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SOIL INVENTORY OF THE MEDFORD DISTRICT

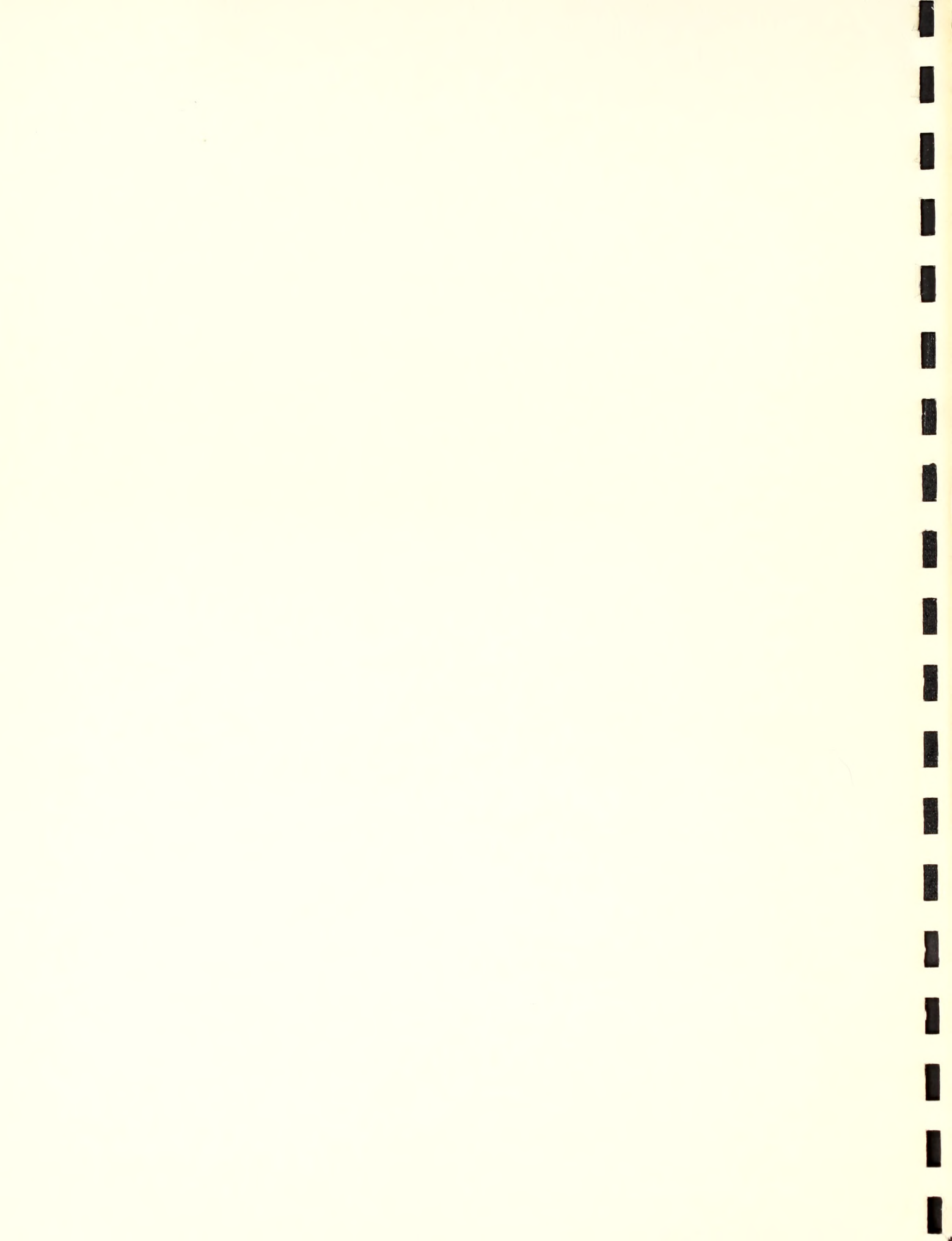
LeRoy A. deMoulin, James A. Pomerening and Byron R. Thomas



December, 1975

This report was prepared to serve as guidelines for Bureau of Land Management Resource Managers.

