.33S., R.16E., Sec. 30, NW1/4, SE1/4	A C IIB	0-5	0.73	34.02	21.01	15.37	10.89	8.19
			5-17	0.82	40.13	32.85	29.98	25.08	19.84
			17-35	1.09	40.29	21.43	15.20	10.57	7.33
89A	T.34S., R.17E., Sec. 30, SE1/4, NE1/4	AC C IIB	2-13	0.84	38.97	25.13	17.91	15.36	10.15
			13-23	0.97	35.55	25.01	18.84	13.98	8.77
			23-30	1.39	37.05	30.66	26.55	19.48	13.56

Landtype	Location	Horizon	Depth (in.)	Bulk Density ^{2/} (Gr./Cm. ³)	Percent Moisture by WT. at Tensions of:				
					0.1 ATM.	0.3 ATM.	0.8 ATM.	2.0 ATM.	15.0 ATM.
95	T.27S., R.11E., Sec. 32, NW1/4, SE1/4	A C ₁ C ₂ IIC ₂	0-7 7-14 14-35 35-72	0.71 0.56 0.66 1.33	45.37	31.07	17.64	14.07	8.69
					30.26	17.12	7.22	5.22	2.66
					18.69	14.34	5.75	5.06	2.97
					6.71	4.88	4.62	4.61	2.74
97B	T.25S., R.11E., Sec. 34, NW1/4, SE1/4	AC C ₁ C ₂ IIC ₂	1-9 9-26 26-44 44-51	0.66 0.44 0.73 1.20	-	-	-	-	-
					-	-	-	-	-
					-	-	-	-	-
					-	-	-	-	-
99	T.28S., R.12E., Sec. 13, NE1/4, SW1/4	A C ₁ C _X	0-3 3-24 24-50	1.29 1.24 1.45	22.99	16.08	14.48	10.81	6.16
					21.46	14.70	11.74	11.50	7.33
					26.05	17.96	14.59	14.11	9.51
					-	-	-	-	-

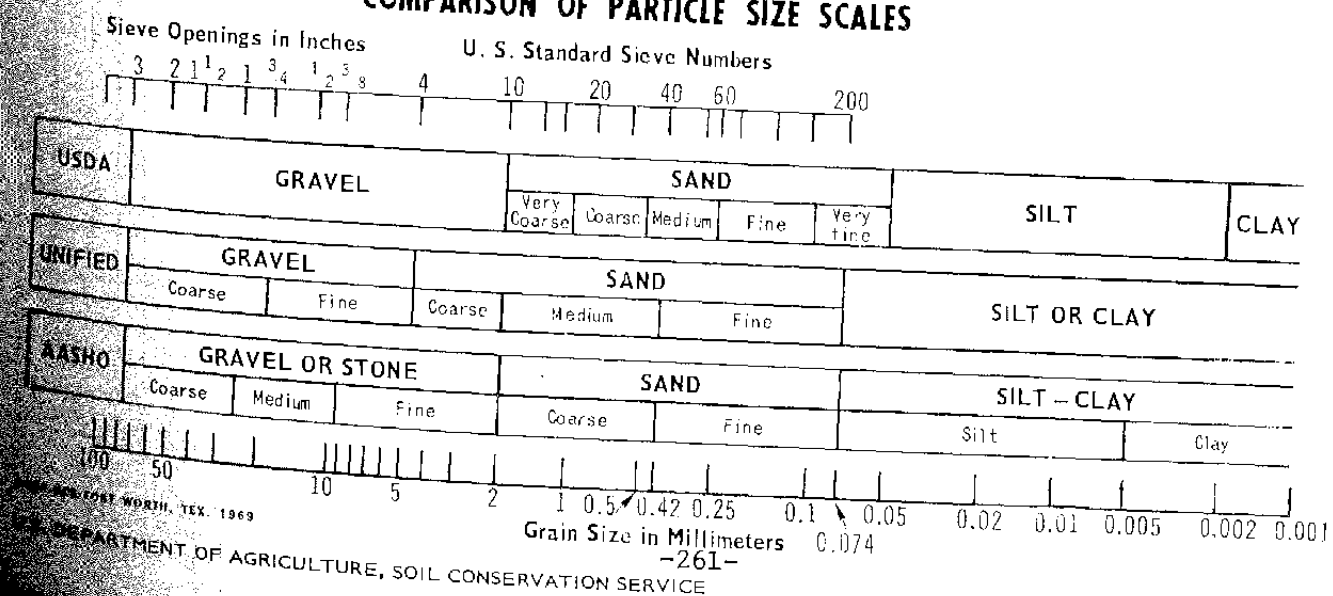
GUIDE FOR TEXTURAL CLASSIFICATION IN SOIL FAMILIES

Draft, Subject to Change, June, 1964



* Very fine sand (0.05 - 0.1) is treated as silt for family groupings; coarse fragments are considered the equivalent of coarse sand in the boundary between the silty and loamy classes.

COMPARISON OF PARTICLE SIZE SCALES



U.S. DEPARTMENT OF AGRICULTURE, SOIL CONSERVATION SERVICE

UNIFIED SOIL CLASSIFICATION SYSTEM

MAJOR DIVISIONS			GROUP SYMBOL	TYPICAL NAMES	
Coarse-grained soils (More than half of material is larger than No. 200 sieve size)	Gravels—(More than half of coarse fraction is larger than No. 4 sieve size)	Clean gravels (Little or no fines)	GW	Well-graded gravels, gravel-sand mixtures, little or no fines	
			GP	Poorly graded gravels, gravel-sand mixtures, little or no fines	
		Gravel with fines (Appreciable amount of fines)	GM*	d u	Silty gravels, gravel-sand-silt mixtures
			GC	Clayey gravel, gravel-sand-clay mixtures	
	Sands—(More than half of coarse fraction is smaller than No. 4 sieve size)	Clean sands (Little or no fines)	SW	Well-graded sands, gravelly sands, little or no fines	
			SP	Poorly graded sands, gravelly sands, little or no fines	
		Sands with fines (Appreciable amount)	SM*	d u	Silty sands, sand-silt mixtures
			SC	Clayey sands, sand-clay mixtures	
	Fine-grained soils (More than half of material is smaller than No. 200 sieve)	Silts and Clays (Liquid limit less than 50)	ML	Inorganic silts and very fine sands, rock flour, silty or clayey fine sands, or clayey silts with slight plasticity	
			CL	Inorganic clays of low to medium plasticity, gravelly clays, sandy clays, silty clays, lean clays	
OL			Organic silts and organic silty clays of low plasticity		
Silts and Clays (Liquid limit greater than 50)		MH	Inorganic silts, micaceous or diatomaceous fine sandy or silty soils, elastic silts		
		CH	Inorganic clays of high plasticity, fat clays		
		OH	Organic clays of medium to high plasticity, organic silts		
Highly organic soils		PT	Peat and other highly organic soils		

SOIL MATERIALS TESTING RESULTS ^{1/} Landtype No. 17

Location: T.40S, R.16E., Sec. 13, SW1/4, NW1/4			Mechanical Analysis	
Depth: 11-39 in.	Unified: CH	ASSHO: A-7-6(25)	Sieve Size	% Passing
Liquid Limit: 59	Plasticity Index: 31		3/8"	100
Specific Gravity: 2.5641			#4	99.92
Sieve and Hydrometer Analysis: Gravel - <1%			#10	99.6
Sand - 25%			#20	98.6
Silt - 25%			#40	96.2
Clay - 50%			#60	88.5
			#100	81.6
Bulk Density: 11-28 in. - 1.06 Gr/Cm ³			#200	75.4
28-39 in. - 1.35 Gr/Cm ³			.0011	44.4
Gap Graded				

Landtype No. 24

Location: T.41S., R.16E., Sec. 12, SW1/4, SW1/4			Mechanical Analysis	
Depth: 18-30 in.	Unified: ML	ASSHO: A-7-5(7)	Sieve Size	% Passing
Liquid Limit: 49	Plasticity Index: 11		3/8"	100
Specific Gravity: 2.6532			#4	99.9
Sieve and Hydrometer Analysis: Gravel - 1%			#10	98.9
Sand - 39%			#20	96.7
Silt - 47%			#40	92.0
Clay - 13%			#60	84.4
			#100	72.3
Bulk Density: 1.17 Gr/Cm ³			#200	60.0
			.0013	10.9
Well Graded				

Landtype No. 25

Location: T.33S., R.15E., Sec. 36, SW1/4, SE1/4			Mechanical Analysis	
Depth: 14-36 in.	Unified: ML	ASSHO: A-6 (4)	Sieve Size	% Passing
Liquid Limit: 39	Plasticity Index: 13		3/8"	100
Specific Gravity: 2.6962			#4	99.3
Sieve and Hydrometer Analysis: Gravel - 4%			#10	96.1
Sand - 45%			#20	93.2
Silt - 38%			#40	86.3
Clay - 13%			#60	71.5
			#100	62.3
Bulk Density: 1.15 Gr/Cm ³			#200	50.6
			.0013	11.6
Well Graded				

Samples tested by Fremont N.F. Soil Materials Lab

SOIL MATERIALS TESTING RESULTS
Landtype No. 26

Location: T.38S., R.15E., Sec. 1, SE1/4, SW1/4			Mechanical Analysis	
Depth: 9-67 in.	Unified: SMu	ASSHO: A-6(2)	Sieve Size	% Passing
Liquid Limit: 37	Plasticity Index: 11		1-1/2"	100
Specific Gravity: 2.7887			1"	94.9
Sieve and Hydrometer Analysis:	Gravel - 17%		3/4"	93.0
	Sand - 40%		1/2"	90.6
	Silt - 29%		3/8"	88.9
	Clay - 14%		#4	86.1
Bulk Density: 9-21 in. - 1.10 Gr./Cm. ³			#10	83.3
21-67 in. - 1.34 Gr./Cm. ³			#40	72.6
			#200	43.4
			.0012	11.9
Gap Graded				

Landtype No. 27

Location: T.41S., R.22E., Sec. 17, SW1/4, SE1/4			Mechanical Analysis	
Depth: 9-21 in.	Unified: SMu	ASSHO: A-7-5(1)	Sieve Size	% Passing
Liquid Limit: 42	Plasticity Index: 11		1-1/2"	100
Specific Gravity: 2.5514			1"	96.9
Sieve and Hydrometer Analysis:	Gravel - 22%		3/4"	96.9
	Sand - 40%		1/2"	95.1
	Silt - 33%		3/8"	94.1
	Clay - 5%		#4	88.8
			#10	77.6
Bulk Density: 1.34 Gr./Cm. ³			#40	59.1
			#200	37.7
			.0014	4.1
Poor Graded				

Landtype No. 28

Location: T.40S., R.18E., Sec. 23, SW1/4, SE1/4			Mechanical Analysis	
Depth: 5-11 in.	Unified: CH	ASSHO: A-7-6(34)	Sieve Size	% Passing
Liquid Limit: 63	Plasticity Index: 34		#4	100
Specific Gravity: 2.7081			#10	99.6
Sieve and Hydrometer Analysis:	Gravel - <1%		#20	98.7
	Sand - 12%		#40	97.5
	Silt - 26%		#60	95.4
	Clay - 62%		#100	92.8
Bulk Density: 1.48 Gr./Cm. ³			#200	88.5
			.0011	58.3

SOIL MATERIALS TESTING RESULTS
Landtype No. 34A

Location: T.39S., R.22E., Sec. 30, SW1/4, SW1/4			Mechanical Analysis	
Depth: 4-18 in.	Unified: SMu	ASSHO: A-6(3)	Sieve Size	% Passing
Liquid Limit: 37	Plasticity Index: 11		1-1/2"	100
Specific Gravity: 2.7135			1"	98.8
Sieve and Hydrometer Analysis:	Gravel - 18%		3/4"	96.5
	Sand - 33%		1/2"	94.2
	Silt - 31%		3/8"	91.0
	Clay - 18%		#4	86.2
			#10	82.0
Bulk Density: 4-9 in. - 1.06 Gr./Cm. ³			#40	71.3
9-18 in. - 1.17 Gr./Cm. ³			#200	48.8
Gap and Poor Graded			.0012	15.9

Landtype No. 37A

Location: T.31S., R.16E., Sec. 6, SW1/4, SE1/4			Mechanical Analysis	
Depth: 7-25 in.	Unified: SMu	ASSHO: A-4(2)	Sieve Size	% Passing
Liquid Limit: 38	Plasticity Index: 8		1-1/2"	100
Specific Gravity: 2.7965			1"	97.0
Sieve and Hydrometer Analysis:	Gravel - 19%		3/4"	97.0
	Sand - 34%		1/2"	96.5
	Silt - 37%		3/8"	94.8
	Clay - 10%		#4	89.1
			#10	81.5
Bulk Density: 7-19 in. - 1.40 Gr./Cm. ³			#40	69.8
12-25 in. - 1.10 Gr./Cm. ³			#200	46.6
Gap Graded			.0013	8.35

Landtype No. 38

Location: T.30S., R.14E., Sec. 22, SW1/4, SW1/4			Mechanical Analysis	
Depth: 7-18 in.	Unified: SMD	ASSHO: A-4(0)	Sieve Size	% Passing
Liquid Limit: 25	Plasticity Index: 2		1-1/2"	100
Specific Gravity: 2.7741			1"	97.4
Sieve and Hydrometer Analysis:	Gravel - 18%		3/4"	95.1
	Sand - 40%		1/2"	94.4
	Silt - 32%		3/8"	93.3
	Clay - 10%		#4	89.2
			#10	81.9
Bulk Density: 1.47 Gr./Cm. ³			#40	71.5
			#200	41.7
Gap Graded			.0013	7.4

SOIL MATERIALS TESTING RESULTS
Landtype No. 40A

Location: T.30S., R.16E., Sec. 3, SE1/4SE1/4	Mechanical Analysis	
Depth: 15-27 in. Unified: GMu ASSHO: A-2-6(0)	Sieve Size	% Passing
Liquid Limit: 31 Plasticity Index: 7	3"	100
Specific Gravity: 2.6598	1-1/2"	98.2
Sieve and Hydrometer Analysis: Gravel - 66%	1"	88.4
Sand - 18%	1/2"	72.7
Silt - 13%	3/8"	64.2
Clay - 3%	#4	48.7
	#10	34.3
	#40	21.7
Bulk Density: 1.26 Gr./Cm. ³	#200	15.8
	.0013	2.2
Poor Graded		

Landtype No. 41A

Location: T.38S., R.17E., Sec. 5, NW1/4, SW1/4	Mechanical Analysis	
Depth: 10-36 in. Unified: Smd ASSHO: A-2-4(0)	Sieve Size	% Passing
Liquid Limit: 0 Plasticity Index: 0	3"	100
Specific Gravity: 2.4756	1-1/2"	93.1
Sieve and Hydrometer Analysis: Gravel - 33%	1"	88.4
Sand - 41%	1/2"	82.7
Silt - 20%	3/8"	79.9
Clay - 6%	#4	74.4
	#10	67.6
	#40	63.5
Bulk Density: 10-23 in. - 1.19 Gr./Cm. ³	#200	25.9
23-36 in. - 1.10 Gr./Cm. ³	.0014	4.3
Poor and Gap Graded		

Landtype No. 43

Location: T.38S., R.22E., Sec. 6, SE1/4, NW1/4	Mechanical Analysis	
Depth: 13-32 in. Unified: SMu ASSHO: A-2-6(0)	Sieve Size	% Passing
Liquid Limit: 36 Plasticity Index: 6	1-1/2"	100
Specific Gravity: 2.5511	1"	98.8
Sieve and Hydrometer Analysis: Gravel - 44%	3/4"	97.7
Sand - 30%	1/2"	95.2
Silt - 24%	3/8"	91.3
Clay - 2%	#4	76.2
	#10	55.2
	#40	42.2
Bulk Density: 1.32 Gr./Cm. ³	#200	25.2
	.0014	4.2
Poor Graded		

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SOIL MATERIALS TESTING RESULTS
Landtype No. 56A

Location: T.37S., R.12E., Sec. 11, NE1/4, SW1/4	Mechanical Analysis	
Depth: 8-22 in. Unified: CL ASSHO: A-6 (6)	Sieve Size	% Passing
Liquid Limit: 35 Plasticity Index: 11	1"	100
Specific Gravity: 2.6846	3/4"	99.3
Sieve and Hydrometer Analysis: Gravel - 2%	1/2"	99.3
Sand - 31%	3/8"	99.2
Silt - 47%	#4	98.8
Clay - 20%	#10	98.2
	#40	91.5
Bulk Density: 8-12 in. - 1.24 Gr./Cm. ³	#200	67.3
12-22 in. - 1.51 Gr./Cm. ³	.0013	16.8
Poor Graded		

Landtype No. 63B

Location: T.37S., R.18E., Sec. 4, SW1/4, NW1/4	Mechanical Analysis	
Depth: 5-25 in. Unified: Smd ASSHO: A-4 (0)	Sieve Size	% Passing
Liquid Limit: 0 Plasticity Index: 0	3/4"	100
Specific Gravity: 2.7886	1/2"	99.3
Sieve and Hydrometer Analysis: Gravel - 7%	3/8"	98.7
Sand - 46%	#4	97.2
Silt - 40%	#10	93.2
Clay - 7%	#40	82.7
	#100	55.7
Bulk Density: 1.35 Gr./Cm. ³	#200	46.8
	.0013	4.7
Poor Graded		

Landtype No. 64

Location: T.29S., R.13E., Sec. 35, NW1/4, NE1/4	Mechanical Analysis	
Depth: 5-21 in. Unified: Smd ASSHO: A-4 (0)	Sieve Size	% Passing
Liquid Limit: 27 Plasticity Index: 2	1"	100
Specific Gravity: 2.7176	3/4"	98.5
Sieve and Hydrometer Analysis: Gravel - 24%	1/2"	95.3
Sand - 35%	3/8"	92.9
Silt - 33%	#4	85.6
Clay - 8%	#10	76.0
	#40	65.7
Bulk Density: 1.09 Gr./Cm. ³	#100	50.9
	#200	40.5
	.0013	5.3
Poor Graded		

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SOIL MATERIALS TESTING RESULTS
Landtype No. 67B

Location: T.37S., R.18E., Sec. 8, NW1/4, SE1/4			Mechanical Analysis	
Depth: 12-32 in.	Unified: MH	ASSHO: A-7-5(78)	Sieve Size	% Passing
Liquid Limit: 115	Plasticity Index: 69		3/8"	100
Specific Gravity: 2.7801			#4	99.98
Sieve and Hydrometer Analysis:	Gravel - <1%		#10	99.8
	Sand - 8%		#20	99.3
	Silt - 24%		#40	98.7
	Clay - 68%		#60	97.5
			#100	95.8
Bulk Density: 1.14 Gr./Cm. ³			#200	91.7
			.0011	64.0

Landtype No. 68B

Location: T.36S., R.19E., Sec. 9, SW1/4, SW1/4			Mechanical Analysis	
Depth: 1-18 in.	Unified: SMD	ASSHO: A-2-4 (0)	Sieve Size	% Passing
Liquid Limit: 0	Plasticity Index: 0		3"	100
Specific Gravity: 2.5774			1-1/2"	95.5
Sieve and Hydrometer Analysis:	Gravel - 20%		1"	93.5
	Sand - 51%		1/2"	91.9
	Silt - 23%		3/8"	90.1
	Clay - 6%		#4	86.8
			#10	79.8
Bulk Density: 0.98 Gr./Cm. ³			#40	65.9
			#200	28.6
Poor Graded			.0014	5.3

Landtype No. 74C

Location: T.38S., R.18E., Sec. 3, NW1/4, NE1/4			Mechanical Analysis	
Depth: 11-50 in.	Unified: SMD	ASSHO: A-1-b(0)	Sieve Size	% Passing
Liquid Limit: 0	Plasticity Index: 0		3"	100
Specific Gravity: 2.6399			1-1/2"	88.7
Sieve and Hydrometer Analysis:	Gravel - 43%		1"	83.2
	Sand - 37%		1/2"	80.2
	Silt - 14%		3/8"	78.2
	Clay - 6%		#10	56.4
			#10	56.4
Bulk Density: 11-25 in. - 1.40 Gr./Cm. ³ 25-50 in. - 1.50 Gr./Cm. ³			#40	41.2
			#200	1.2
Gap and Poor Graded			.0013	

SOIL MATERIALS TESTING RESULTS
Landtype No. 76B

Location: T.36S., R.18E., Sec. 15, SW1/4, SW1/4			Mechanical Analysis	
Depth: 15-45 in.	Unified: SMD	ASSHO: A-1-b(0)	Sieve Size	% Passing
Liquid Limit: 27	Plasticity Index: 0		3"	100
Specific Gravity: 2.6010			1-1/2"	77.2
Sieve and Hydrometer Analysis:	Gravel - 50%		1"	75.7
	Sand - 31%		1/2"	71.2
	Silt - 14%		3/8"	68.8
	Clay - 5%		#4	60.8
			#10	50.4
Bulk Density: 15-29 in. - 1.28 Gr./Cm. ³ 29-45 in. - 1.30 Gr./Cm. ³			#40	34.5
			#200	19.1
Well Graded			.0013	3.7

Landtype No. 77B

Location: T.34S., R.13E., Sec. 20, SW1/4, SW1/4			Mechanical Analysis	
Depth: 12-22 in.	Unified: SMD	ASSHO: A-1-b(0)	Sieve Size	% Passing
Liquid Limit: 0	Plasticity Index: 0		3"	100
Specific Gravity: 2.6036			1-1/2"	97.1
Sieve and Hydrometer Analysis:	Gravel - 29%		1"	95.2
	Sand - 55%		1/2"	88.5
	Silt - 14%		3/8"	84.1
	Clay - 2%		#4	77.2
			#10	71.2
Bulk Density: 0.75 Gr./Cm. ³			#40	45.8
			#200	16.1
Uniform Graded			.0014	2.4

Landtype No. 88B

Location: T.33S., R.16E., Sec. 30, NW1/4, SE1/4			Mechanical Analysis	
Depth: 5-17 in.	Unified: SMD	ASSHO: A-2-4(0)	Sieve Size	% Passing
Liquid Limit: 0	Plasticity Index: 0		1"	100
Specific Gravity: 2.5390			3/4"	99.2
Sieve and Hydrometer Analysis:	Gravel - 7%		1/2"	98.4
	Sand - 71%		3/8"	97.7
	Silt - 20%		#4	96.3
	Clay - 2%		#10	92.9
			#40	64.1
Bulk Density: 0.82 Gr./Cm. ³			#200	22.5
			.0014	1.8
Uniform Graded				

SOIL MATERIALS TESTING RESULTS
Landtype No. 95

Location: T.27S., R.11E., Sec. 32, NW1/4, SE1/4			Mechanical Analysis	
Depth: 14-35 in.	Unified: SP	ASSHO: A-1-b(1)	Sieve Size	% Passing
Liquid Limit: 0	Plasticity Index: 0		3/8"	100
Specific Gravity: 2.6022			#4	99.8
Sieve and Hydrometer Analysis:	Gravel - 8%		#10	91.6
	Sand - 85%		#20	85.7
	Silt - 5%		#40	42.0
	Clay - 2%		#60	9.8
			#100	6.0
Bulk Density: 0.66 Gr./Cm. ³			#200	4.6
			.0014	1.5
Uniform Graded				

Landtype No. 99

Location: T.28S., R.12E., Sec. 13, NE1/4, SW1/4			Mechanical Analysis	
Depth: 3-24 in.	Unified: SMd	ASSHO: A-2-4(0)	Sieve Size	% Passing
Liquid Limit: 0	Plasticity Index: 0		1/2"	100
Specific Gravity: 2.7051			3/8"	99.97
Sieve and Hydrometer Analysis:	Gravel - 2%		#4	99.8
	Sand - 67%		#10	98.5
	Silt - 22%		#20	95.5
	Clay - 9%		#40	88.1
			#60	79.1
Bulk Density: 1.24 Gr./Cm. ³			#100	60.0
			#200	31.1
Uniform Graded			.0013	7.3



TAXONOMY of MODAL SOILS (ESTIMATED) 1/

Mapping
Unit No.