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SOIL INVENTORY OF THE MEDFORD DISTRICT

by

LeRoy A. deMoulin

James A. Pomerening

Byron R. Thomas

December, 1975

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	Detailed soil association maps	bound in back of report
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SOIL INVENTORY OF THE MEDFORD DISTRICT

by

LeRoy A. deMoulin, James A. Pomerening and Byron R. Thomas¹

I. INTRODUCTION

The inventory area is in southwestern Oregon. It consists of large portions of Jackson and Josephine Counties and small parts of Curry, Douglas and Klamath Counties (Figure 1). The total area of the inventory is about 1.5 million acres. The extent of the National Resource land in the inventory area is 911,000 acres, or about 1,424 square miles. It is interspersed with private, State and County lands mostly in the uplands. Large tracts of agricultural lands and private forested lands have been excluded from the inventory.

The southern part of the area, in places, is adjacent to the California border and extends about 95 miles from U.S. Highway 199 on the west to U.S. Highway 97 on the east. The length of the western part of the area (Siskiyou Mountains) is about 50 miles. The length of the eastern portion (Cascade Range) is about 15 miles.

The area primarily is a timber-producing region. Grazing occurs on semi-arid range lands and on adjacent timberlands in the southern and eastern parts. The publicly-owned land is used for timber production, recreation, livestock grazing, wildlife and watershed. Farming, which consists mainly of orchard fruit production, is an important use of the privately-owned land. Much of the private land is also in timber. A limited amount of mining for metal deposits is done locally.

This soils report contains interpretations of technical and scientific data that is useful as a basis for making land management decisions. It was made primarily to provide information about the soil and vegetation resources and to evaluate the potential and limitations of these resources. This report consists of a soil association map, descriptions of mapping units and soil behavior, detailed descriptions of individual soil series and tables of interpretations for soil suitabilities and limitations for Medford District resource management programs.

This soils inventory was conducted to locate soils and identify their response to resource management. For example, the soil association map and detailed interpretations and descriptions will assist foresters in timber-sale layout, cutting practices and harvest methods. It will help engineers in selecting sites for stable roads and will aid resource specialists in determining the suitability of sites for water reservoirs, livestock watering ponds or for campgrounds. The general soil map and information about the climate, geology and land form of the area will be most useful for large-scale planning of the entire area.

¹Medford District Soil Scientist, Bureau of Land Management; Temporary Soil Scientist, Bureau of Land Management; and Oregon State Office Soil Scientist, Bureau of Land Management, respectively.

This inventory will also facilitate planning research on soils, vegetation, wildlife and watershed problem areas and will aid in applying the results of research to different parts of the District. Research results from any sample area can be extended with confidence to all other areas having the same combination of natural resources as the sample area. The report, in general, will add to the fund of knowledge about the environmental conditions on the District.

Three natural resources - soil, vegetation and water - are all interrelated and can be expected to last indefinitely if properly managed. Soil is renewable only over a long period of time and is the most critical resource. Proper management, therefore, involves using a very long-range planning period and having an understanding of the interactions among all resources. Ideally, proper management of the resources has the goal of maximizing economic returns without causing an adverse impact on any one of the resources or on environmental quality. Meeting this goal is extremely difficult because of (1) the short-range view of many users, (2) the general lack of knowledge of the interactions among the resources and (3) differences in immediate economic returns among the various competing uses of the same resource.

All lands in the District are classified for multiple use and retention in Federal ownership unless otherwise withdrawn. Examples of withdrawn areas are the Brewer Spruce Natural Area and the Wild and Scenic Rogue River Area.