Classification

- 13: Typic Haplaquents, fine-loamy over ashy, mixed, frigid family
- 14: Mollic Vitrandepts, sandy, mixed, frigid family
- 16: Cumulic Cryaquolls, fine, mixed family
- 17: Pachic Argixerolls, fine, mixed, mesic family
- 18: Fluvaquentic Haplaquolls, fine-loamy, mixed, frigid family
- 19: Mollic Xerofluvents, loamy-skeletal, mixed, mesic family
- 20: Typic Chromoxererts, fine, montmorillonitic, mesic (frigid) family
- 22: Typic Durochrepts, fine-loamy, mixed, mesic, shallow family
- 23: Entic Haploxerolls, loamy-skeletal, mixed, mesic family
- 24: Typic Durixerolls, fine, mixed, mesic family
- 25: Typic Cryaquolls, fine-loamy, mixed family
- 26: Duric Argixerolls, fine-loamy, mixed, frigid family
- 27: Pachic Cryoborolls, fine-loamy, mixed family
- 28: Lithic Haploxeralfs, fine, mixed, frigid family
- 29: Argic Pachic Cryoborolls, fine, mixed family
- 30A: Typic Argixerolls, fine, mixed, frigid family
- 34A: Typic Argixerolls, loamy-skeletal, mixed, frigid family
- 35: Typic Argixerolls, fine, mixed, frigid family
- 36: Typic Argixerolls, loamy-skeletal, mixed, frigid family
- 37A: Typic Argixerolls, loamy-skeletal, mixed, frigid family
- 38: Typic Argixerolls, loamy-skeletal, mixed, frigid family
- 39: Argic Pachic Cryoborolls, loamy-skeletal, mixed family
- 40B: Typic Xerorthents, sandy-skeletal, mixed, mesic family
- 41A: Typic Xerorthents, sandy-skeletal, mixed, frigid family
- 42: Typic Xerorthents, sandy-skeletal, mixed, frigid family
- 43: Typic Cryorthents, sandy-skeletal, mixed family
- 44: Typic Cryorthents, sandy-skeletal, mixed family
- 50: Lithic Argixerolls, fine, mixed, frigid (mesic) family
- 51: Typic Rhodoxeralfs, fine, mixed, frigid (mesic) family
- 53: Lithic Xerorthents, fine-loamy, mixed, frigid (mesic) family
- 56A: Pachic Haploxerolls, fine-loamy, mixed, frigid family
- 57: Typic Xerorthents, fine-loamy, mixed mesic family

1/ Assisted by Jamie Kienzle, Soil Scientist, Soil Conservation Service, Lakeview, Oregon

- 60: Typic Argixerolls, clayey-skeletal, mixed, mesic family
- 61: Fluventic Haploxerolls, coarse-loamy, mixed, mesic family
- 62B: Typic Argixerolls, fine, mixed, frigid family
- 63B: Entic Haploxerolls, coarse-loamy, mixed, frigid family
- 64: Typic Xerochrepts, fine-loamy, mixed, frigid family
- 66: Haplic Durixerolls, loamy-skeletal, mixed, frigid family
- 67B: Mollic Haploxeralfs, fine, mixed, frigid family
- 68B: Entic Haploxerolls, sandy, mixed, frigid family
- 70: Typic Haplaquolls, fine-silty, mixed, frigid family
- 74C: Typic Xerorthents, sandy-skeletal, mixed, frigid family
- 76B: Typic Xerorthents, sandy-skeletal, mixed, mesic family
- 77B: Typic Xerorthents, ashy over loamy-skeletal, mixed, frigid family
- 78: Typic Xerorthents, ashy over sandy-skeletal, mixed, mesic family
- 79: Typic Xerorthents, medial over Loamy-skeletal, mixed, frigid family
- 80A: Typic Cryorthents, ashy over loamy-skeletal, mixed family
- 81: Typic Xerorthents, fine-loamy, mixed, frigid family
- 82: Typic Xerorthents, ashy over loamy-skeletal, mixed, frigid family
- 83: Aquic Xerorthents, ashy, mixed, frigid family
- 84: Typic Xerorthents, ashy over loamy, mixed, frigid family
- 85: Typic Xerorthents, ashy over loamy, mixed, frigid family
- 86: Typic Xerorthents, ashy over loamy, mixed, frigid family
- 87: Typic Xerorthents, ashy over loamy, mixed, frigid family
- 88B: Typic Xerorthents, ashy over loamy-skeletal, mixed, frigid family
- 89A: Typic Cryorthents, ashy over loamy-skeletal family
- 90: Aquic Xerorthents, ashy over loamy-skeletal, mixed, mesic family
- 92: Pergelic Cryorthents, ashy over loamy-skeletal, mixed family (Typic Cryorthents)
- 93A: Typic Xerorthents, ashy over loamy-skeletal, mixed, frigid family
- 94A: Typic Xerorthents, cindery, frigid family
- 95: Typic Xerorthents, cindery, frigid family
- 96A: Typic Xerorthents, cindery, frigid family
- 97B: Typic Xerorthents, cindery, frigid family
- 98: Typic Cryorthents, ashy family
- 99: Typic Durandeps, ashy, frigid family

CLIMATOLOGICAL DATA

Station: Round Grove
 Elevation: 4,888 Feet
 Period: 1951-1960, 1970-1978

Month	Mean Temp. °F	Precipitation (Inches)
January	28.5	2.17
February	32.8	1.76
March	34.4	1.73
April	40.6	1.29
May	47.5	1.92
June	54.8	1.29
July	62.6	.52
August	60.9	.60
September	54.3	.98
October	45.8	1.35
November	36.2	2.01
December	27.4	2.34
ANNUAL	43.8	17.96

Station: Lakeview
 Elevation: 4,800 Feet
 Period: 1964-1978

Month	Precipitation (Inches)
January	2.51
February	1.23
March	1.42
April	1.20
May	1.24
June	1.51
July	.39
August	.54
September	.56
October	1.21
November	2.00
December	2.35
ANNUAL	16.16

Station: Chemult
 Elevation: 4,760 Feet
 Period: 1970-1978. Temp
 1937-1952 and
 1970-1978 Precipitation

Month	Mean Temp °F	Precipitation (Inches)
January	25.52	4.30
February	29.69	3.62
March	32.93	2.72
April	37.37	1.23
May	46.63	1.27
June	54.40	1.29
July	60.63	.62
August	59.30	.56
September	51.72	.77
October	43.19	1.96
November	32.60	4.02
December	25.31	5.00
ANNUAL	41.60	27.36

Sources:

National Oceanic and Atmospheric Adm. Climatic Summary of the U.S.; Supplement for 1931 through 1952.

Climatological Data; Annual Summaries for Oregon for 1970-1978.

GLOSSARY

A-HORIZON -- Zone of eluviation. The uppermost zone in the soil profile, from which soluble salts and colloids are leached, and in which organic matter has accumulated. Generally the most fertile soil layer.

ALLUVIAL -- Pertaining to material that is transported and deposited by running water.

ALLUVIUM -- A general term for all detrital and unconsolidated material deposited or in transit by streams, including gravel, sand, silt, clay, and all variations and mixtures of these.

ANDESITE -- A dark gray to black, dense, fine-grained extrusive igneous rock. Very similar to basalt.

ASH -- Uncemented volcanic ejecta less than 4.0 mm in diameter.

AVAILABLE WATER -- The portion of water in a soil that can be absorbed by plant roots, usually considered to be that water held in the soil against a tension of up to approximately 15 bars.

AVAILABLE WATER HOLDING CAPACITY -- The capacity to store water available for use by plants, usually expressed in linear depths of water per unit depth of soil. Commonly defined as the difference between the percentage of soil water at field capacity and the percentage at wilting point. This difference multiplied by the bulk density and divided by 100 gives a value in surface inches of water per inch depth of soil.

BASALT -- A very dark to black, dense, fine-grained extrusive igneous rock. Very similar to andesite.

BEARING CAPACITY -- The maximum load that a soil can support before failing.

BEDROCK -- The more or less solid rock in place either on or beneath the surface of the earth. It may be soft or hard and have a smooth or irregular surface.

B-HORIZON -- Illuvial horizon. The lower soil zone which is enriched by the deposition or precipitation of material from the overlying zone or A-horizon.

BRECCIA -- A rock composed of coarse angular fragments cemented together.

BULK DENSITY -- The mass of dry soil per unit bulk volume; usually measured as grams per cubic centimeter.

CALDERA -- A large, basin-shaped volcanic depression, more or less circular in form. Two basic types are from explosion or collapse.

C-HORIZON -- A layer of unconsolidated material, relatively little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a portion of the overlying solum has developed.

CINDERS -- Primarily uncemented, glossy, and vesicular volcanic ejecta.

CINDER CONE -- A conical elevation formed by the accumulation of cinder material around a vent.

CIRQUE BASIN -- A half-amphitheater formed by alpine glaciation with three steep sides. Usually found at upper ends of valleys and along ridges.

CLASSIFICATION -- The systematic arrangement of soils into groups or categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties. On January 1, 1965, a new USDA soil classification system (soil taxonomy) was adopted for use in publications by the National Cooperative Soil Survey.

CLAY -- A soil separate less than .002 mm in diameter. As a soil textural class--soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

COARSE FRAGMENTS -- Rock or mineral particles greater than 2.0 millimeters in diameter.

COBBLE -- A rock fragment between 3 and 10 inches in diameter.

COLLUVIUM -- Soil material or rock fragments moved downslope by gravitational force in the form of soil creep, slides, and local wash.

COMPACTION -- The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

COMPLEX -- An association in which two or three mapping units or miscellaneous mapping units are so intricately mixed that it is not practical to show them separately at the scale of mapping used.

COMPOSITE CONE -- A volcanic cone built of alternating layers of rhyolitic and andesitic lava and pyroclastic material, with moderately steep or steep slopes.

CREEP -- Slow mass movement of soil and soil material down relatively steep slopes primarily under the influence of gravity but facilitated by saturation with water and by alternate freezing and thawing.

CRITICAL SOIL -- The term "critical soil" is frequently used by laymen, but it is a meaningless term unless it is related to a specific function.

Many soils may be critical for one reason or another, but different soils may not be critical for the same reasons. For example, a deep, wet, plastic and unstable soil will be critical in relation to road location and stability. This soil is not critical in relations to regeneration and droughtiness problems. Another soil may be very shallow over hard bedrock. This soil is not critical from the standpoint of road stability, but may be critical as to regeneration problems resulting from droughtiness and low fertility. It may also be critical in relation to surface erosion. The term "critical soil" must be defined by the user in relation to its intended purpose.

DEBRIS SLIDE -- A rapidly moving slide composed of soil, bedrock, or both.

DISPLACEMENT -- Soil displacement refers to the repositioning or removal of the surface soil layers by mechanical action.

DUFF - The more or less firm organic layer on top of mineral soil, consisting of fallen vegetative matter in the process of decomposition, including everything from litter on the surface to pure humus. Duff is a general, nonspecific term.

DURIPAN -- A subsurface horizon that is cemented by silica.

EOLIAN SOIL MATERIAL -- Soil material accumulated through wind action.

EROSION -- (1) The wearing away of the land surface by running water, wind, ice, or other geological agents, including such processes as gravitational creep; (2) detachment and movement of soil or rock fragments by water, wind, ice, or gravity. The following terms are used to describe different types of water erosion:

Accelerated Erosion -- Erosion much more rapid than normal, natural, or geologic erosion primarily as a result of the influence of the activities of man, or, in some cases, of other animals or natural catastrophes that expose mineral soil surfaces. For example-- wild fire.

Geological Erosion -- The normal or natural erosion caused by geological processes acting over long geologic periods and resulting in the wearing away of mountains, the building up of flood plains, coastal plains, etc. Syn. for natural erosion.

Gully Erosion -- The erosion process whereby water accumulates in narrow channels and, over short periods, removes the soil from this narrow area to considerable depths, ranging from 4 inches to as much as 75 to 100 feet.

Natural Erosion -- Wearing away of the earth's surface by water, ice, or other natural agents under natural environmental conditions of climate, vegetation, etc. undisturbed by man. Syn. for geologic erosion.

Rill Erosion -- An erosion process in which numerous small channels less than 4 inches deep and 6 inches wide are formed.

Sheet Erosion -- The removal of a fairly uniform layer of soil from the land surface by runoff water.

Splash Erosion -- The spattering of small soil particles caused by the impact of raindrops on exposed mineral soil. The loosened and spattered particles may or may not be subsequently removed by surface runoff.

ERUPTIVE CENTER -- An area of concentrated volcanic activity around a vent resulting in cone or dome-shaped landforms.

EVAPOTRANSPIRATION -- Water transpired by vegetation plus that evaporated from the soil.

EXTRUSIVE BEDROCK -- This applies to those igneous rocks derived from volcanic lavas that cooled on the surface of the earth. This lava cools rapidly and forms fine-textured rocks such as basalt and andesite.

FAULT -- A fracture or fracture zone along which there has been displacement of one side with respect to the other.

FAULT ESCARPMENT -- The steep slope along the face of a fault system.

GEOMORPHOLOGY -- The study of landforms as they relate to geologic composition and history.

GLACIATED VALLEY -- U-shaped valley formerly occupied by a glacier.

GRAVEL -- A rock fragment between 2.0 millimeters and 3 inches in diameter.

GROUND COVER -- Litter, slash, grasses, forbs, or low-growing reproduction which absorbs rainfall energy, reduces overland flow, and keeps soil from being washed or blown away.

HUMMOCKY -- Hilly, uneven landscape resulting from deep-seated soil movement, usually of a rotational nature.

HYDROPHOBIC -- Lacking a strong affinity for water, water repellent.

INCLUSION -- Landtype found within a mapping unit that is not extensive enough to be mapped separately or as part of a complex.

INFILTRATION -- The gradual downward flow of water from the surface through the soil to ground water and water table reservoirs.

INTRUSIVE BEDROCK -- This applies to those igneous rocks derived from magmas that have been injected into older rocks at depth without reaching the surface. These magmas are slow-cooling and form coarse-textured rocks, such as granite.

LACUSTRINE DEPOSIT -- Material deposited in lake water and later exposed either by lowering the water level or by the elevation of the land.

LANDFORM -- Structural configuration of the topography as a result of past and present geological activity.

LANDSLIDE -- A mass of material that has slipped downhill under the influence of gravity, frequently occurring when the material is saturated with water.

LANDTYPE -- A land system with a designated soil, vegetation, geology, topography, climate, and drainage situation. The basic taxonomic unit in the Soil Resource Inventory.

LAPILLI -- Volcanic ejecta between 4 mm and 32 mm in diameter.

LAVA DOME -- Lava domes are masses of lava which have issued from central vents to build a dome-shaped pile of lava.

LAVA FLOW -- A solidified mass of rock formed when a stream of viscous, molten lava from a volcano or fissure has cooled and congealed.

MAPPING UNIT -- Any delineated area shown on a soil map that is identified by a number of letter code. A mapping unit may be a standard landtype, a miscellaneous landtype, or a complex.

MASS MOVEMENT -- All movement of soil and bedrock materials occurring below the soil surface such as landslips, landflows, rock slides, slumps, etc.

MISCELLANEOUS LANDTYPES -- A mapping unit for areas of land that have little or no natural soil or have properties that are too variable and unpredictable for classification.

MOISTURE TENSION -- The equivalent negative pressure in the soil water. It is equal to the equivalent pressure that must be applied to the soil water to bring it to hydraulic equilibrium, through a porous permeable wall or membrane, with a pool of water of the same compositions.

OBSIDIAN -- A massive, glassy, noncrystalline rock.

PARENT MATERIAL -- The unconsolidated and more or less chemically weathered mineral or organic matter from which the solum of soils is developed by pedogenic processes.

PERCOLATION, SOIL WATER -- The downward movement of water through soil, especially the downward flow of water in saturated or nearly saturated soil at hydraulic gradients of the order of 1.0 or less.

PERMEABILITY, SOIL -- The quality of a soil horizon that enables water or air to move through it. The permeability of a soil may be limited by the presence of one nearly impermeable horizon even though the others are permeable.

PHYSIOGRAPHIC DIVISIONS -- Broad land groupings based on the physical features of the landscape.

PLASTIC SOIL -- A soil capable of being molded or deformed continuously and permanently, by relatively moderate pressure into various shapes.

PUDDLING AND PUDDLED -- The act of destroying soil structure by manipulating a soil when it is in a wet and plastic condition. Puddling reduces porosity and permeability and increases bulk density.

PUMICE -- Frothy, volcanic glass; an excessively cellular, light-colored, volcanic ejecta.

PUMICEOUS -- Containing pumice properties. Pumiceous volcanic ash is pumice material that is less than 4 mm in diameter.

PYROCLASTIC -- A general term applied to rocks formed from volcanic material that has been explosively or aerially ejected from a volcanic vent.

RHYOLITE -- A light-colored, fine-grained, acidic, extrusive rock.

RESIDUUM -- Soil material formed from rock weathering in place.

RAVEL -- The movement of individual particles down a slope by gravitational force.

RUNOFF -- That part of the precipitation which appears in surface streams of either perennial or intermittent form.

SAND -- A soil separate between .05 and 2.0 millimeters in diameter.

SEDIMENTARY ROCK -- Rock formed by deposition of soil and rock particles by water, ice, or wind that later solidifies through cementation, ionic exchange or compression.

SHIELD VOLCANOE -- A volcanic dome with gentle slopes built up by repeated eruptions of basaltic lava.

SILT -- A soil separate consisting of particles between 0.002 and 0.05 millimeters in diameter.

SLOPE CLASSES -- Terms to indicate relative range of slope gradients.

- A (0 to 15%) -- Gentle
- B (16 to 40%) -- Moderately Steep
- C (> 40%) -- Steep

SLUMP -- A deep-seated, slow-moving, rotational failure occurring in plastic materials, resulting in vertical and lateral displacement.

SOIL -- The unconsolidated mineral and organic material on the immediate surface of the earth that serves as a natural medium for the growth of land plants. The unconsolidated mineral matter on the surface of the earth that has been subjected to and influenced by genetic and environmental factors of parent material, climate (including moisture and temperature effects), macro- and micro-organisms, and topography, all acting over a period of time and producing a product--soil--that differs from the material from which it is derived in many physical, chemical, biological, and morphological properties and characteristics.

SOIL CREEP -- Slow mass movement of soil materials down slopes primarily under the influence of gravity, but facilitated by saturation with water and/or by alternating freezing and thawing.

SOIL SEPARATES -- Mineral particles, less than 2.0 mm in diameter, ranging between specified size limits. The names and size limits of separates recognized in the United States are: sand, 2.0 to 0.5 mm; silt, 0.05 to 0.002 mm; and clay, less than 0.002 mm.

SOIL TEXTURE -- The relative proportions of the various soil separates in a soil as described by the classes of soil texture. Twelve basic soil texture classes are recognized. The textural classes may be modified by the addition of suitable adjectives when coarse fragments are present in substantial amounts; for example, "stony loam."

SPOT SYMBOLS - Symbols used on soil maps to represent a landscape factor too small to delineate.

STONE -- A rock fragment greater than 10 inches in diameter.

STONY -- Used to modify textural classes and identifies that the volume of greater than 10 inch in diameter rock fragments in the soil ranges from 35 to 50 percent; very stony ranges from 50 to 80 percent; and extremely stony exceeds 80 percent.

STRUCTURE -- The combination or arrangement of primary soil particles into secondary particles, units, or peds. These secondary units are characterized and classified on the basis of size, shape, and degree of distinctness into classes, types, and grades, respectively.

SUBSOIL LAYERS -- The soil materials lying between the surface layers and bedrock. They can include any soil horizon below the A horizon and differs from the surface layers significantly in soil characteristics.

SURFACE LAYERS -- The portion of a soil extending from the duff layer down to a layer that differs significantly in soil characteristics.

TOESLOPE -- That portion of a slope that is transitional between the valley floor and the upper slope.

TUFF -- A rock formed of compacted volcanic fragments, generally smaller than 4 mm in diameter.

UNIFIED SOIL CLASSIFICATION SYSTEM (ENGINEERING) -- A classification system based on the identification of soils according to their particle size, gradation, plasticity index, and liquid limit.

VESICULAR CRUST -- A dense, structureless, and highly porous surface soil layer from 2 to 4 inches thick and usually associated with arid or semiarid rangelands.

VOLCANIC EJECTA -- Any and all material forcibly blown out of volcanic cones, fissures, and vents.

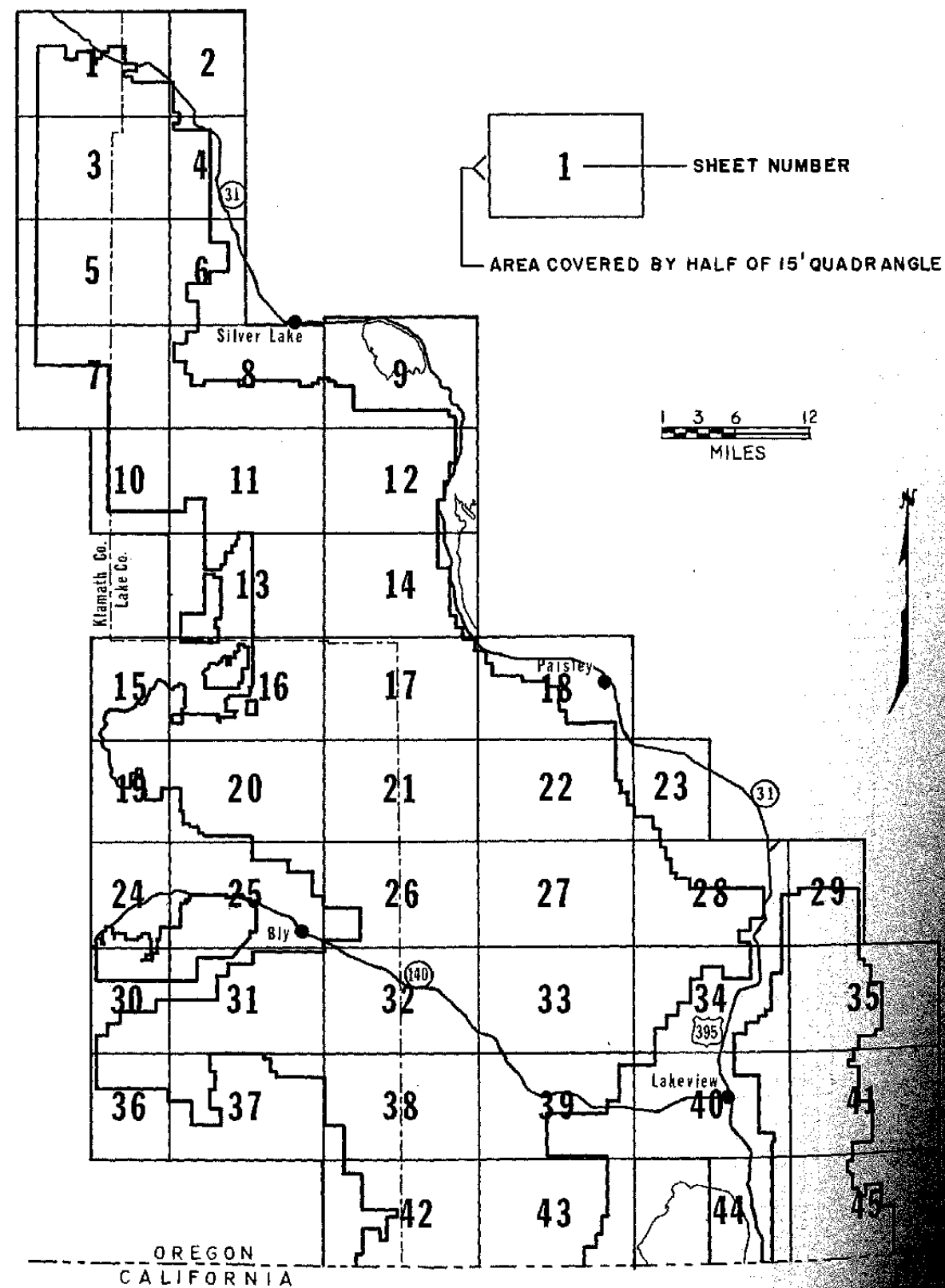
WELDED TUFF -- A tuff that has been indurated (hardened) by the combined action of the heat retained by the particles and the enveloping hot gases.



Landtype Maps



MAP INDEX



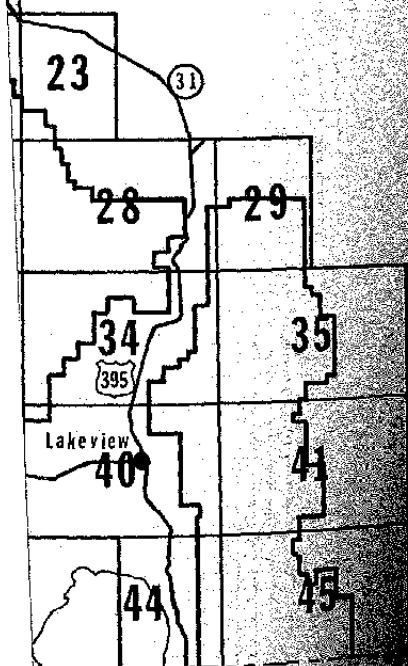
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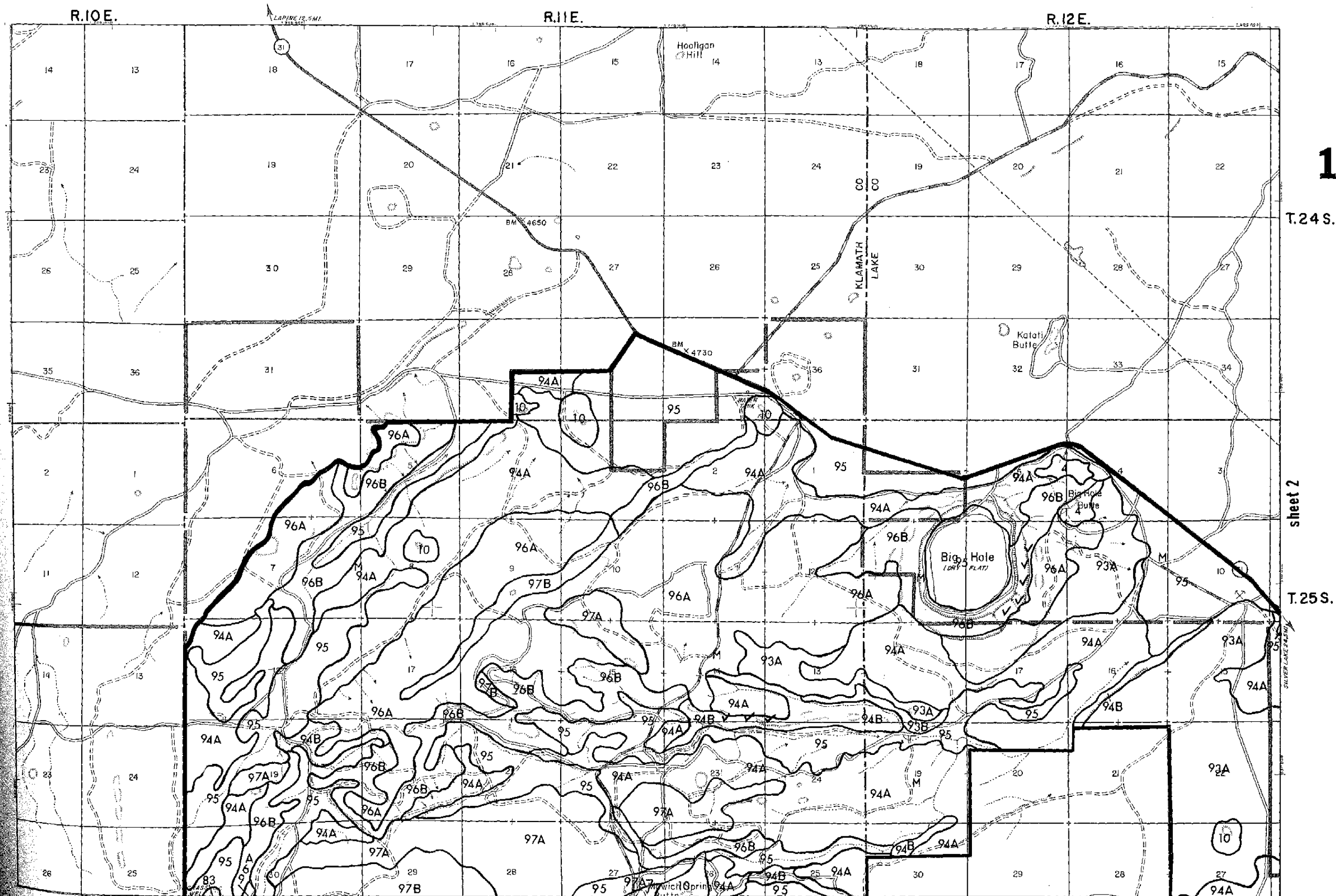
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MILES



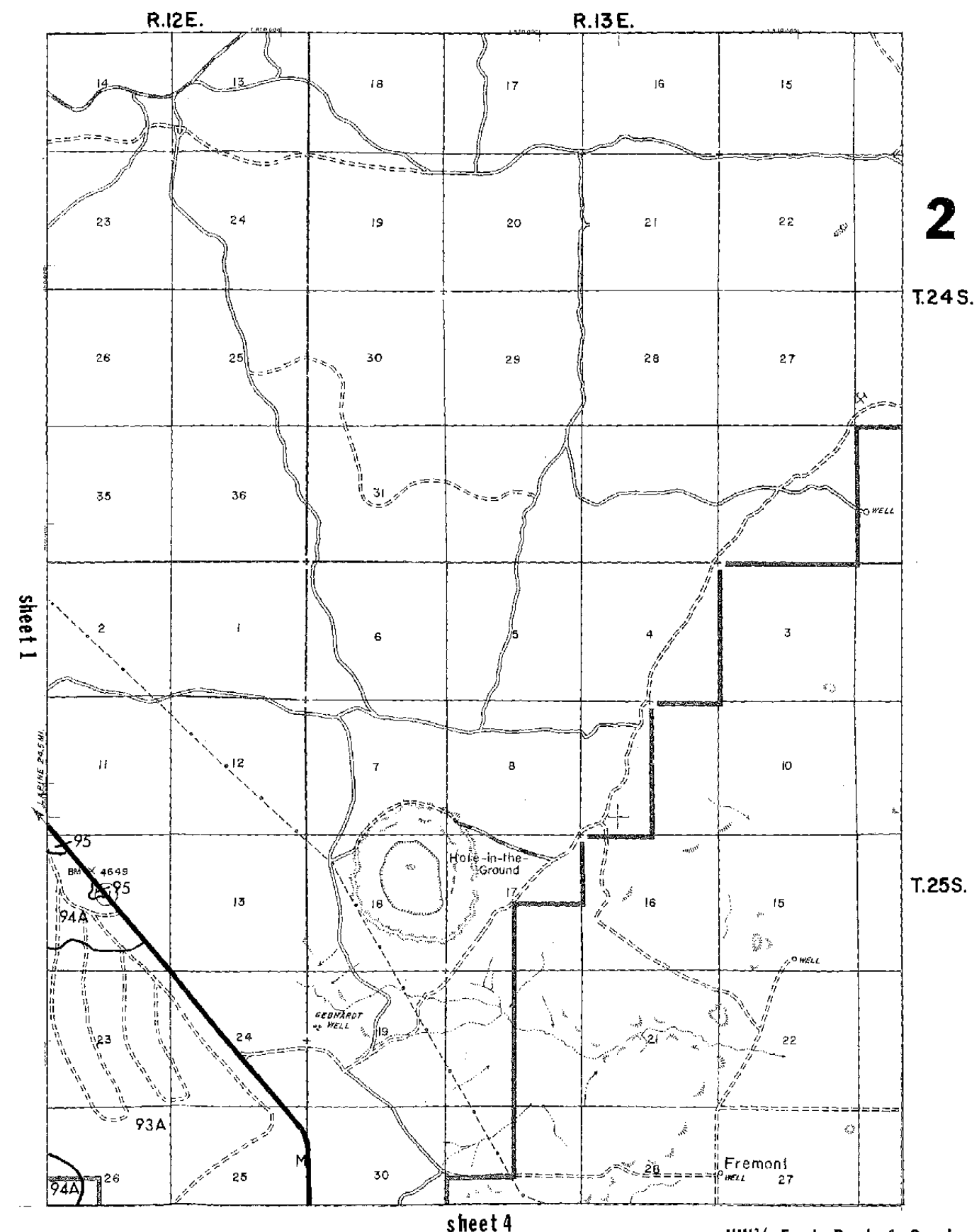
DESIGNED AND DRAWN
ROBERT MUELLER



sheet 3

sheet 2

N 1/2 Fort Rock 2 Quad.
Scale 1"=1 Mi.



2

T.24S.

T.25S.

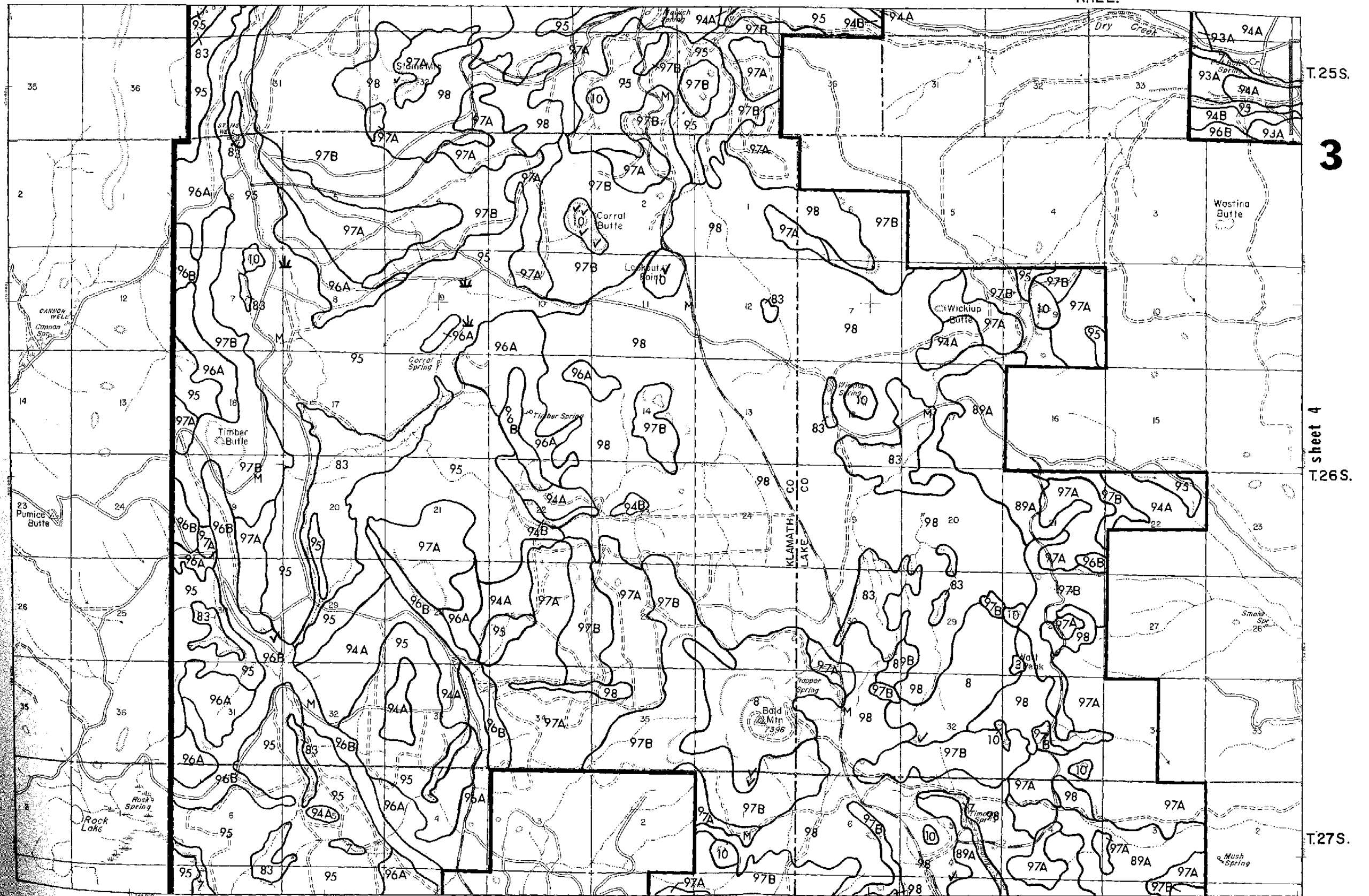
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NW 1/4 Fort Rock 1 Quad.
Scale 1" = 1 Mi.

R.10E.

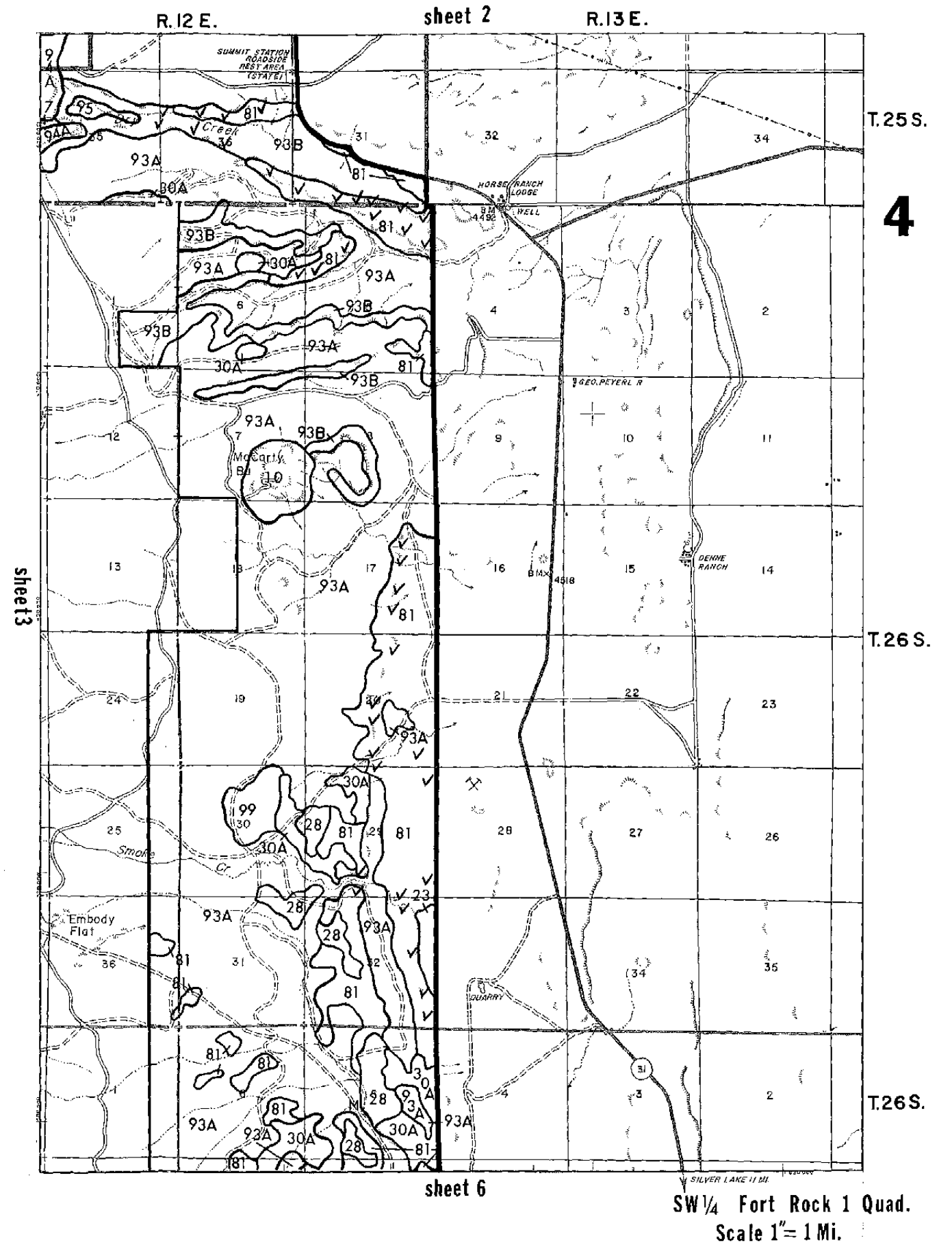
R.11E. sheet 1

R.12E.



sheet 5

S 1/2 Fort Rock 2 Quad.
Scale 1"=1 Mi.



IOE.

R.II.E.

sheet 3

R.12E.

5

T.275.

sheet 6

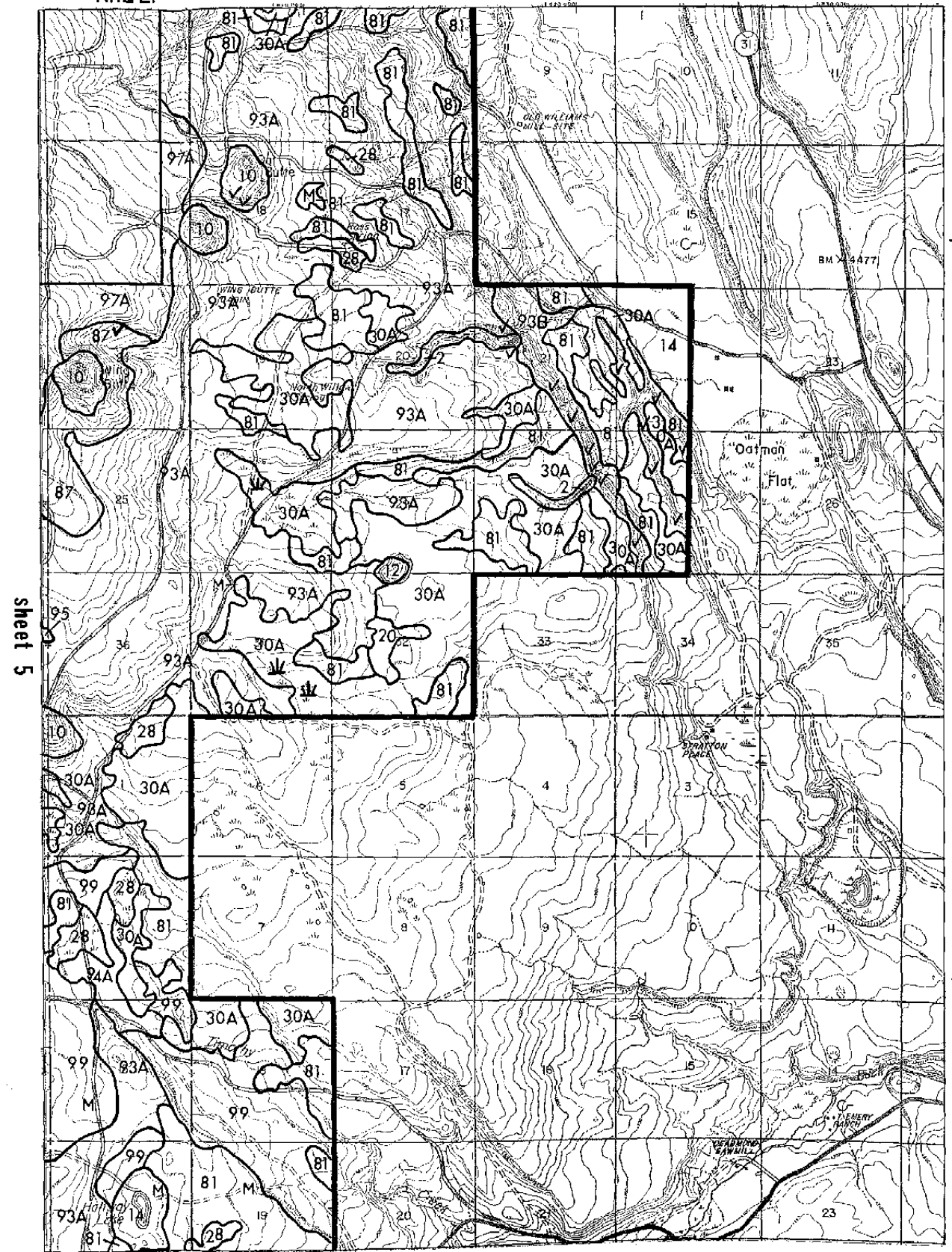
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sheet 7

N 1/2 Fort Rock 3 Quad.
Scale 1"=1 Mi.