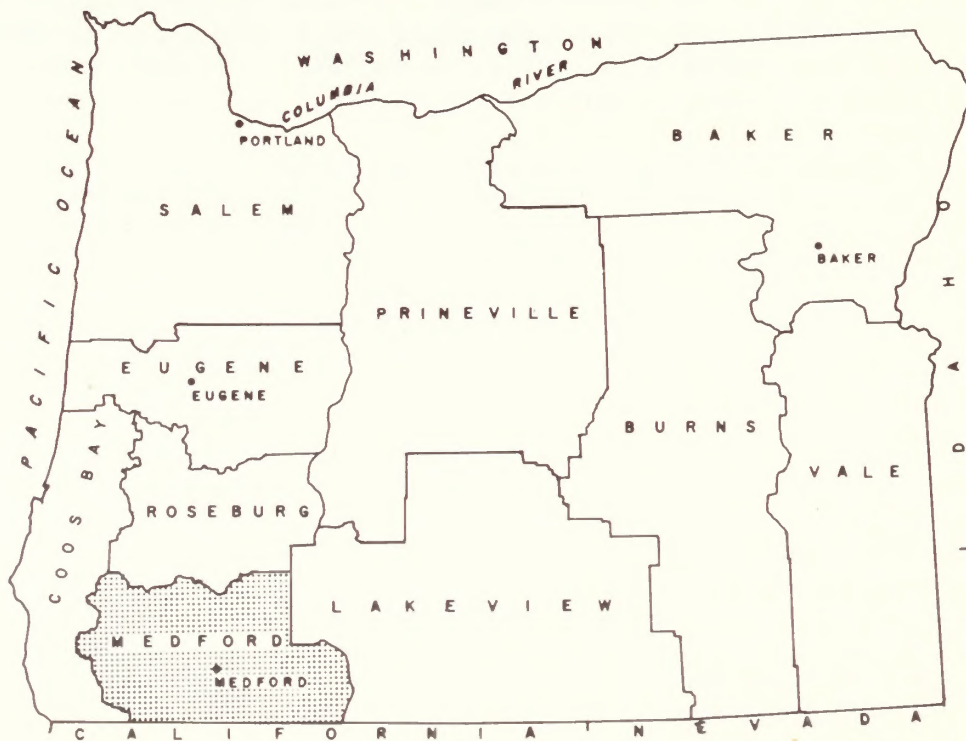


Figure 1. Location of the Medford District inventory area.

II. INVENTORY METHODS

This inventory was made in an area where a system of roads has been developed. Since little was known about the various soils in the Medford District, when the inventory was initiated, preliminary studies were needed. Therefore, traverse studies were made along prominent as well as little-used logging roads.

Traveling along the forest roads, soil scientists used the cutbank of roadways to examine soil profiles. Soil physical characteristics were recorded and notations were made of shape and gradient of slopes, stream flow, drainage dissection pattern of the watersheds, kinds and amounts of native vegetation and kinds and nature of the parent rock. A soil map having a scale of 1:62,500 was compiled using the additional aid of aerial photographs, stereoscope and other available data on geology, relief, vegetation and climate.

Representative sample areas were selected for each mapping unit (map delineation) to determine the kinds of soils, their distribution, extent and slope position. These sample areas were concentrated on National Resource lands. They were large enough to be representative and to disclose the pattern of soils in the mapping unit. Each sample area consisted of a two- to five-mile section of road depending on the size of the delineations and the location of roads within them. Inspection of the soil profile and rock strata was made at one-tenth and one-twentieth mile intervals along the roads. Identification of soils at these intervals, together with environmental features, served to provide the approximate percentage of individual soil series in the mapping units and the behavioral characteristics of each soil under different conditions. The soils were numbered or named and classified according to uniform procedures.

III. HOW TO USE THE REPORT

A soil association is a landscape that has a distinctive proportional pattern of two or more soil series that individually occur in areas too small to delineate separately. An association is named for the one, two or three most abundant soils making up collectively at least 80 percent of the area. Soils occupying less than 20 percent of the association are inclusions and, although not included in the name of the association, are described according to their setting and proportionate extent. It is important to recognize and identify these inclusions in the field because they may actually be the dominant soils of a management unit or timber harvest unit.

A soil series is comprised of soils with profiles almost alike. All soils of a series are similar in kind, thickness and arrangement of horizons and their structure, color, texture (except texture of the surface layer), and other important characteristics. In this inventory, each series is identified by a numeral, such as 370, 382, 701 or 840.

Soils identified by numbers from 700 to 899 were first located and described in the inventory area. Those soils identified by other numbers were first located and described elsewhere. Soils numbered from 800 to 899 have cool temperatures and those identified by numbers less than 800 have warm temperatures.

Some soils have been correlated to named series commonly in use by the Soil Conservation Service. These names appear adjacent to identifying numerals in parentheses throughout the report.

Phases of soil series refer to differences that cannot be related directly to soil series. Slope gradient and slope aspect are two external features used to define phases of soil series in this report. These phases are significant to the behavior and use of soils. This is particularly so in relationship to soil productivity and forest regeneration.

The symbols 380-382/WXn and 380-382/WX are two phases of the 380-382 soil association. Soils of the 380 series are the most abundant kind of soil in this association and are, therefore, listed first. Soils of series 382 are of secondary importance but make up at least 20 percent of the area. Most delineations identified by the 380-382 designation will also have inclusions of soils from other series, such as 381 and 370. The W and X refer to slope gradients. Areas identified by a slope symbol of W are on slopes ranging from 10 to 35 percent. Those on slopes ranging from 35 to 60 percent are identified by an X. If the slopes mainly range from 10 to 60 percent, the combined symbol WX is used. The n refers to a northerly aspect. The absence of a lower-case letter following the slope symbol indicates a southerly aspect.

Some areas of land are so rocky, or so shallow that they scarcely can be called soils. Other areas of land occur along stream channels where small bodies of several kinds of soil are in a complex mixture. These areas

are shown on the soil map like other mapping units but they are given the descriptive names of Rock land and Alluvial land and are called miscellaneous land types.

It is essential that the mapping unit descriptions be used for the determination of location and extent of each soil in an association when the map is used. To find information about individual soils, refer to the report. Use the table of contents to locate the pages in the report that contain the table or descriptive material for the various kinds of information.

Persons using the report in the field should refer to the section on descriptions of soil series and mapping units. This will help them become acquainted with the characteristics and field relationships of individual soils to land form and slope positions.

If a person wants to know how a specific tract of land will behave under certain treatments or silvicultural practices, he should:

First, locate the tract of land on the Soil Association Map bound in the back of this report. From this map, he learns the dominant slope group, aspect and soils of the association in which the tract is located.

Second, turn to the part of the report called Descriptions of the Soil Series, Soil Behavior and Mapping Units, p. 22. Here, he is advised of the major as well as minor soils of each mapping unit, their physical and environmental features, their position and distribution on the terrain and their behavior under management. The same section shows the number of acres for each kind of delineation on the map.

Third, turn to the part called Soil Use and Management, p. 138. Here, he can obtain additional information on applied uses of each soil in sections called (1) Engineering Uses of the Soils, p. 138; (2) Interpretive Ratings for Soil Uses, p. 148; (3) Interpretive Ratings for Selected Soil Properties and Qualities, p.176; (4) Forest Management, p. 183; (5) Range Management, p. 188; and (6) Wildlife Management, p. 194.

Generally, the degree of limitation or capability for a specific objective is given for each mapping unit or soil series in tables. Definitions and criteria used to rate the soils are given in the report under the appropriate heading.

Persons interested in the general nature of the area, soil information and soil classification will find the general soil map and the specific sections of the report dealing with these matters of special interest.

IV. GENERAL CHARACTERISTICS OF THE AREA

A. Climate

The Medford District mostly has short, cool, moist winters and long, warm, dry summers. Dry continental winds that influence the area during growing seasons make southwestern Oregon generally a low timber-producing region. The soils are drier in the rooting zone than the wilting point for grass for more than 45 consecutive days a year.

The Pacific Ocean is 30 to 40 miles west of the District's western border. At this latitude, the prevailing wind direction is from the west. Thus, air masses are predominantly of marine origin. They have been considerably modified by the ascent over the Siskiyou and Cascade Range. In being lifted from sea level to between 4,000 and 5,000 feet, air temperatures are reduced between three and five degrees for each 1,000-foot increase in elevation. This cooling causes much of the moisture in the air to fall out as rain or snow. Air reaching lower slopes, valley floors and areas east of the Cascade summit is much drier than the original marine air.

Areas receiving most precipitation are the high Siskiyou Mountains to the north and west of Medford, the higher elevations near Cave Junction, and the high Cascade Range east of Medford. The better timber-producing soils occur in zones where annual precipitation exceeds 35 inches. Regeneration of conifer species is better, especially on northerly aspects where precipitation exceeds 35 inches.

Areas generally receiving the least precipitation occur at lower elevations and lay within the triangle of Ashland, Grants Pass, and Trail; and the area east of the Cascade summit and south of Highway 66. Timber production is low where annual precipitation is less than 35 inches.

Scanty summer rainfall is brought by thunderstorm activity that mostly affects the southeastern Cascades. However, this is an important factor in regeneration of pine species. Snowfall is heavy in the high mountains and, in places, the snowpack provides moisture necessary for timber production into the dry summer months.

The broad range in elevations on the District results in a proportional variance in temperatures. Daytime and nighttime temperatures fluctuate more during summer because of relatively cloud-free skies and low humidity. The area northwest of Grants Pass has the coastal influence of more fog and cloud cover that lowers surface temperatures and reduces evapotranspiration rates during the growing season. Soils occurring below 4,000 feet west of the high Cascades have a mean annual soil temperature of more than 47° F. at a 20 inch depth. Therefore, they are classified in the mesic family grouping. The soils above 4,000 feet and most soils east of the Cascade summit have a mean annual soil temperature, at a 20-inch depth, cooler than 47° F. and are classified in the frigid family. Aspect has an effect on temperature and, in some areas, the 3,500-foot contour was used to separate the mesic and frigid classes.