R.12E.

sheet 4 R.13E.



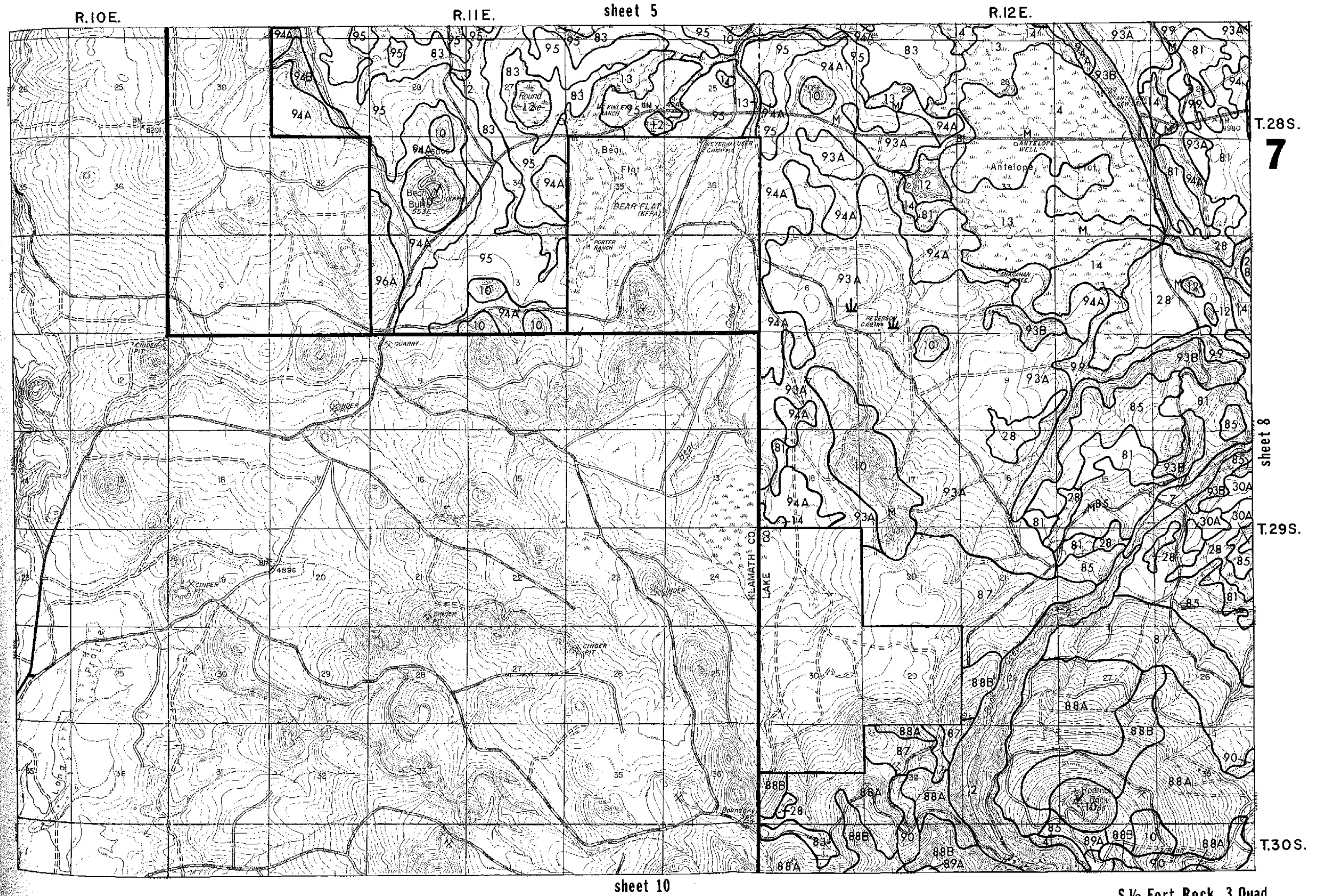
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T.27S.

T.28S.

sheet 8

NW 1/4 Fort Rock 4 Quad.
Scale 1"=1Mi.
Contour Interval 20 Ft.



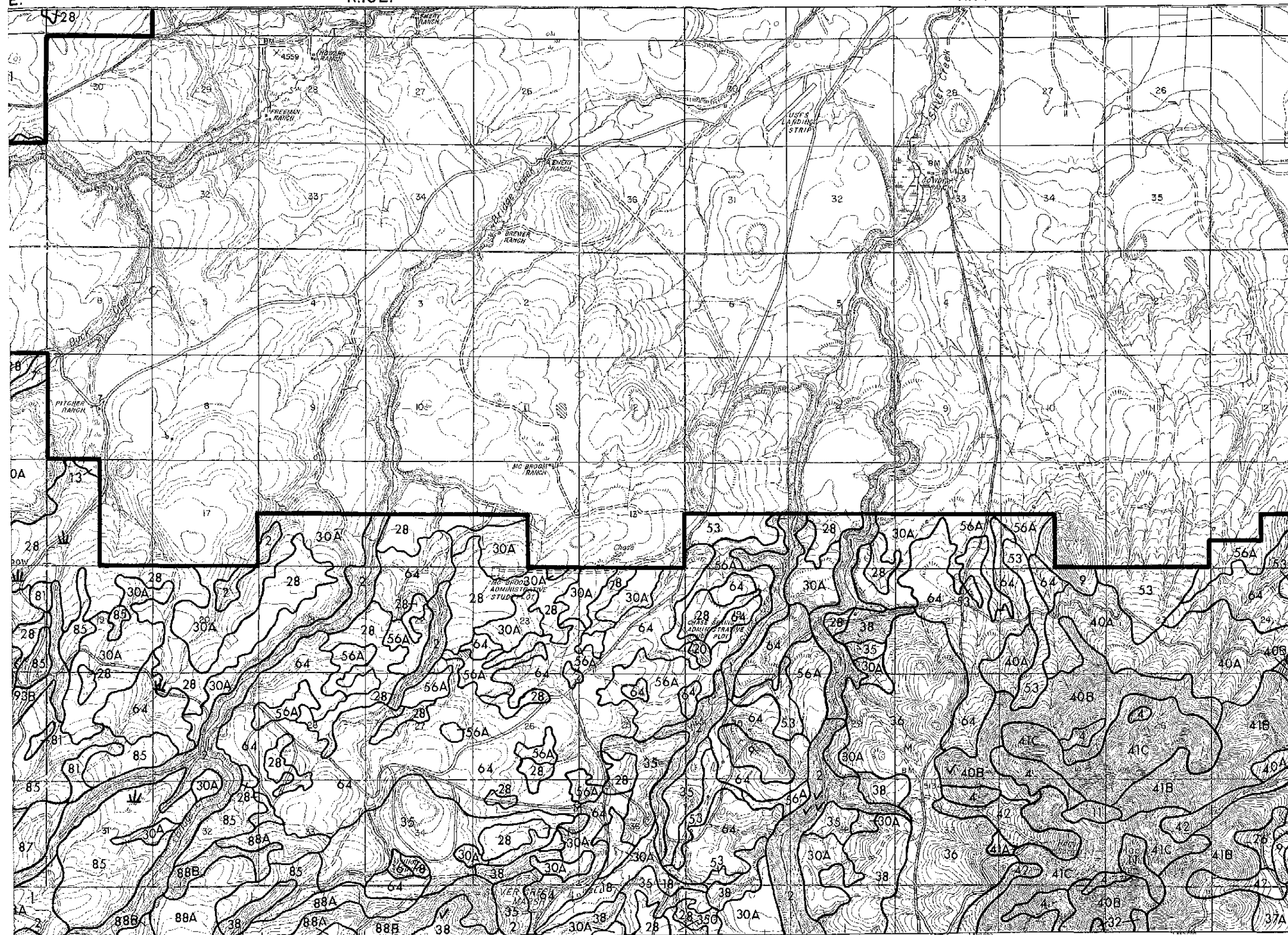
S 1/2 Fort Rock 3 Quad.
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E

R.13E.

sheet 6

R.14E.



T.285.

8

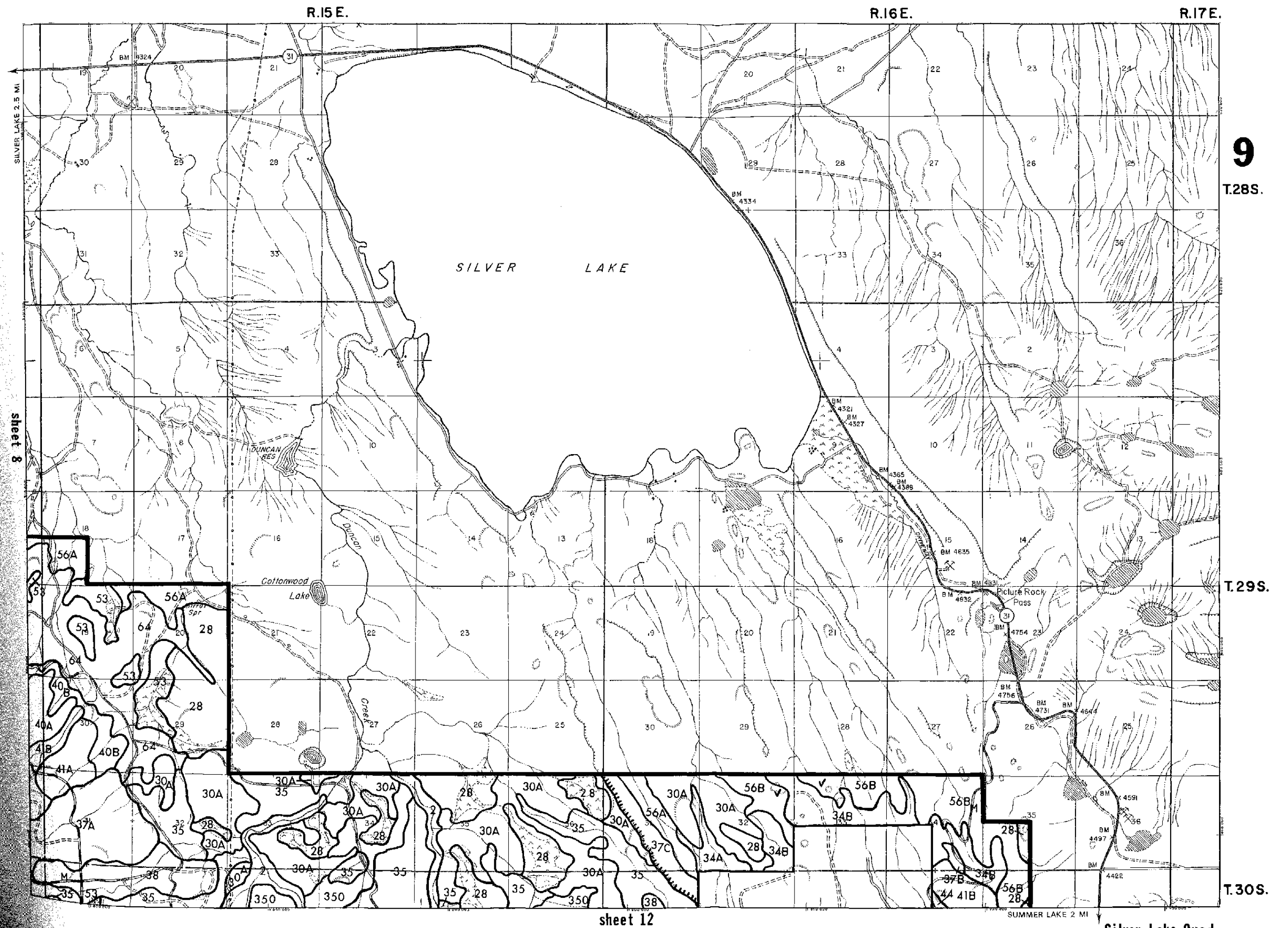
Sheet 9

T.295.

T.30S.

sheet 11

S¹/₂ Fort Rock 4 Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.



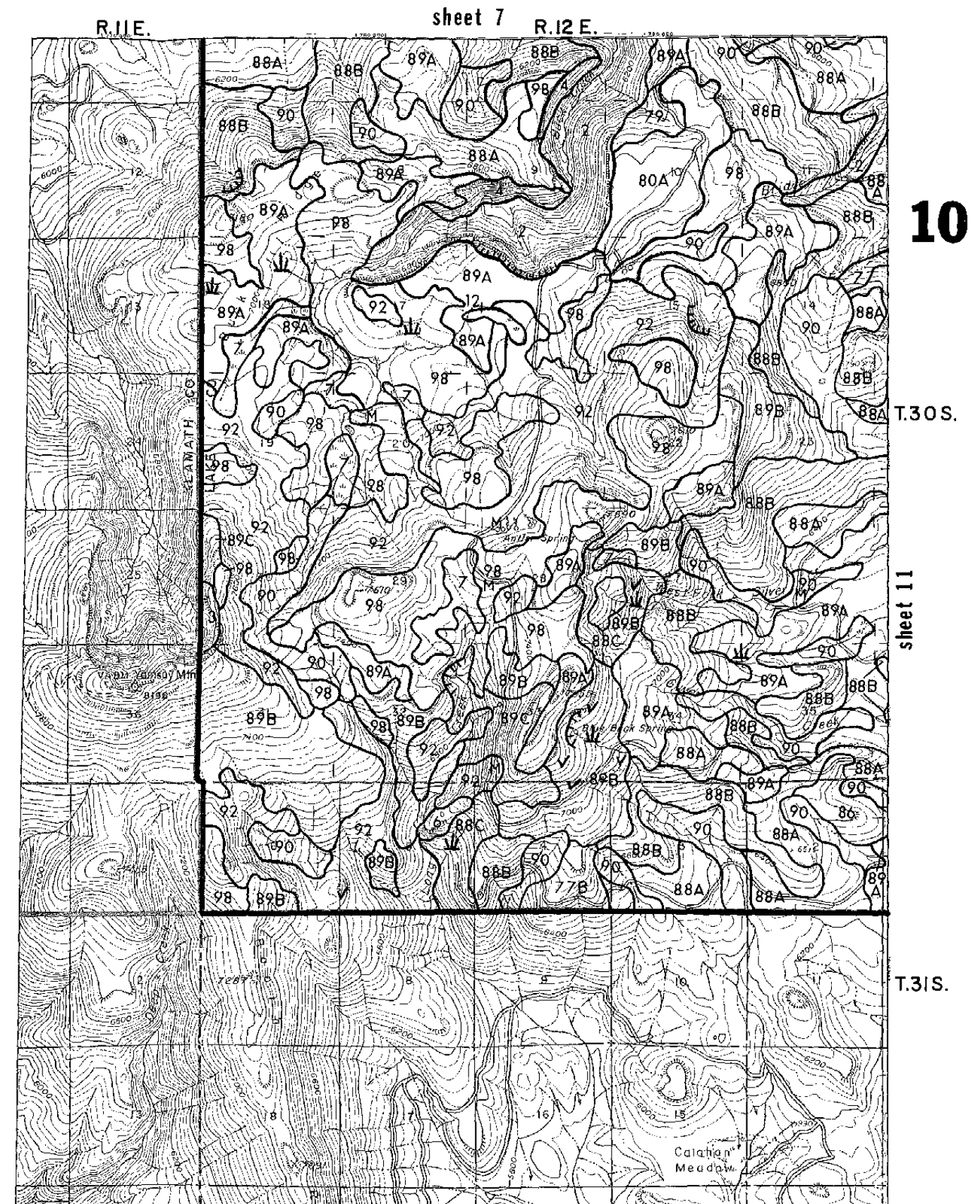
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T.28S.

T.29S.

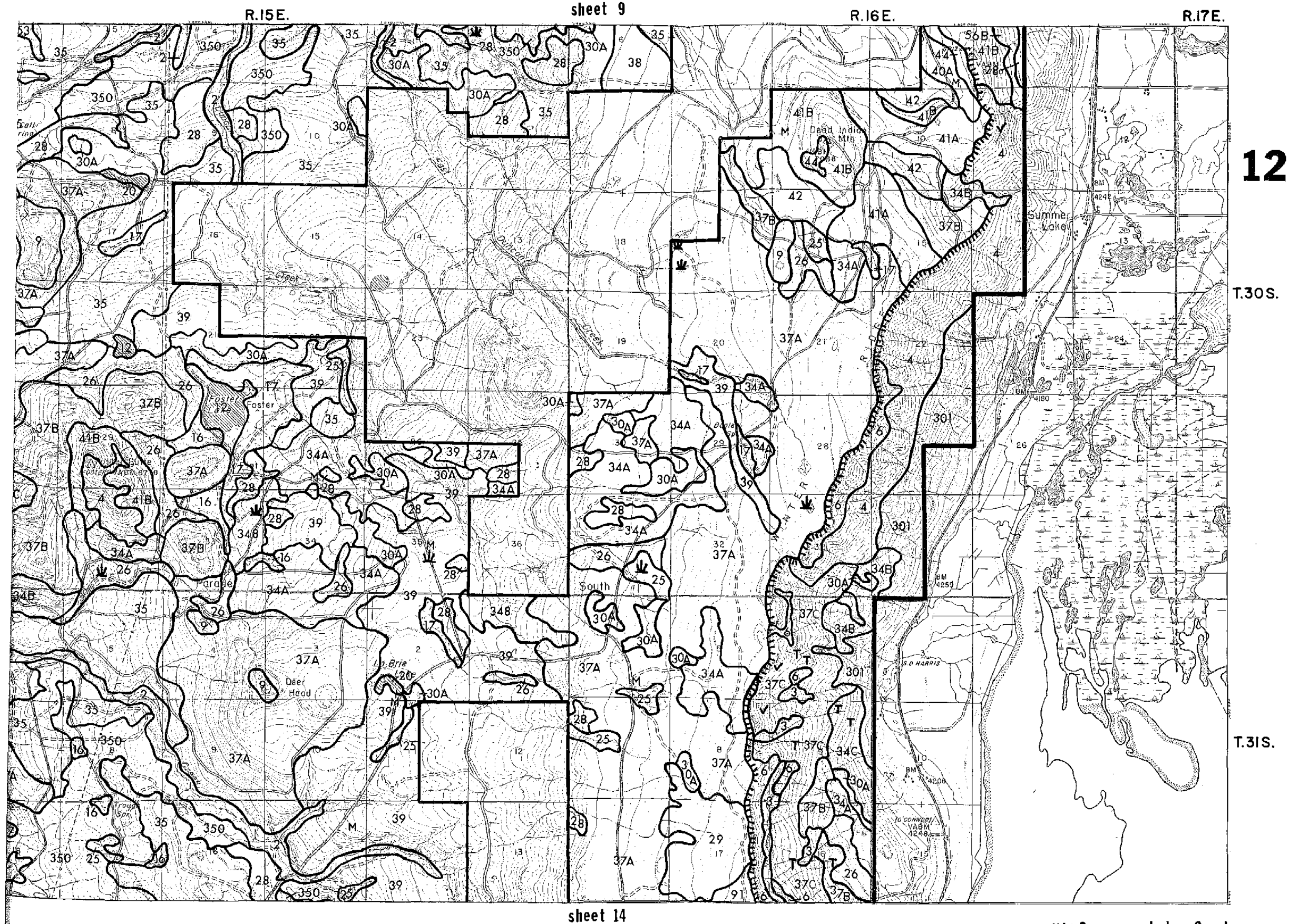
T.30S.

sheet 12

Silver Lake Quad.
Scale 1"=1 Mi.



NE 1/4 Yamsay Mtn. Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.