B. Geology

The major rock units of the Siskiyou Mountains are the Dothan, Umpqua and Galice formations, the Applegate group, Ultramafic rocks and Intrusive rocks. In the Cascade Range, the dominant units are pyroclastic rocks and andesite and basalt rocks. Other units are recent stream deposits and landslide areas that are minor in extent.

The relation between geological materials and associated soils are given in Table 1. Detailed and general studies of the geology of the District have been made by Oregon Department of Geology and Mineral Industries (Refs. 20, 21, 22, 23, 24)¹.

General distribution of major rock units in the Siskiyou is simple. Bands of sedimentary, volcanic, metamorphic and intrusive rocks - metamorphosed to various degrees - trend across the area in a north-northeasterly direction. From west to east, they are: massive sandstones, shales and flows of the Dothan formation; Ultramafic rocks and a complex of other intrusive rocks; slates, sandstones and metavolcanic rocks of the Galice and Rogue formations; metavolcanic and metasedimentary rocks of the Applegate group with scattered bodies of intrusive granitoid rocks; and massive, shaly sandstones of the Umpqua formation that forms most of the floor of Bear Creek Valley and generally separates the Siskiyou and Cascades.

The sedimentary and volcanic rocks are closely folded and broken by faulting and bedding-plane slippage. Thin shale beds are crumpled, broken and sheared where they occur between massive sandstone layers. In places, faults and highly-fractured zones have been sought out by intrusive material such as peridotite and serpentine. Soils of the (770) Pearsoll series have developed from the serpentinitic rocks that indicate unstable zones.

Natural landslides have occurred in unstable zones of bedded formations resulting in deep deposits of soil and rock material that extend from a few feet across to one mile wide. Dominant soils developing on these deposits are the 370, (380) Pollard and 382 series.

Soils developing from sedimentary, volcanic and metamorphic rocks are distributed by the dominating influences of soil temperature, annual precipitation and age or degree of profile development. Soils of the 370, 371, 372, (380) Pollard, 381, 382, (712) Jumpoff, 824 and 825 soils occur in zones receiving more than 35 inches annual precipitation. The 701, (718) Beekman, (719) Manzanita and (781) Colestine soils receive less than 35 inches annual precipitation. The (380) Pollard, 381, 382, (712) Jumpoff and (719) Manzanita soils are older and have more clay. The 824 and 825 soils have mean soil temperatures cooler than 47° F. Coarse-fragment content is higher in soils where more fracturing and shearing of the bedrock occurred and in landslide material.

¹Numbers of references cited will appear in the body of the report preceded by "Ref." This is to distinguish a citation from a soil series symbol.

TABLE 1

GEOLOGIC MATERIALS AND ASSOCIATED SOILS

<u>Kind of Material</u>	<u>Formation</u>	<u>Probable Age</u>	<u>Associated Soils and Misc. Land Type</u>
Sedimentary	Dothan, Galice	Upper Jurassic	370, 371, 372, (380) Pollard, 381, 382, 824, 825
Sedimentary	Umpqua	Upper Eocene	(715) Brader, (716) Debenger
Older Volcanic	Dothan, Galice, Rogue	Upper Jurassic	370, 371, 372, (380) Pollard, 381, 382, 824, 825
Metasedimentary and Metavolcanic	Applegate Group	Upper Triassic	370, 371, 372, (380) Pollard, 381, 382, 701, (712) Jumpoff, (718) Beekman, (719) Manzanita, (781) Colestine, 824, 825
Ultramafic	Unnamed	Upper Jurassic	(770) Pearsoll
Granitoid	Unnamed	Upper Jurassic to Lower Cretaceous	(721) Siskiyou, (722) Holland, (861) Rogue
Andesite, Tuffs, Breccia, etc.	Western Cascades	Upper Eocene to Lower Miocene	(36) Witzel, (704) Carney, 705, (706) Medco, (731) Straight, 732, (741) Freezner, (745) Laurelhurst, 840, 842, 850
Andesite and Basalt	Unnamed	Pliocene to Pleistocene	(36) Witzel, (704) Carney, 705, (706) Medco, (740) Geppert, (750) Dumont, 790, 806, 809, 810, 840, 842, 850, 880, 882
Alluvium	Unnamed	Recent	1, (710) Coker

Intrusive granitoid rocks are a family of light-colored, coarse-grained, strongly-weathered rocks commonly referred to locally as "decomposed granite." These rocks occur in large bodies in the West Evans Creek watershed, upper Williams Creek watershed, the Grants Pass area, Ashland Creek watershed and in other, smaller bodies scattered in the Siskiyou Mountains. These rocks exhibit a high degree of instability when excavated. Soils with a high sand content have developed from these rocks. They are the (721) Siskiyou, (722) Holland and (861) Rogue soils. The Rogue soils have mean soil temperatures cooler than 47° F.

General distribution of major volcanic rock units of the Cascade Range from west to east are: older, massive flows of dark-gray, basaltic andesite and gray andesite mixed with light-colored tuffs and breccia; and younger flows of basalt and andesite with mixed flows of tuffs and breccia that cap the high Cascades.

The older rocks are volcanic flows and flow breccias, interbedded with fragmented products of explosive volcanic action. This group comprises a great variety of volcanic rocks including dense andesite and flow breccias and direct products of explosive eruptions ranging from agglomerates to fine-grained white tuff. This assemblage of rocks has been called the volcanics of the Western Cascades. The younger rocks of the high Cascades are similar in origin but mostly consist of basalt and andesite flows.

Twenty soil series occur on the volcanic rocks of the Cascades. Some of the reasons for the diversity of soils are: (1) differences in climatic conditions, (2) differences in the thickness of the soil associated with differences in age and mineralogical composition of the rocks which affects rate of weathering and (3) differences in the amount of coarse fragment in the soil profiles.

The (36) Witzel, (704) Carney, 705, (706) Medco, (745) Laurelhurst and 790 soils have mean soil temperatures above 47° F. and receive 18 to 35 inches annual precipitation. They have clayey subsoils except the loamy (36) Witzel series. The (704) Carney and 790 soils have large amounts of montmorillonitic clay with a high shrink/swell ratio. The 790 soils receive less than 18 inches annual precipitation.

Soils of the (731) Straight, 732, (740) Geppert, (741) Freezner and (750) Dumont series have mean soil temperatures above 47° F. and receive more than 35 inches annual precipitation. The (741) Freezner and (750) Dumont soils occupy less steep terrain, are older and more strongly developed and have clay-textured subsoils.

Soil series 806, 809, 810, 840, 842, 850, 880 and 882 have mean annual soil temperatures below 47° F. The 880 and 882 soils receive less than 35 inches annual precipitation. The 840, 842 and 850 soils have developed from older, more strongly-weathered volcanic rocks and have clay-textured subsoils. Series 850 has large amounts of montmorillonitic clay and occupies the moderately-sloping terrain.

Soils having more than 35 percent of their volume composed of gravel, cobbles and stones are separated at the family level in the soil classification system from those that contain less than 35 percent coarse fragments. Soils developing from hard volcanic rock usually contain more coarse fragments than soils derived from softer material. Soils of the (704) Carney, (706) Medco, (741) Freezner, (745) Laurelhurst, (750) Dumont, 850 and 880 series have fewer than 35 percent coarse fragments by volume.

The (710) Coker soils and (1) alluvial land, a miscellaneous land type, are derived from stream alluvium. The (710) Coker soils have large amounts of montmorillonitic clay. (1) Alluvial land has variable characteristics.

C. Land Form

Major kinds of land forms in the Medford District include (1) flood-plains and low stream terraces, (2) moderately steep to steep hills with benched sideslopes and rounded ridges, (3) steep to very steep canyon walls and mountainous areas with sharp ridges and (4) moderately steep to steep and very steep ridges and sideslopes of major volcanic uplands. Certain kinds of soils are associated with each of these principle land forms and slope positions.

The ground conditions encountered in the field are the direct result of geologic processes operating on and within the earth. Such processes are the movement of surface and subsurface water, weathering, changes in structure of the earth's crust and volcanism. The land features also are the result of the same processes having operated in the geologic past. These processes are often interrelated and the ground features may be the composite result.