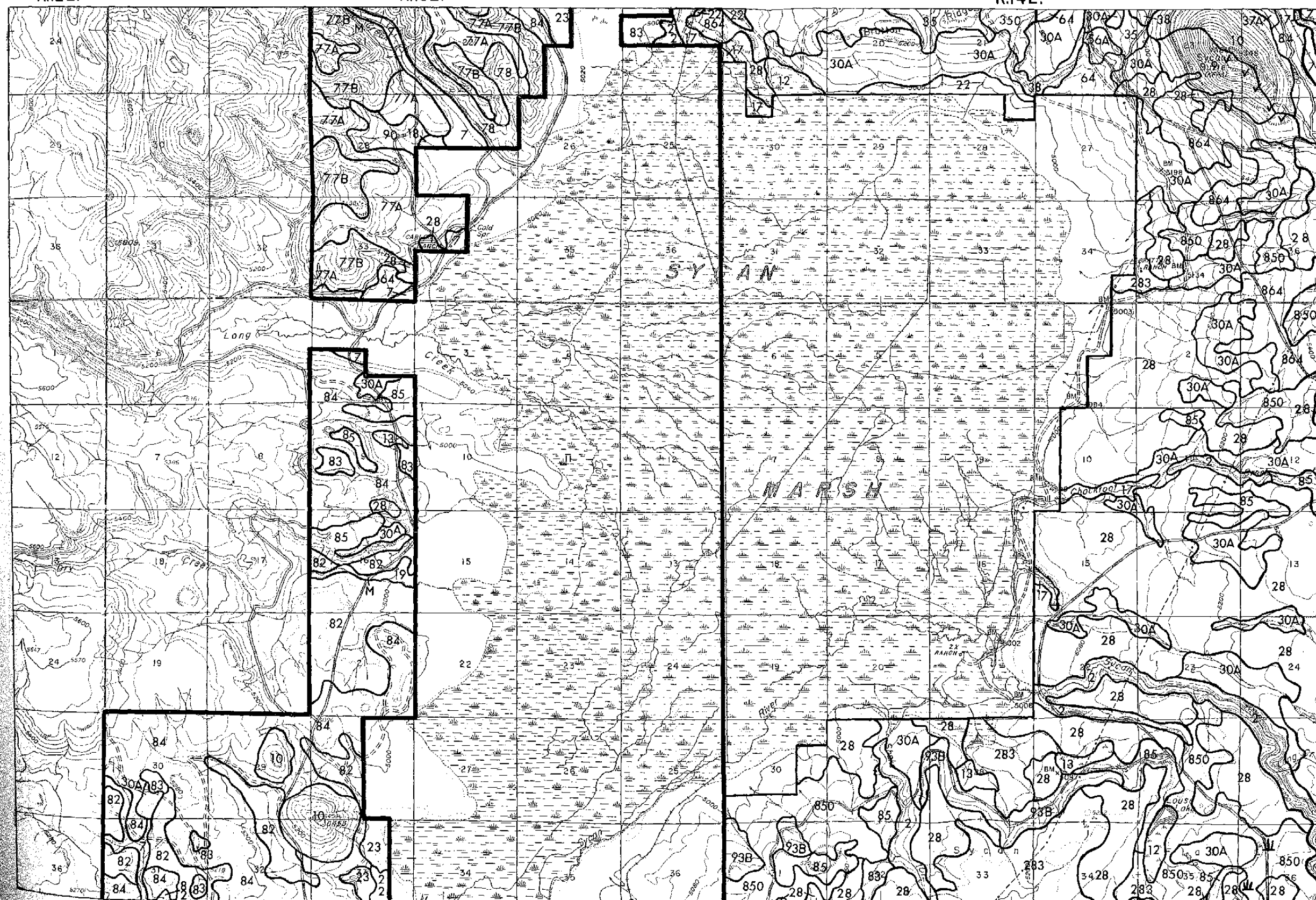
N 1/2 Summer Lake Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.

R.12E.

R.13E.

sheet 11

R.14E.



sheet 16

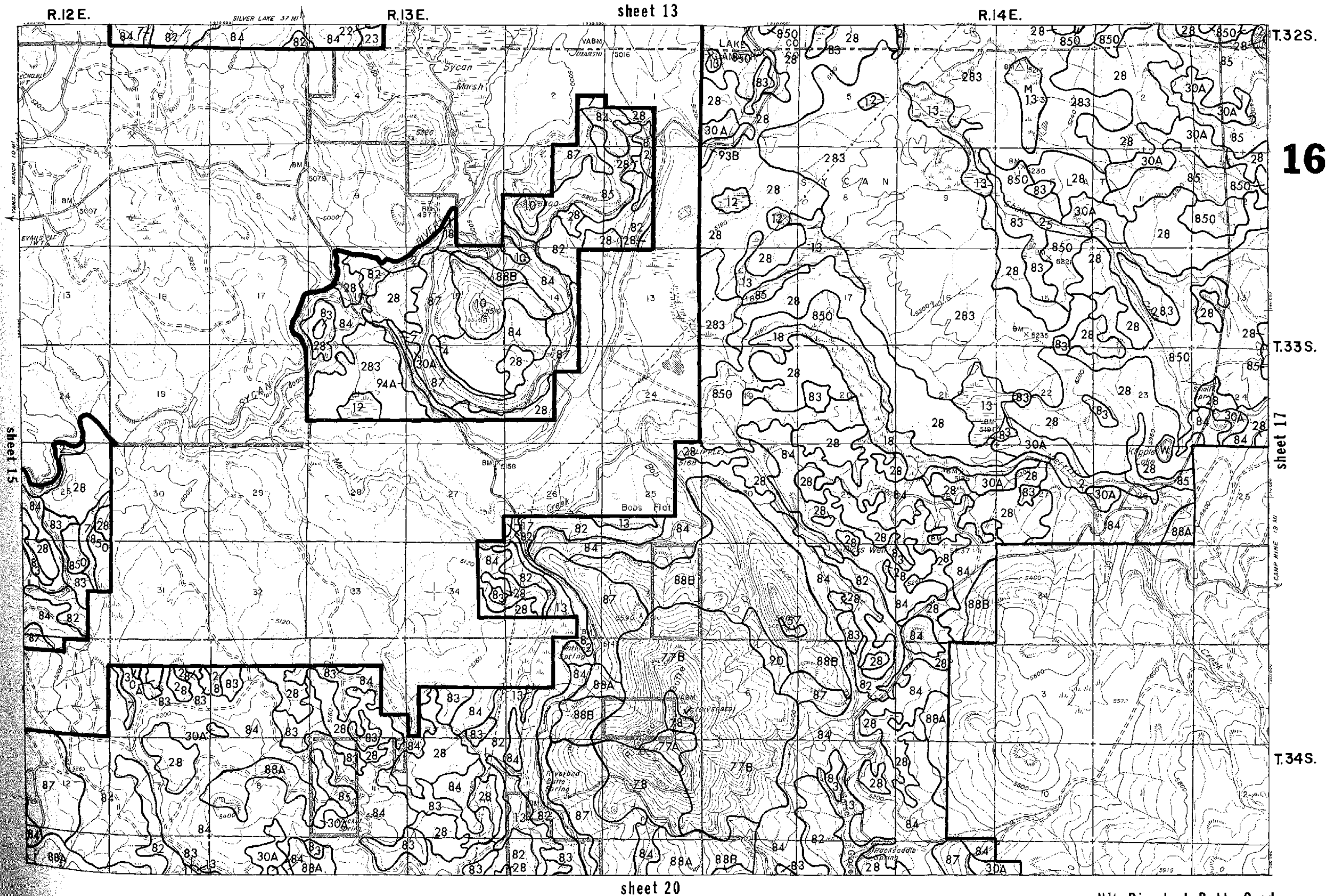
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T.31S.

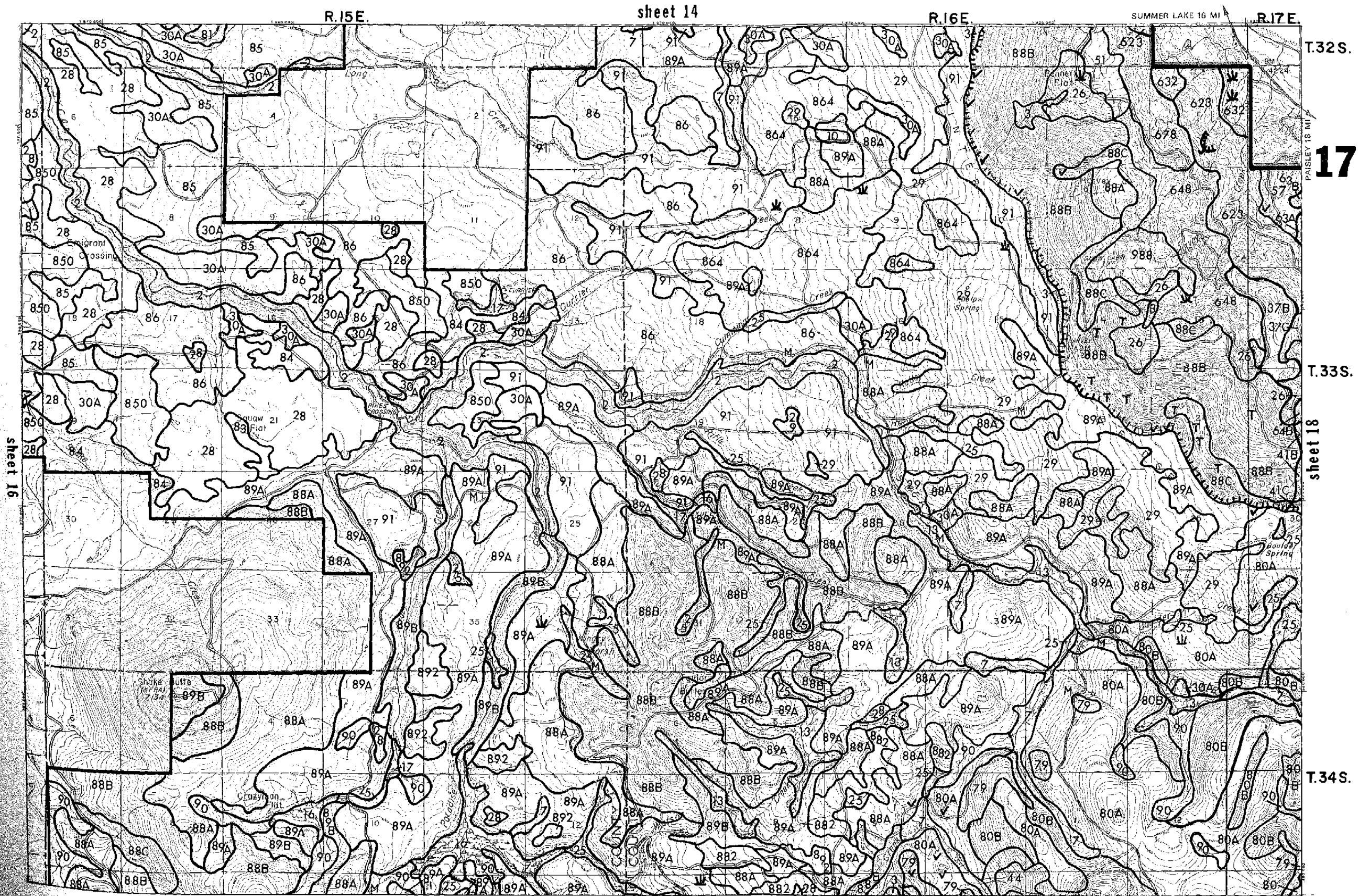
sheet 14

T.32S.

S $\frac{1}{2}$ Sycan Marsh Quad.
 Scale 1"=1 Mi.
 Contour Interval 40 Ft.

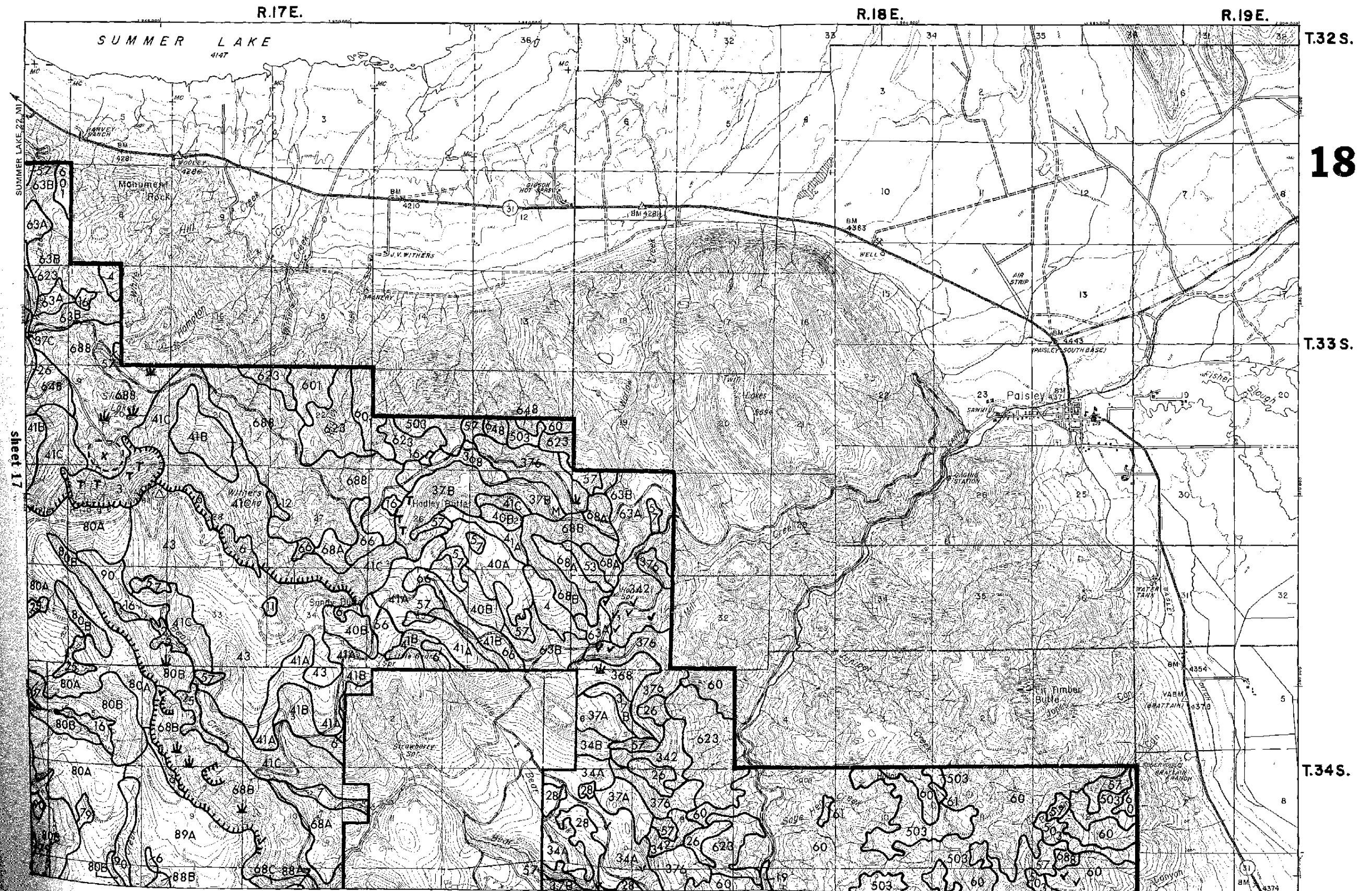


N 1/2 Riverbed Butte Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.



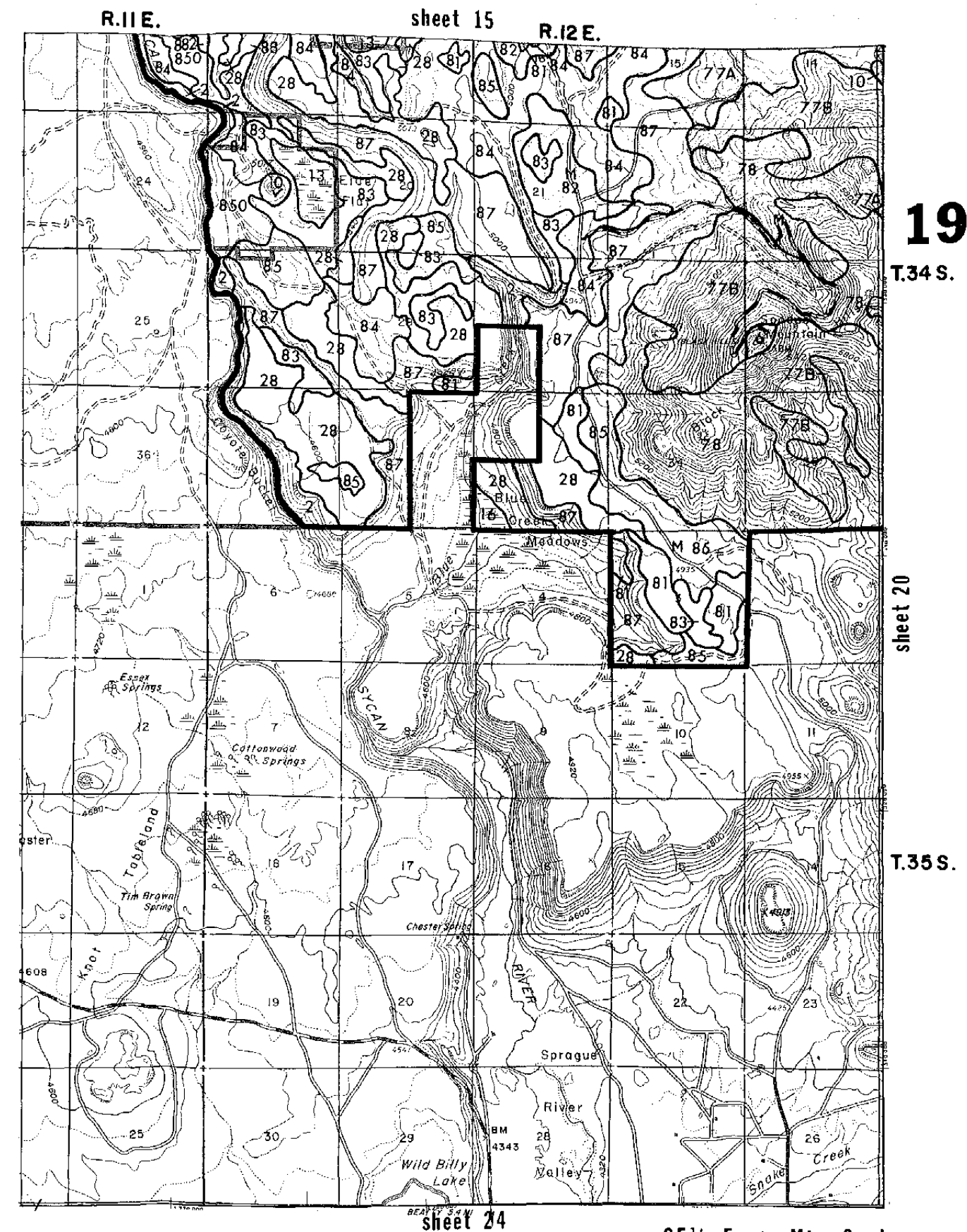
sheet 21

N $\frac{1}{2}$ Bald Butte Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.



sheet 22

N 1/2 Paisley Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.



SE 1/4 Fuego Mtn. Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.

R.13E.

sheet 16

R.14E.

20

T.34 S.

sheet 21

T.35S.

sheet 25

S¹/₂ Riverbed Butte Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.



21

T.34 S.

sheet 22

T.35 S.

sheet 26

S¹/₂ Bald Butte Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.

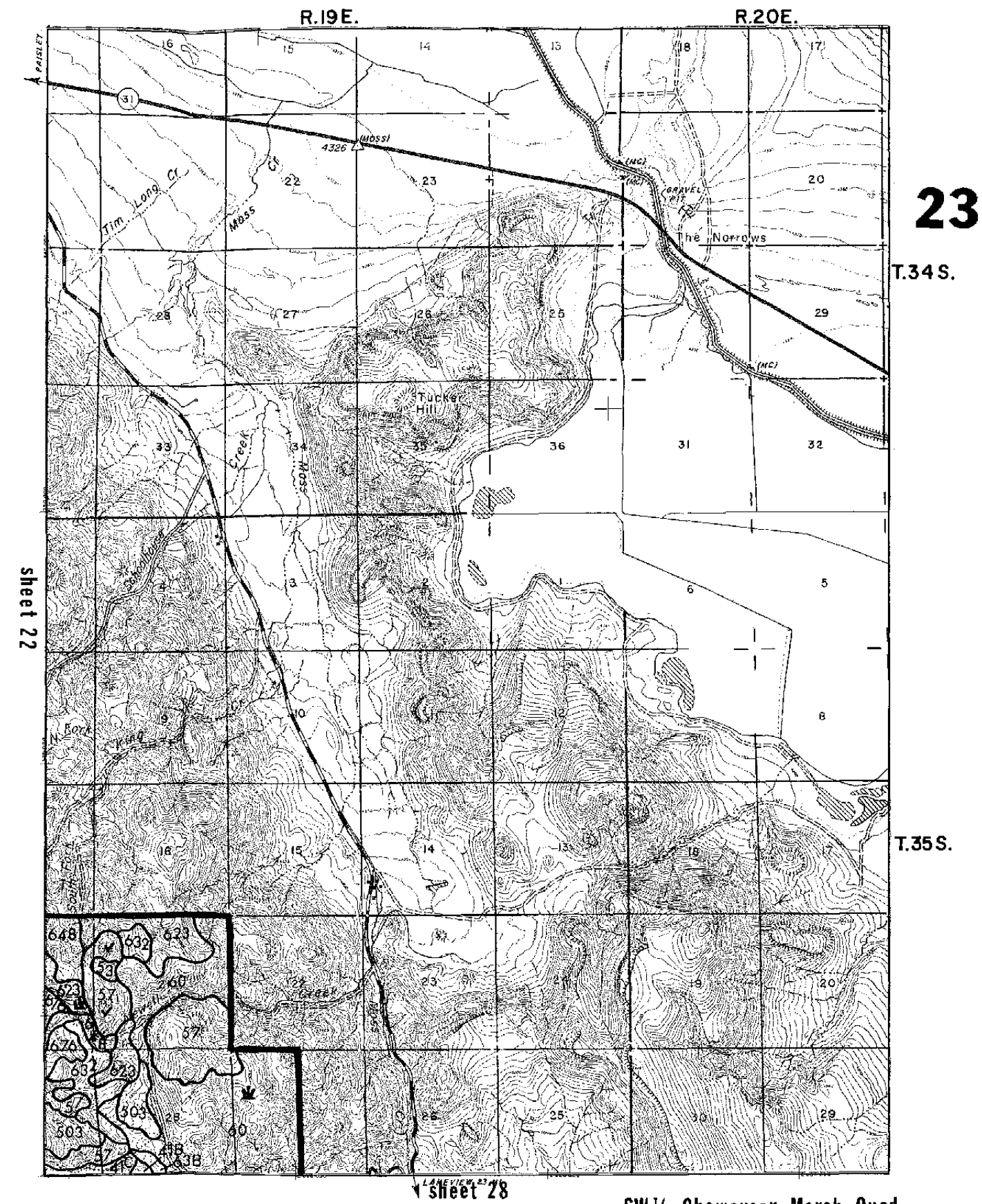
R.19E.

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35 S.

S¹/₂ Paisley Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.