Intensity and importance of many geologic processes in any specific area are dependent upon slope gradient and aspect, elevation, climate, geologic material and time. Variation in any one or combination of these can result in totally different land form. For example, landslide activity is more common where the rocks are strongly folded and fractured, especially in high-precipitation zones. Such areas are marked by hummocky terrain below steep headwalls. In low-precipitation zones, the weathering process is slower and there are fewer of these land features.

Different kinds of rock and rock structures have a strong influence upon the shape of the earth's surface.

Igneous rocks originate from a molten mass deep below the earth's surface. Those that solidify within the upper layers of the earth's crust cool slowly, are coarse grained and are called intrusive. Those that flow or are blown out onto the surface of the earth are called extrusive.

The intrusive igneous rocks in the District are the strongly-weathered, granitoid rocks referred to locally as "decomposed granite." Sandy or coarse-textured soils that are easily eroded are derived from these rocks, hence, the high-density stream dissection pattern of the landscape.

The extrusive igneous rocks vary from medium- to fine-grained lava flows and volcanic ejecta ranging from coarse, angular blocks to cinders and fine-grained ash. The various degrees of hardness and mineral grain size of these mixed materials affects their rate of weathering. This results in sculpture of the land surface mainly by mass wasting. The terrain is marked by massive rock bluffs and rotational slumps and basins below steep headwalls. This kind of topography characterizes much of the Western Cascades. The more stable terrain and less sloping surfaces are supported by the dominantly harder volcanic rocks of the high Cascades.

Sedimentary rocks are derived from the disintegration, transportation and deposition of materials from preexisting parent rock. They are divided into two principal groups: (1) mechanical, or clastic sediment, in which transportation and deposition have been chiefly by mechanical means; and (2) chemical sediments, in which the material has been carried in solution and later precipitated. The clastic sediments consist of such rock strata as conglomerate, sandstone, siltstone and shale, whereas the chemical sediments include mostly limestones, dolomites, chert and others.

The strength or stability of sedimentary rocks depends upon a number of conditions, including kind of interbedded materials, thickness of individual layers and degree of folding and faulting of the rock strata. In general, the thin-bedded and "soft" strata, and interbedded sequence of firm, massive layers and soft, weak layers, will be less stable. Uneven mountain sideslopes, saddles and benched spur ridges are some land forms indicating rock weaknesses.

Metamorphic rocks are formed from previously-existing igneous or sedimentary rocks by the action of heat or pressure or both. The dynamic stresses to which these rocks have been subjected caused the development of foliation, which implies the ability to split along approximately parallel surfaces due to the distribution of layers or lines of one or more prominent minerals in the rock. Fractures and faults in metamorphic rocks produce some of the same land forms as these structural features do in sedimentary rocks.

Alluvial formations have developed where valleys have become wider and stream gradients gentler.

General productivity of forest soils and bedrock stability in the Medford District can be related to certain land forms. Low productive sites usually are on slopes with very steep gradients and on the highest slope positions. The most productive sites are the least stable and occupy hummocky terrain where seeps and springs and high water tables occur.

V. SOILS

A. Descriptions for the General Soil Map

The general soil map at the back of this report shows soil associations in the Medford District (Ref. 14). This map is very general in nature and should not be confused with the more detailed soils map that also consists of soil association units. A soil association is a landscape that has a distinctive proportional pattern of soils. It normally consists of one or more major soils and at least one minor soil, and it is named for the major soils. The soils in one association may occur in another but in a different pattern.

The general soil map is useful to people who want a general idea of the soils and want to compare different parts of the inventory area. It is also useful as a general guide to managing a watershed or wildlife area.

Each of the following general map unit descriptions identifies the geology, land form, climate, major soils and some of their uses and behavior. The terms for texture used in the title of an association apply to the sub-soil of the major soils.

Soils on Floodplains and Terraces

1. (1) Alluvial Land General Unit

This unit is a miscellaneous land type of cultivated and noncultivated soils of the nearly level floodplains and gently sloping, low stream terraces. Coarse riverwash material and mine tailings occur along major drainageways. This unit makes up about 2 percent of the inventory area.

(1) Alluvial land comprises almost all of this general unit. These lands mostly are in private ownership but few, scattered public lands occur on the lowland positions. Soil characteristics and soil behavior are widely varied. Flooding and high water table are hazards on the floodplain for locating buildings, sewage disposal systems and low bridges.

Predominantly Shallow Soils

2. (36) Witzel - (R) Rock Land General Unit

This unit occurs on steep to very steep foothills underlain by pyroclastic and volcanic flow rocks in the Western Cascade Mountains. This unit makes up about 1 percent of the inventory area.