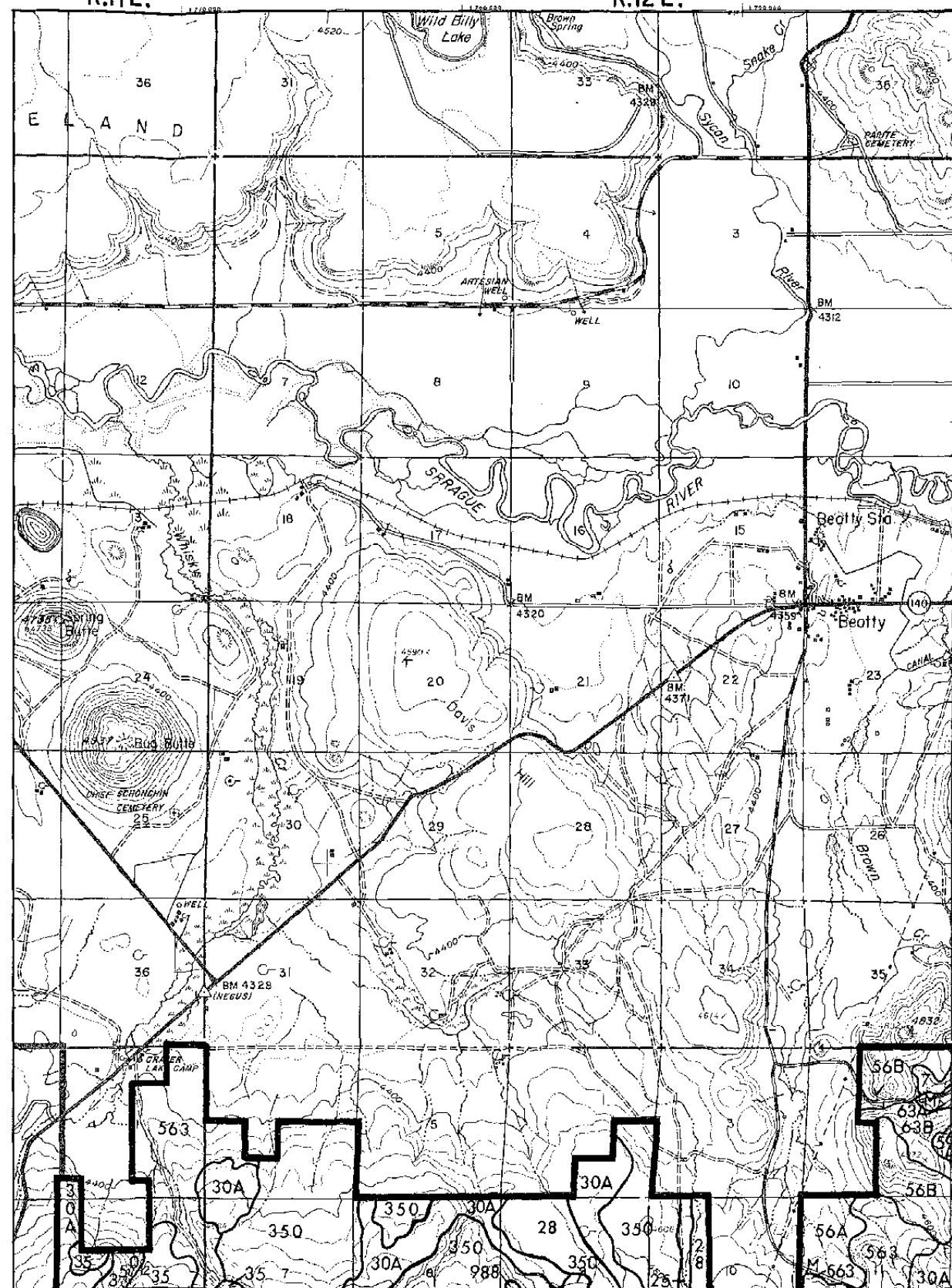
23

SW 1/4 Chewaucan Marsh Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.

R.11E.

sheet 19

R.12E.



T.35 S.

24

T.36 S.

sheet 20

T.37 S.

sheet 30

NE 1/4 Beatty Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.

R.14E.

T.35S.

25

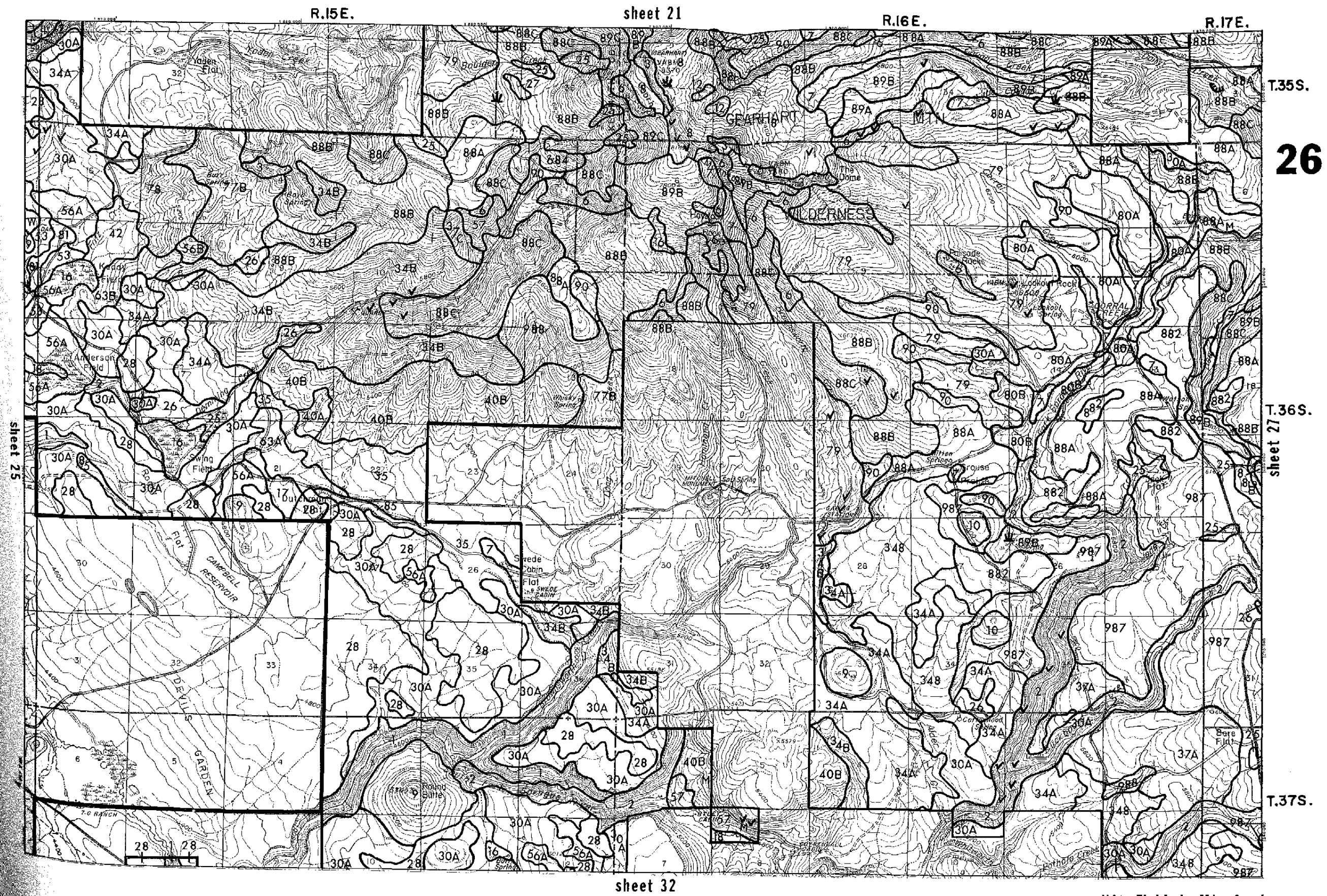
T.36S.

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378.

sheet 31

N¹/₂ Bly Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.



N 1/2 Fishhole Mtn. Quad.
Scale 1"=1 Mi
Contour Interval 40 Ft.

R.19E.

27

sheet 28

T.37S.

N¹/₂ Vistillas 1 Quad.
Scale 1"=1Mi.
Contour Interval 20 Ft.

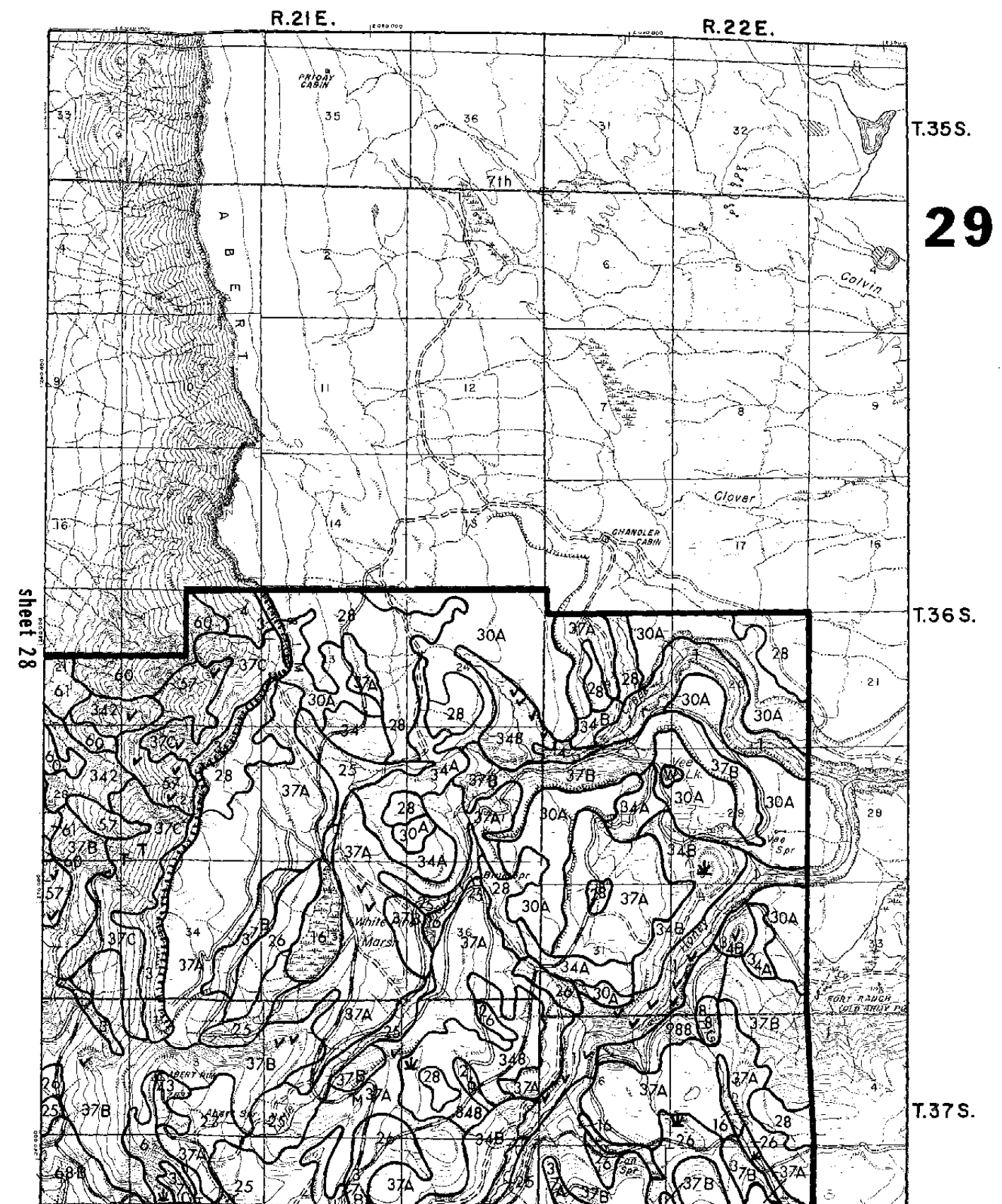
R 21E

28

sheet 29

T.37 S.

N¹/₂ Lakeview 2 Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.



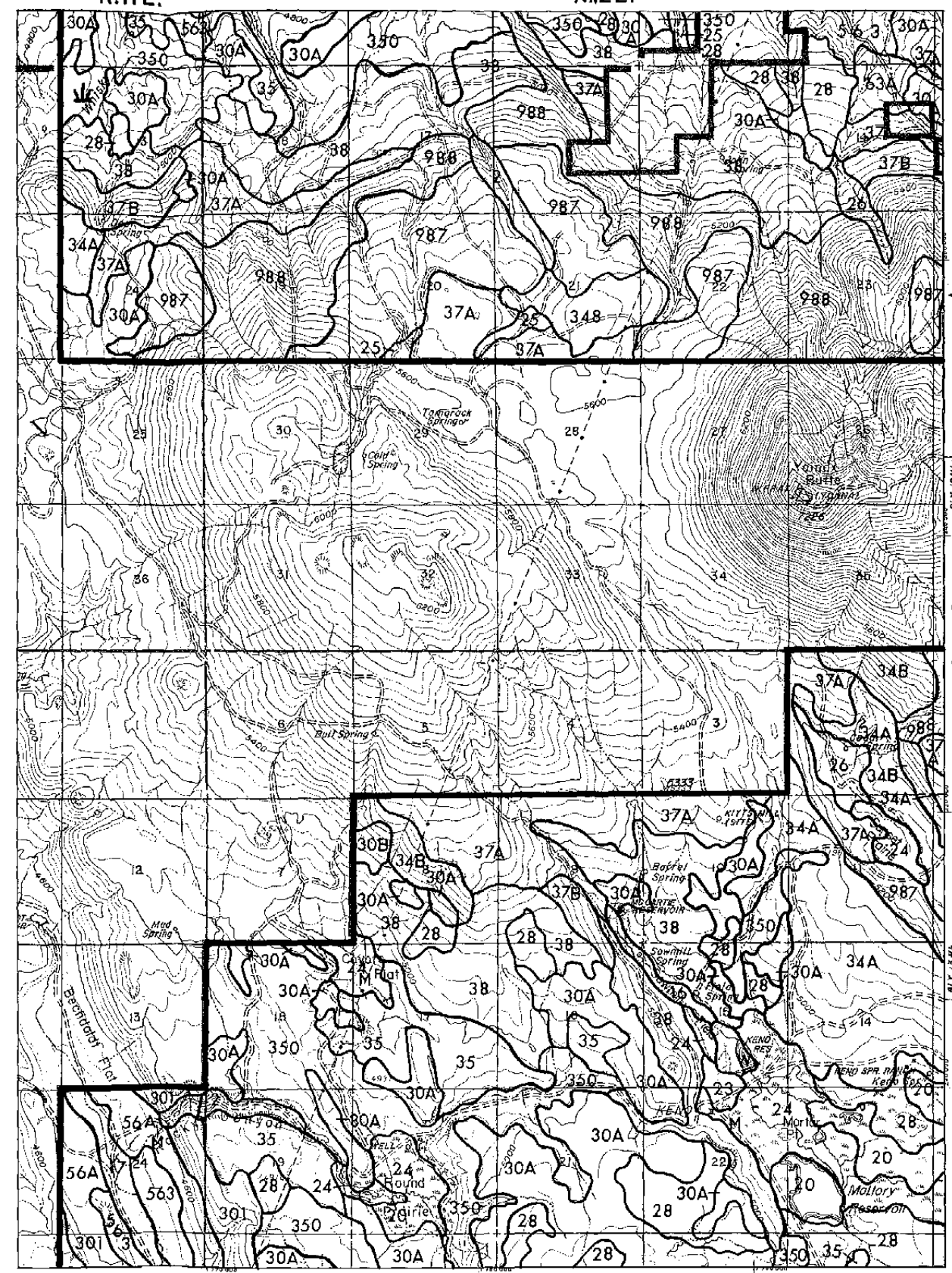
29

NW 1/4 Lakeview 1 Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.

R.11E.

sheet 24

R.12E.



30

T.37S.

sheet 31

T.38S.

sheet 36

SE 1/4 Beatty Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.

R.12E.

R.13E.

sheet 25

R.14 E.

31

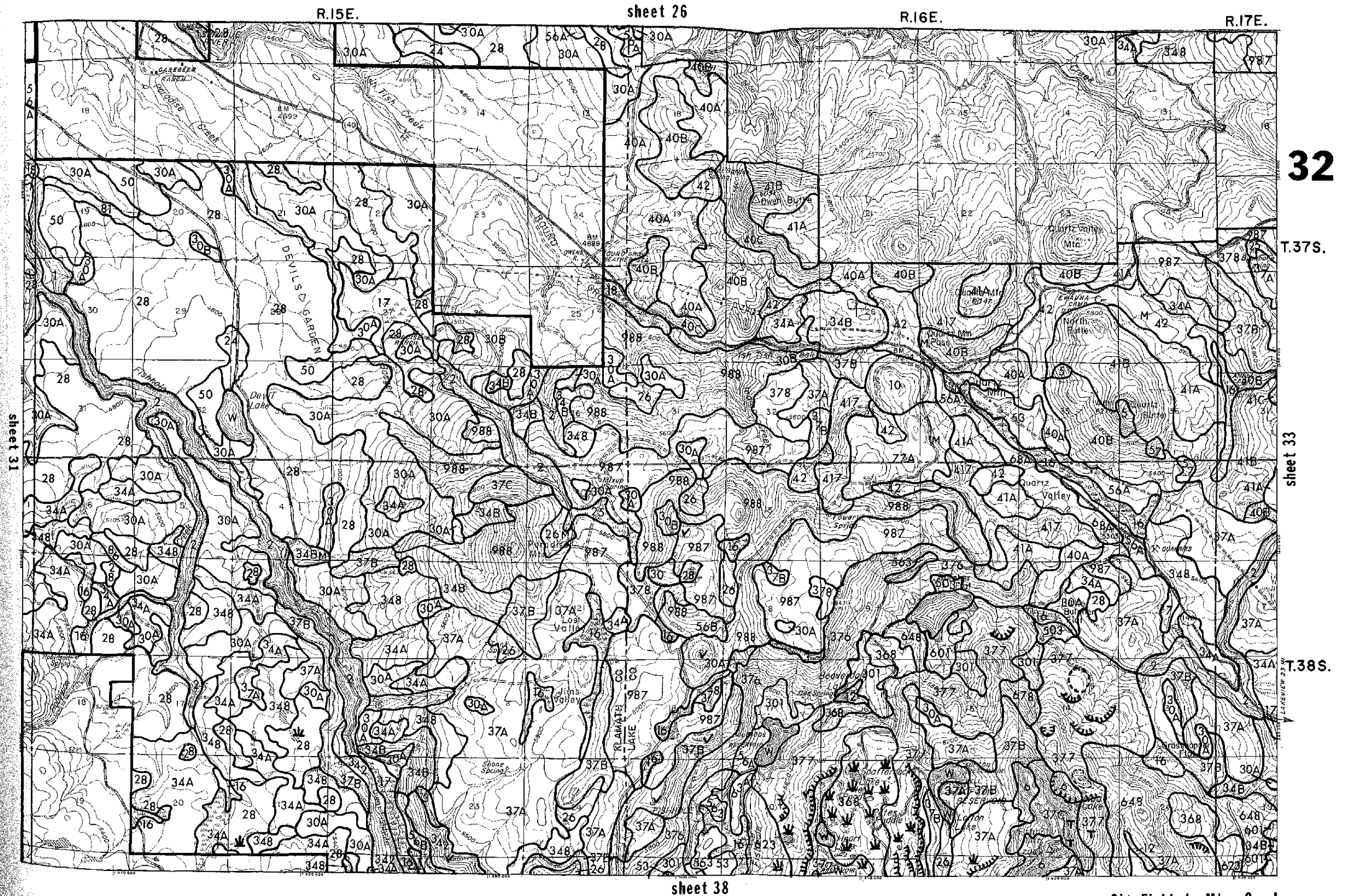
7.37S.

75 13445

385.

sheet 37

S¹/₂ Bly Quad.
Scale 1"=1Mi.
Contour Interval 40 Ft.



32

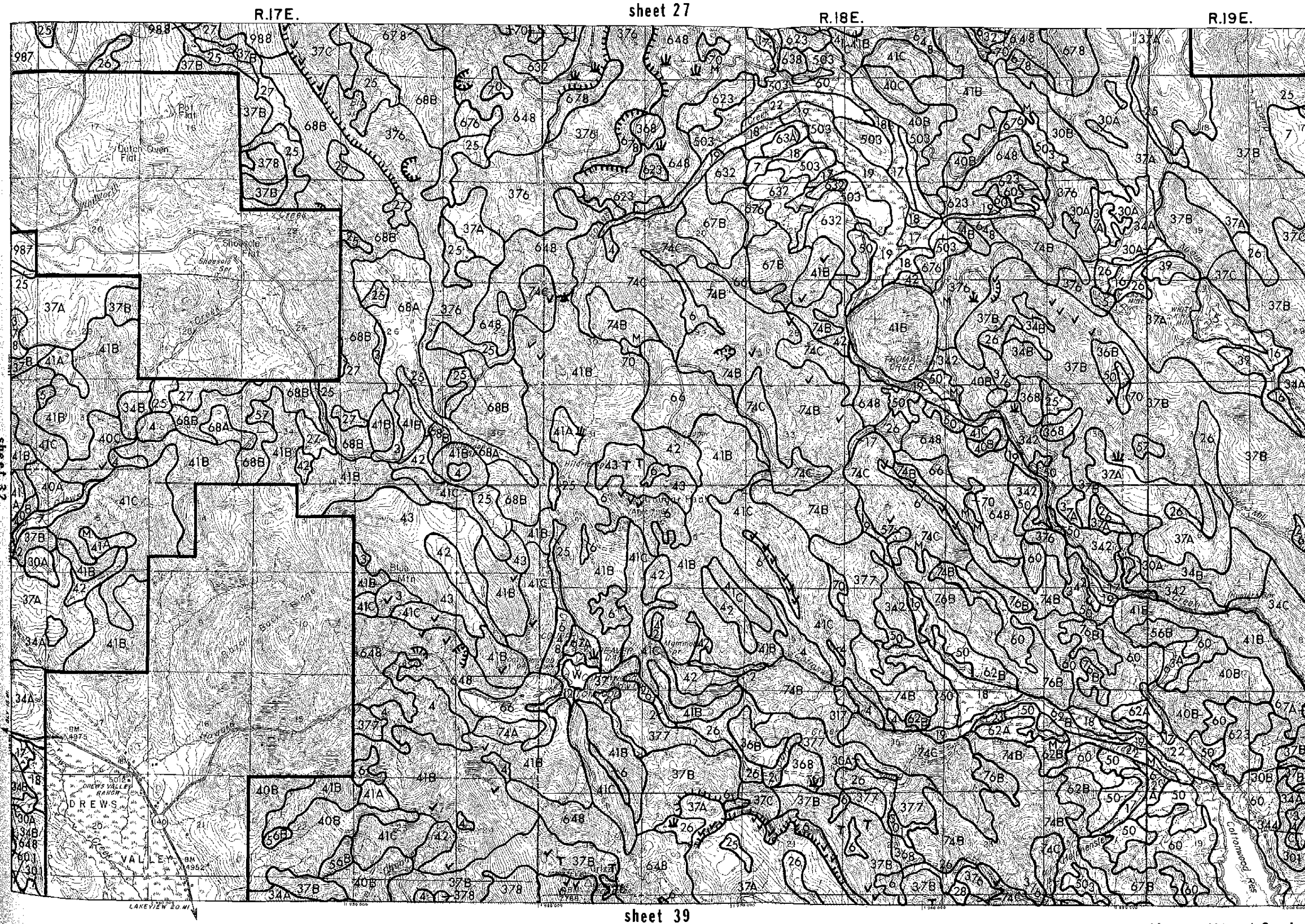
T.37S.

sheet 33

T.38S.

sheet 38

S $\frac{1}{2}$ Fishhole Mtn. Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.



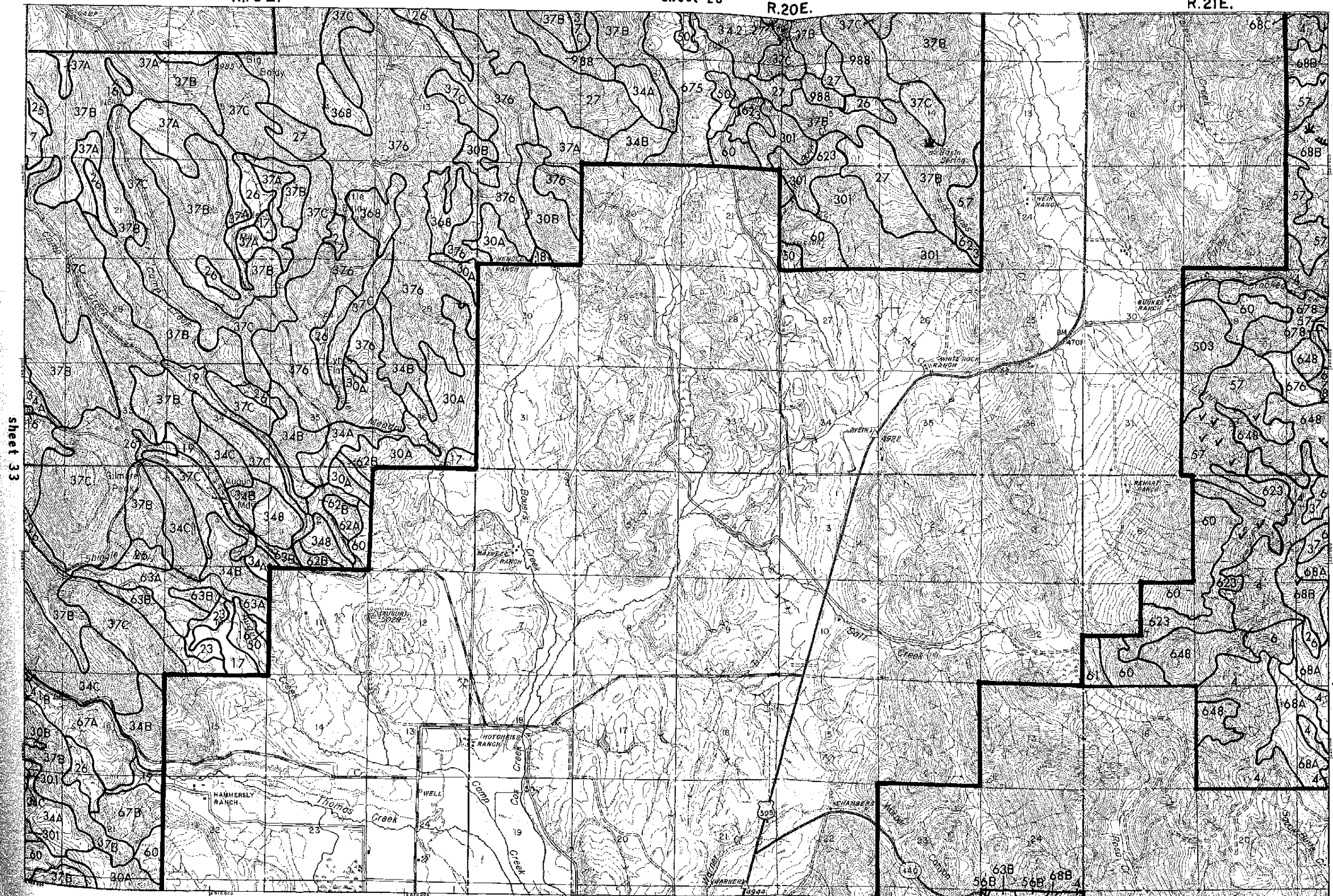
S $\frac{1}{2}$ Vistillas 1 Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.

R.19E.

sheet 28

R.20E.

R.21E.



sheet 33

sheet 40

34

T.37S.

sheet 35

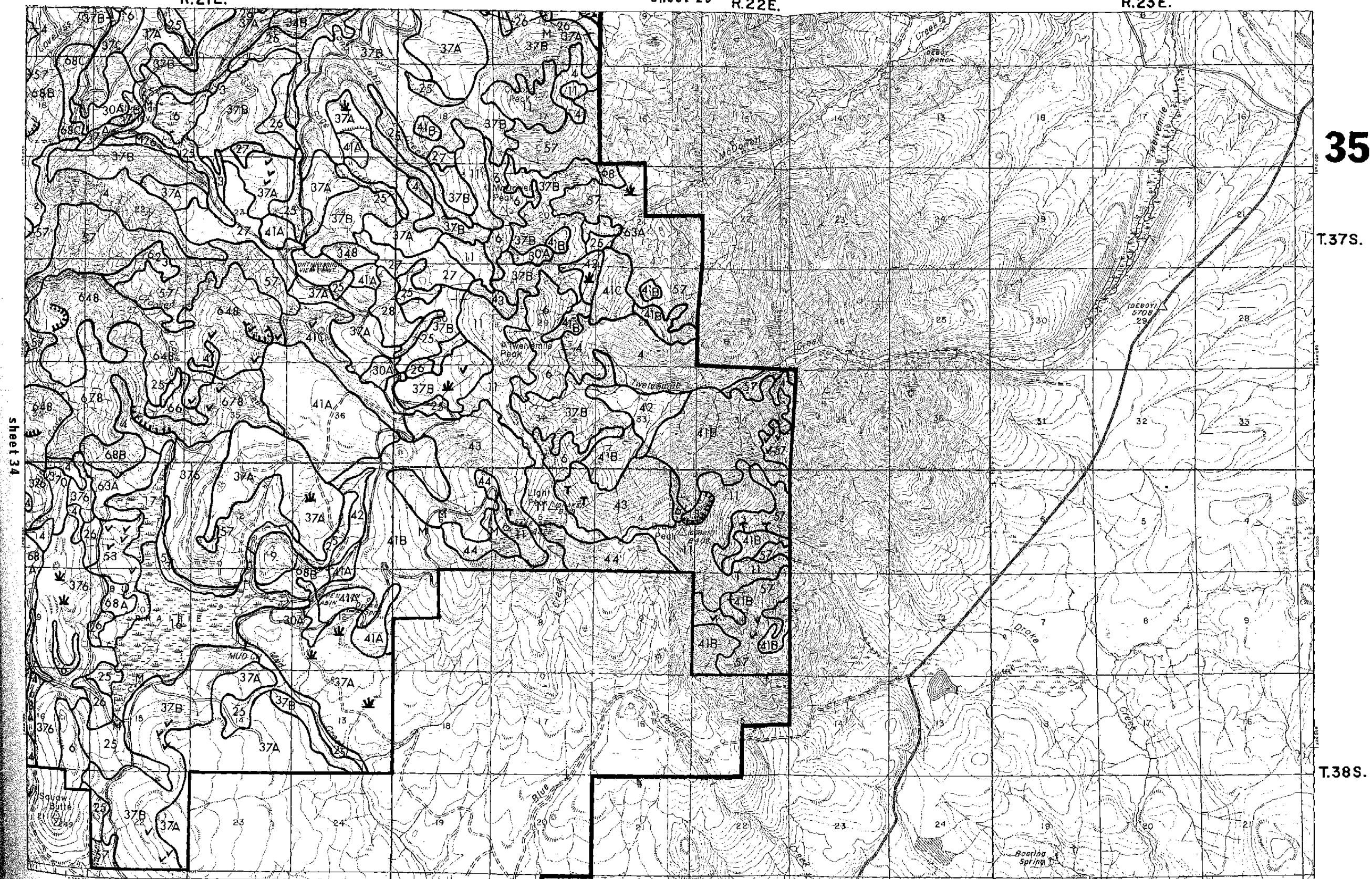
T.38S.

S¹/₂ Lakeview 2 Quad.
Scale 1"=1Mi.
Contour Interval 20 Ft.

R.21E.

sheet 29 R.22E.

R.23E.



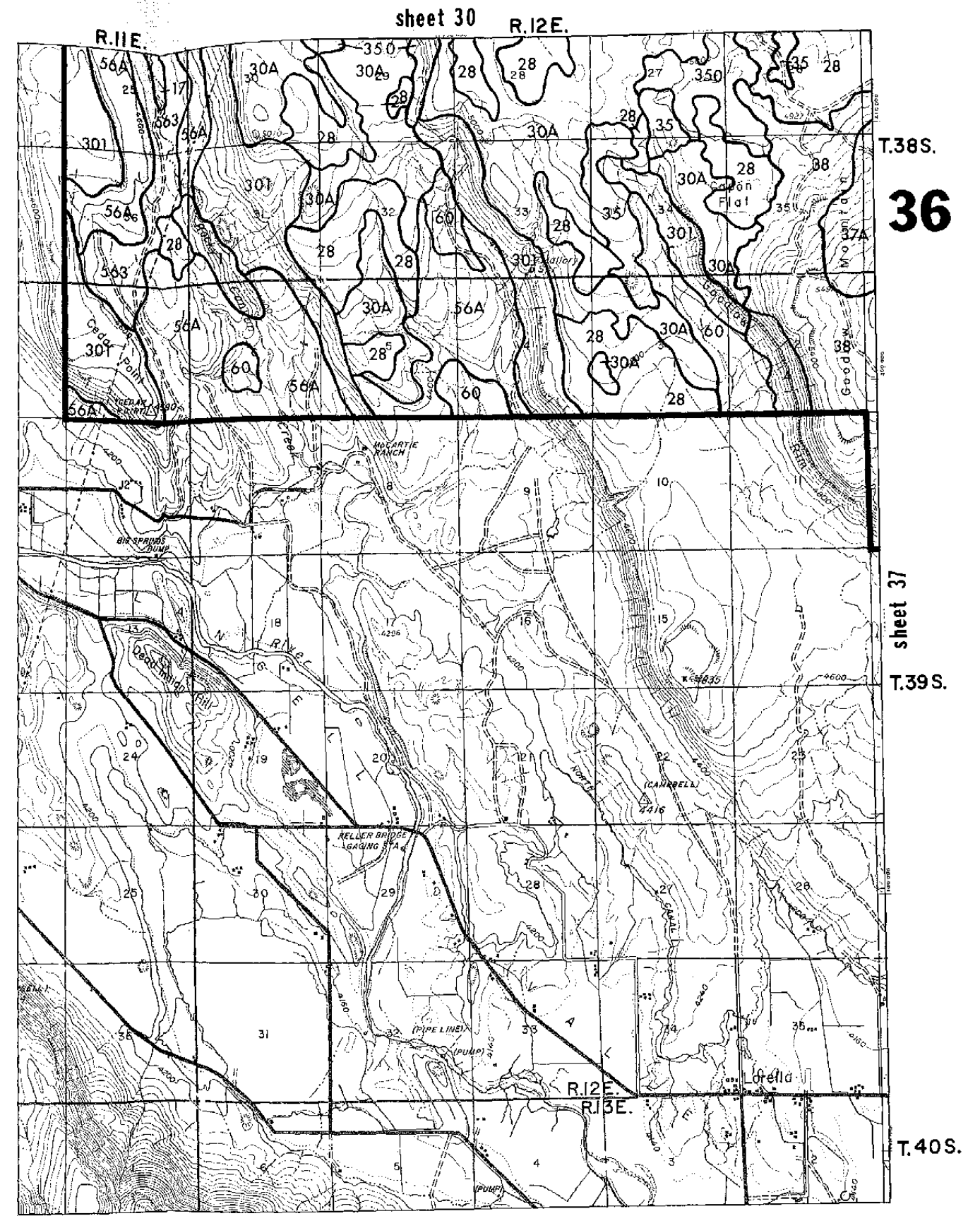
35

T.37S.

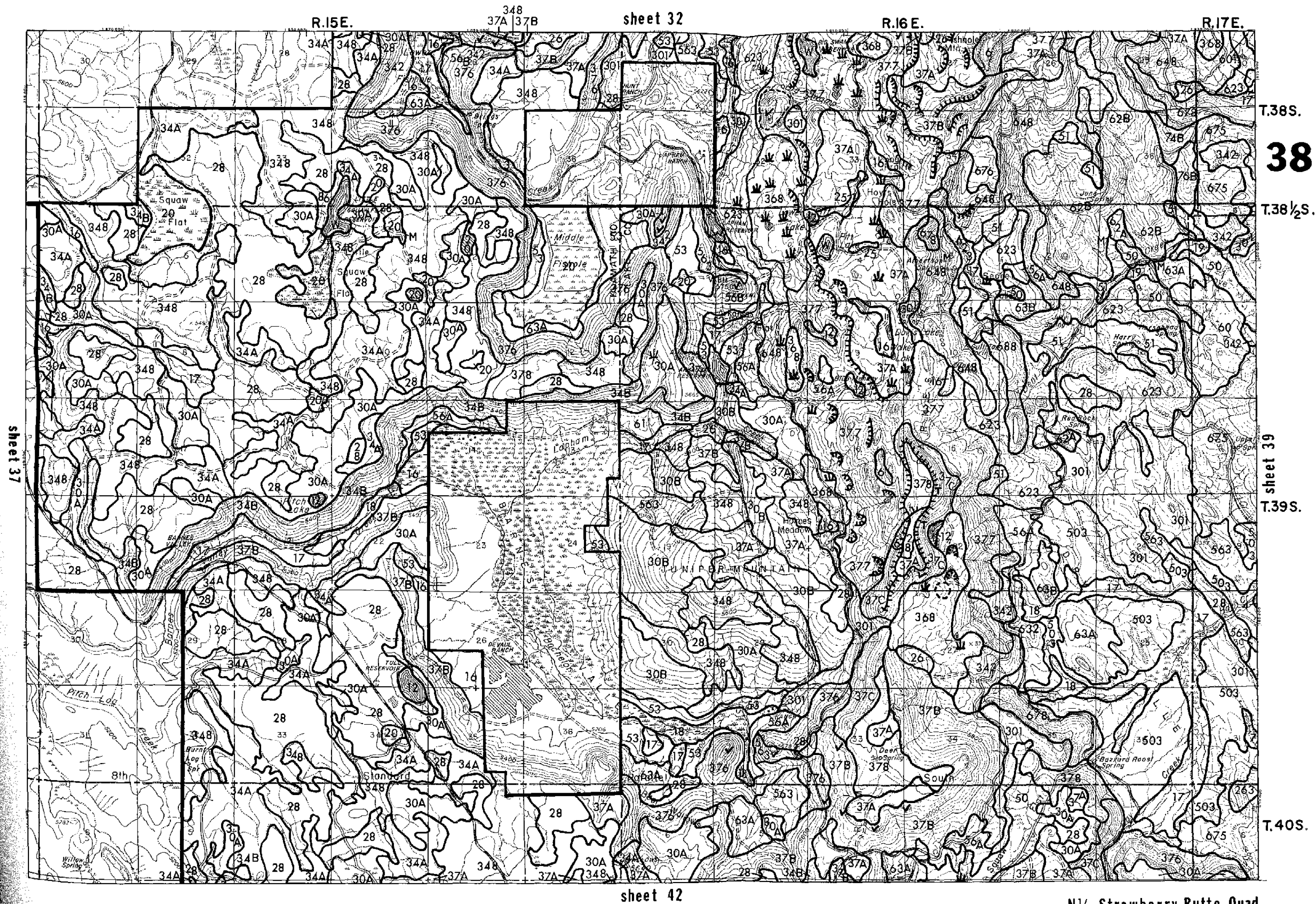
T.38S.

sheet 41

S $\frac{1}{2}$ Lakeview 1 Quad.
Scale 1"=1 Mi.
Contour Interval 20 Ft.



NE 1/4 Malin Quad.
Scale 1"=1 Mi.
Contour Interval 40 Ft.



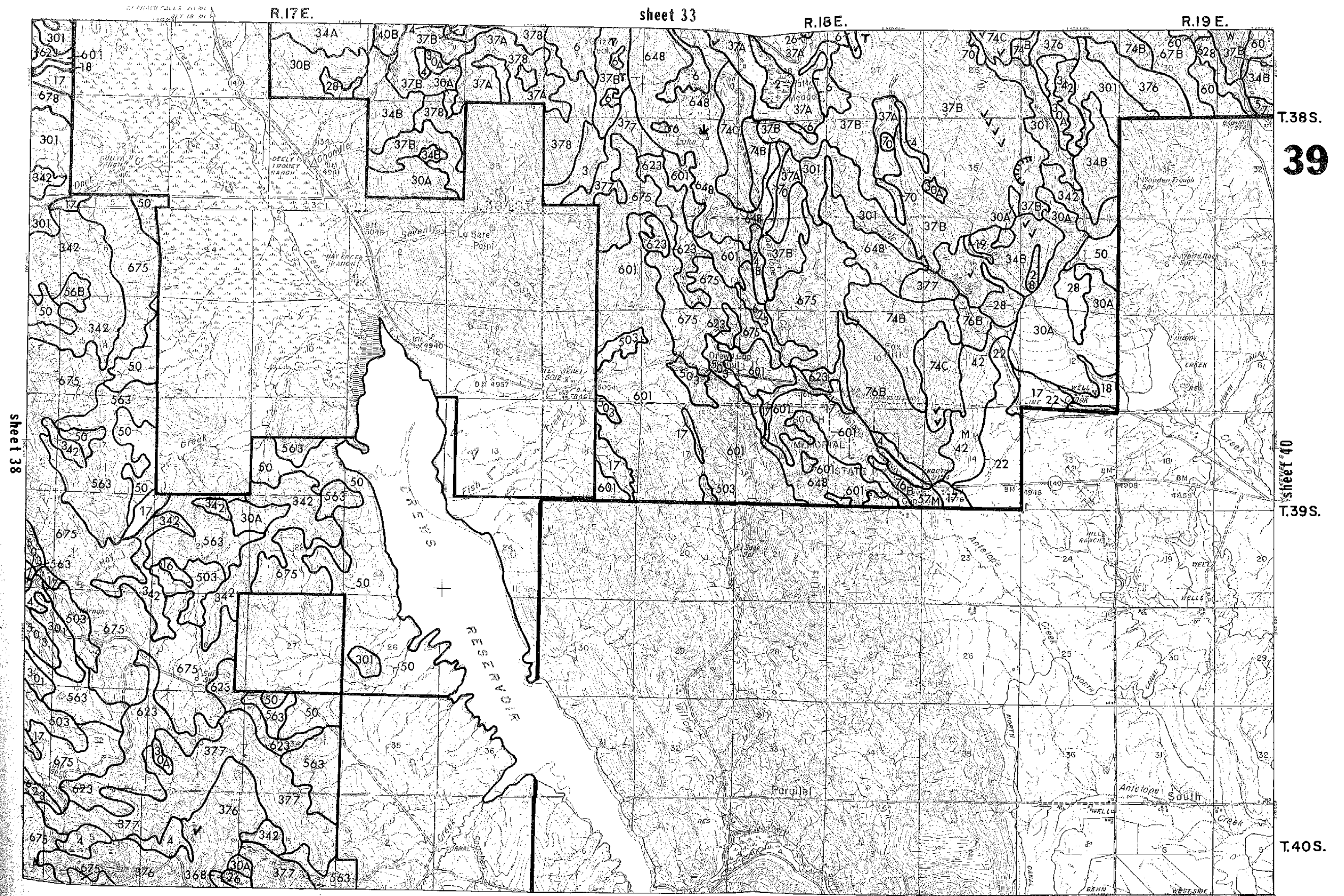
T.38S.
38
T.38 1/2 S.
T.39S.
T.40S.

Sheet 37

Sheet 39

sheet 42

N 1/2 Strawberry Butte Quad.
Scale 1"=1Mi.
Contour Interval 40 Ft.

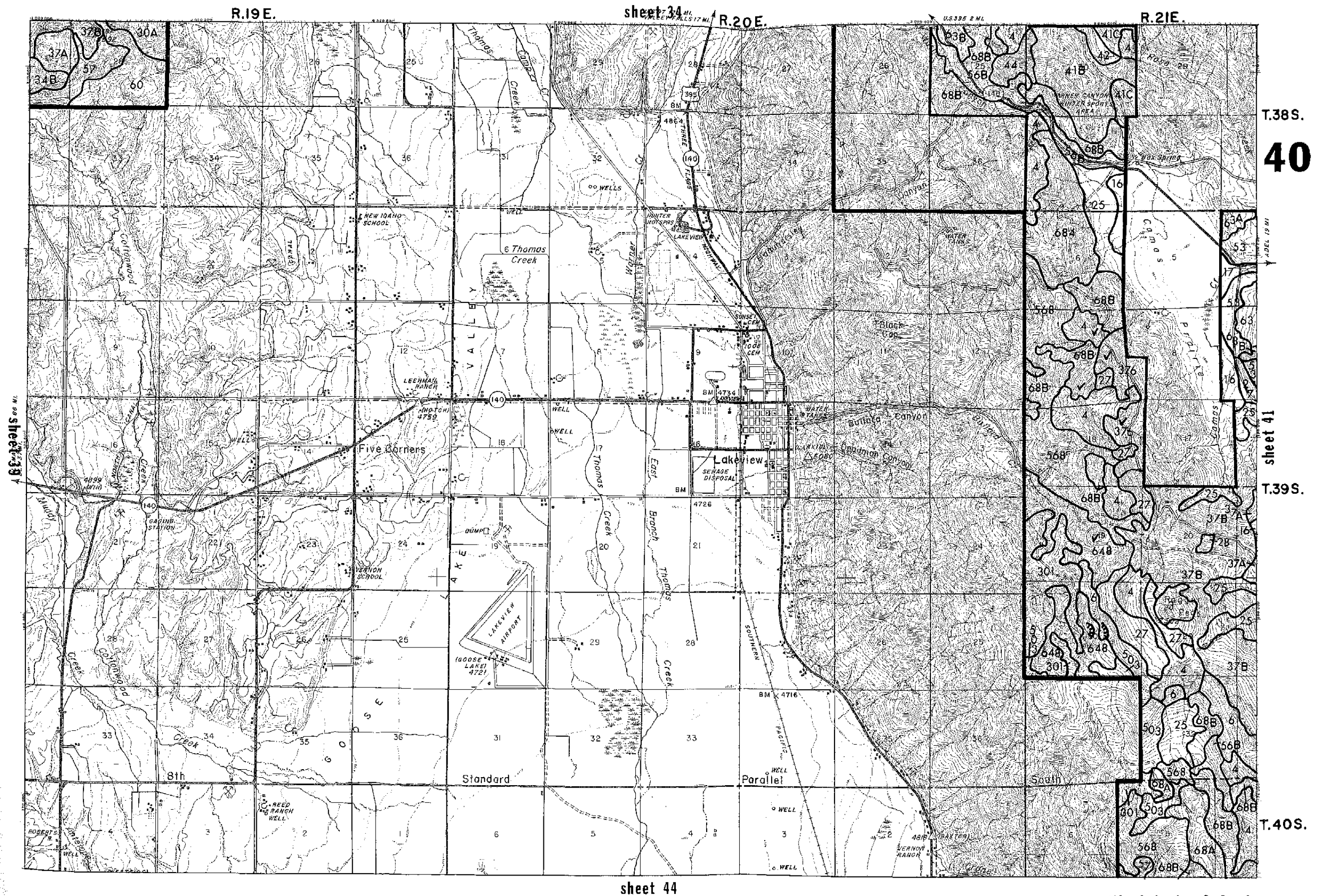


sheet 43

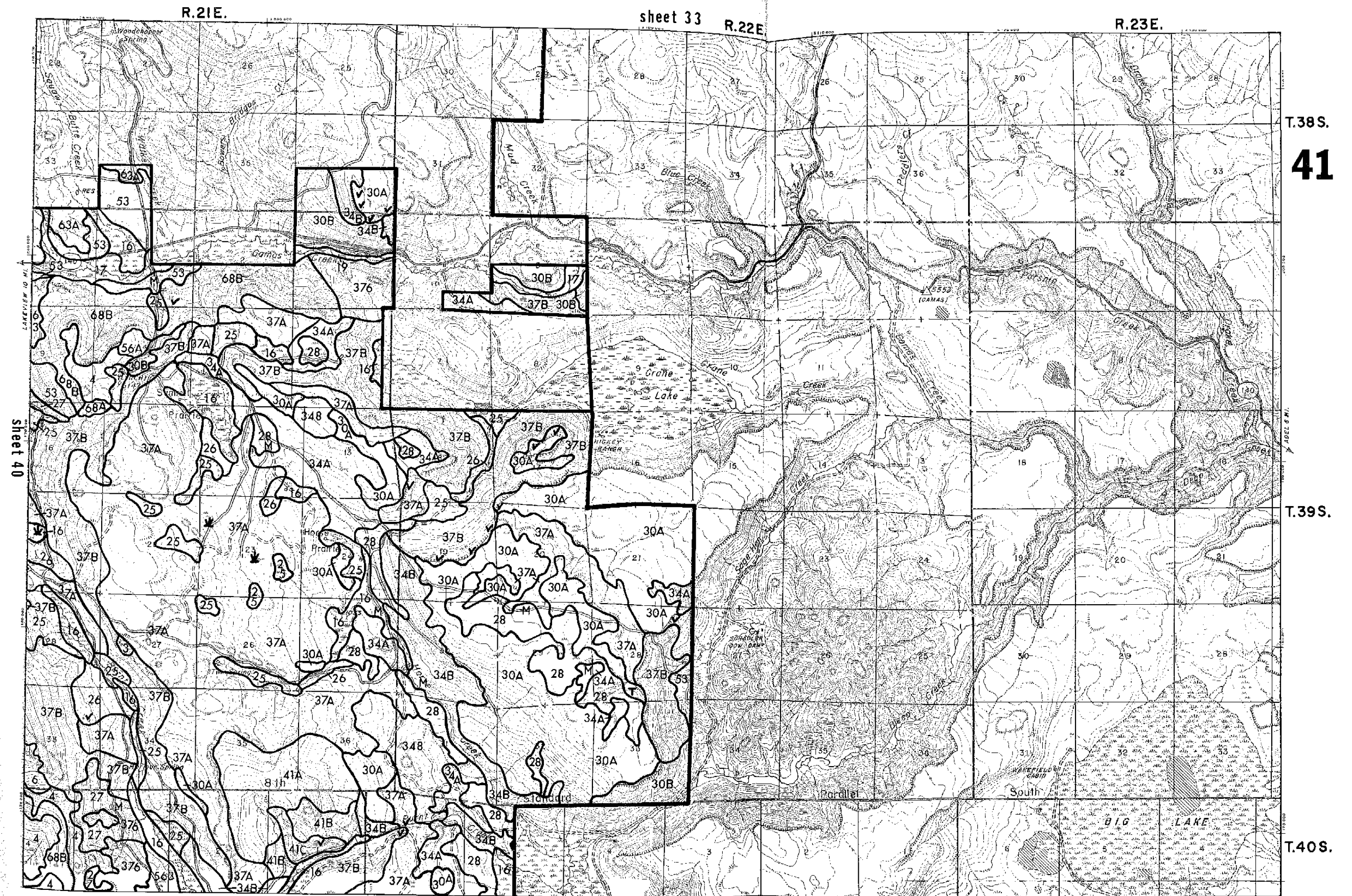
N1/2 Vistillas 4 Quad.

Scale 1"=1 Mi.

Contour Interval 40 Ft



N¹/₂ Lakeview 3 Quad.
Scale 1"=1Mi.
Contour Interval 20 Ft.



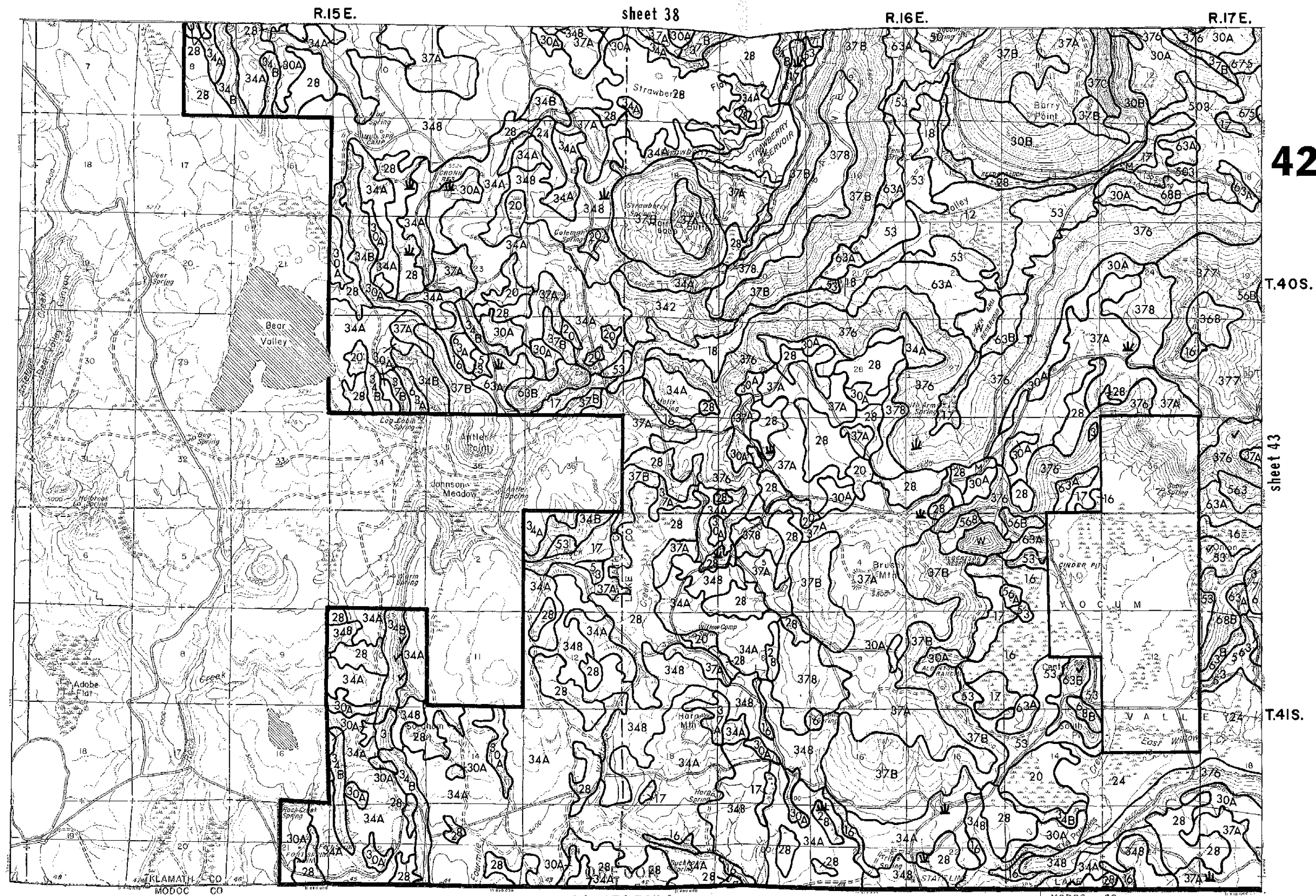
T.38S.
41

T.39S.

T.40S.

sheet 45

N¹/₂ Lakeview 4 Quad.
Scale 1"=1Mi.
Contour Interval 20 Ft.



42

T.40S.

sheet 43

T.41S.

S¹/₂ Strawberry Butte Quad.
Scale 1"=1Mi.
Contour Interval 40 Ft.

R.17E.

sheet 39

R.18E.

R.19E.

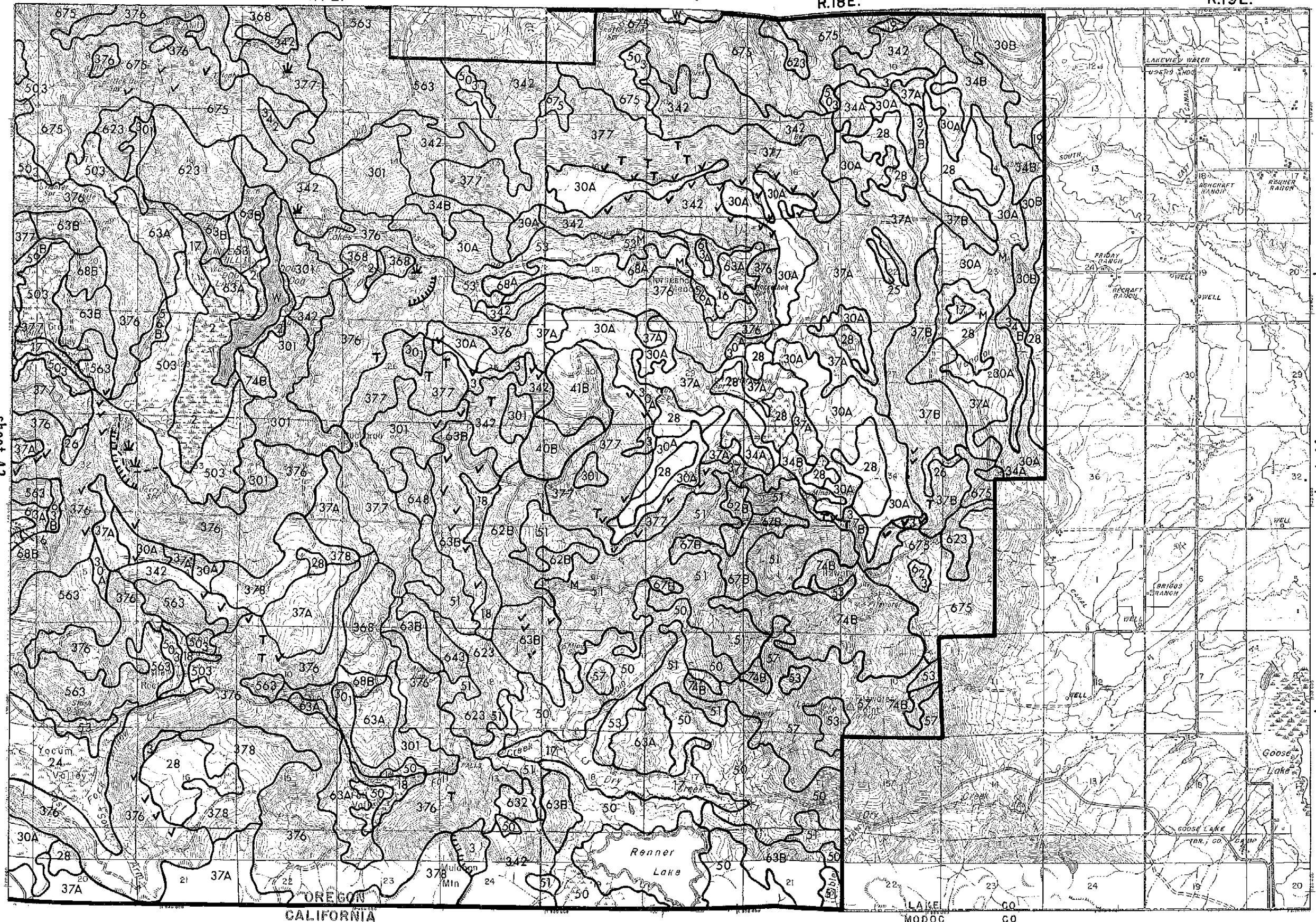
Sheet 42

43

T.40S

sheet 44

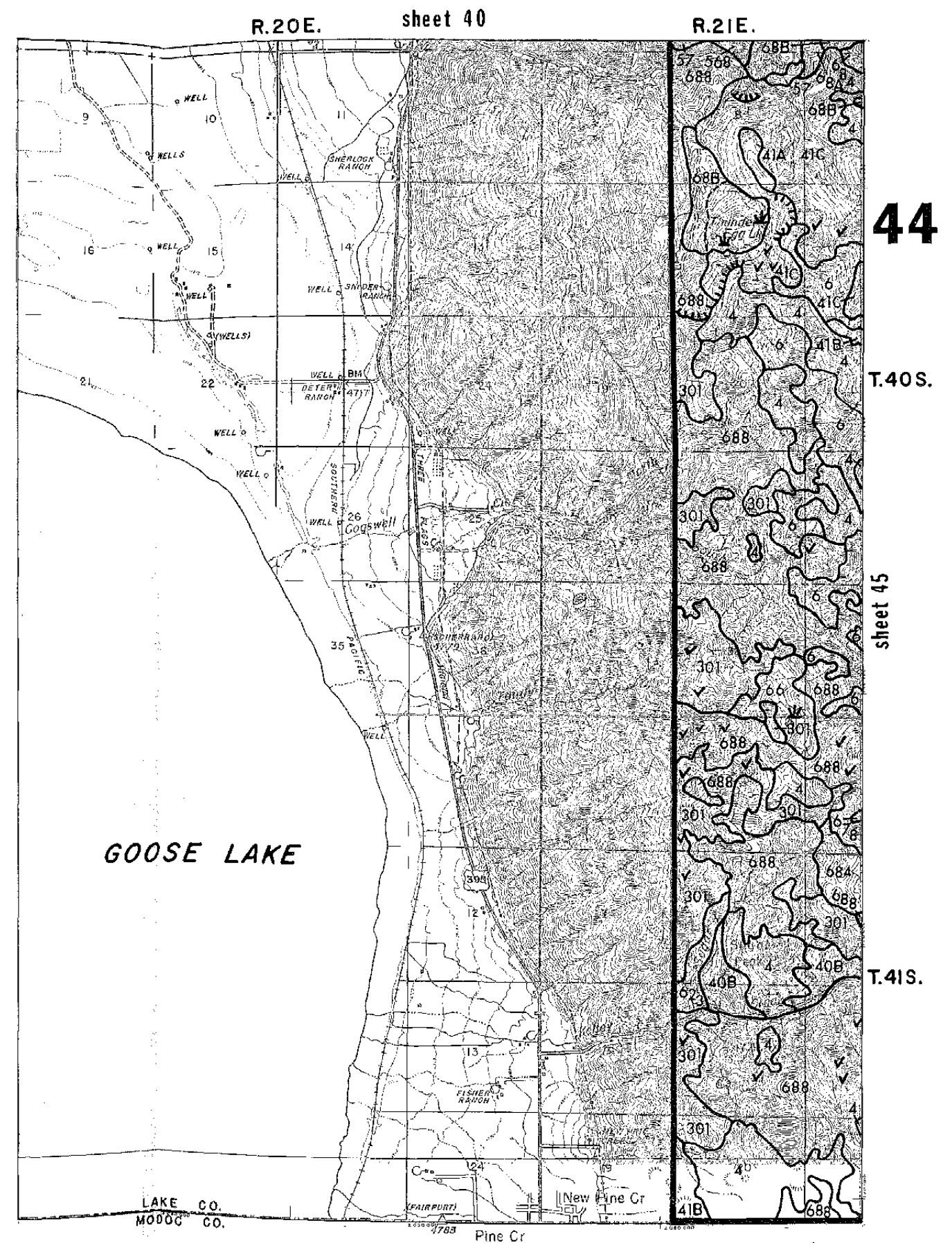
T.41S.



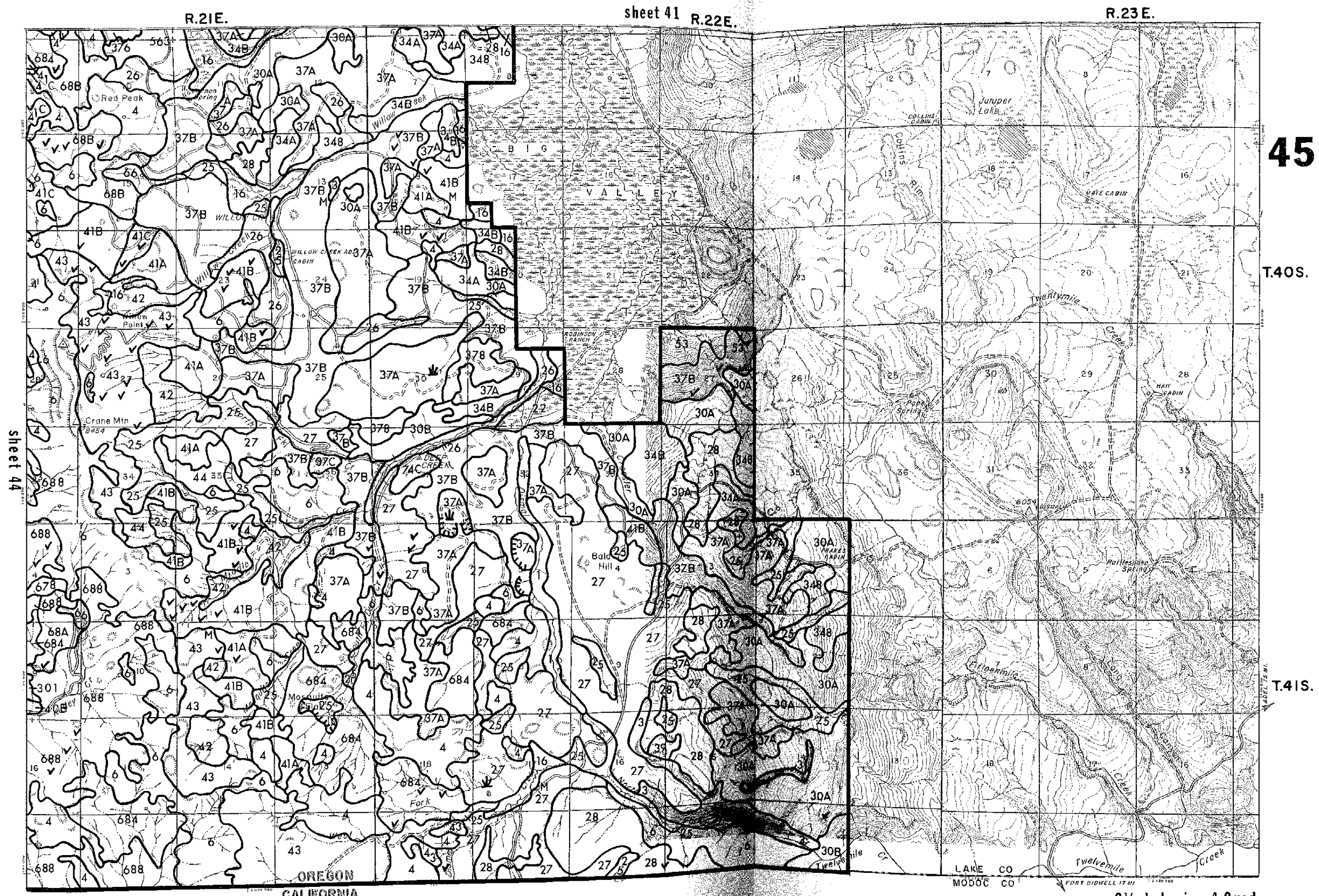
OREGON
CALIFORNIA

LAKE
MODOC CO

S1/2 Vistillas 4 Quad.
Scale 1"=1Mi.
Contour Interval 40 Ft.



SE 1/4 Lakeview 3 Quad.
Scale 1"=1Mi.
Contour Interval 40 Ft.



45

T.40S.

T.41S.

1/2 Lakeview 4 Quad.
Scale 1"= 1Mi.
Contour Interval 20 Ft.