The (36) Witzel soils comprise about 60 percent of the unit and occur at random on steep slope positions. (R) Rock land makes up about 40 percent of this unit and occupies the steeper ridge tops and rims of flat-topped hills. Inclusions of 705 soils dominantly occur on less steep slope positions.

The soils of this general unit are used mainly for range and wildlife. They are droughty and support a sparse vegetative cover of grass, shrubs and hardwoods. Accessibility for livestock is difficult on the steeper positions.

3. 790 General Unit

This unit is on moderately steep to steep slopes underlain by volcanic flow material and diatomite in the Klamath Basin. It comprises about 1 percent of the inventory area.

The 790 soils comprise most of the unit. Inclusions consist of 882 soils on some steep northerly aspects.

This unit is used for range, wildlife and watershed. Annual precipitation is less than 16 inches. These droughty soils support a cover of native grass and shrub species.

4. (770) Pearsoll - (R) Rock Land General Unit

This unit occurs on steep to very steep slopes underlain by serpentine bedrock in the Siskiyou Mountains. It makes up about 1 percent of the inventory area.

The (770) Pearsoll soils comprise about 60 percent of the unit and occur with the (R) rock land at random. (R) Rock land makes up approximately 40 percent of the unit.

This unit supports a scrubby tree and brush cover and is used for wildlife and watershed. Geologic faulting and seeps and springs are common.

5. 372 - 371 - (R) Rock Land General Unit

This unit occupies very steep and steep mountain slopes underlain by sedimentary and metamorphic bedrock in the Siskiyou Mountains. It comprises about 7 percent of the inventory area.

The 372 soils make up about 50 percent of the unit and occur on the steepest slopes and ridges. The 371 soils make up about 40 percent of this unit. (R) Rock land makes up about 10 percent of the unit and occurs randomly mixed with the 372 soils.

Soils of this unit have a low or very low site class for timber. Open areas on southerly aspects are important for deer winter range. Large amounts of gravel in the surface layer hinder reforestation.

Warm Soils Receiving Less Than 35 Inches Precipitation

6. (716) Debenger - (715) Brader General Unit

This unit consists of moderately deep and shallow loamy soils over sedimentary rocks on gently sloping to very steep footslopes of the Western

Cascade Mountains. It comprises approximately 1 percent of the inventory area.

The (716) Debenger soils make up about 55 percent of the unit and (715) Brader soils occupy about 45 percent of the unit. The soils are mixed at random.

Vegetation on this unit mostly is grassland and scattered hardwood species. Some pine and cedar are mixed near zones of higher precipitation. The soils are used for range, wildlife and watershed.

7. (718) Beekman - 701 - (719) Manzanita General Unit

This unit consists of gravelly moderately deep and shallow loamy soils, and deep clayey soils on steep to very steep mountain slopes underlain by metamorphic and sedimentary rocks of the Siskiyou Mountains. It comprises about 5 percent of the inventory area.

The (718) Beekman soils make up about 75 percent, 701 soils make up about 20 percent and (719) Manzanita soils comprise about 5 percent of the general unit.

The (718) Beekman soils and 701 soils are mixed on the steepest topography. (719) Manzanita soils occur on rounded ridges, benched sideslopes and lower slope positions.

Drier parts of the unit are marked dominantly by grassland and hardwood species. Southerly aspects are important for deer winter range where abundant browse species occur. Northerly aspects and drainageways support timber but are low productive sites.

8. (718) Beekman - (781) Colestine - (719) Manzanita General Unit

This unit consists of moderately deep loamy soils and deep clayey soils on moderately steep through steep to very steep foothills and mountains. Soils of this unit are underlain by metamorphic and sedimentary rock of the Siskiyou Mountains. It comprises about 17 percent of the inventory area.

The (718) Beekman soils make up about 50 percent of the unit. (781) Colestine soils occupy about 40 percent of the unit and occur randomly mixed with the (718) Beekman soils on steeper slopes. The (719) Manzanita soils make up about 10 percent of the unit and occur on benched slopes and on slower slope positions.

Drier parts of the unit are marked by grassland and an abundance of hardwoods. Southerly aspects are critical deer winter range areas where browse species occur. Northerly aspects support commercial timber but also are important wildlife cover areas.

9. (712) Jumpoff - (718) Beekman General Unit

This unit is comprised of moderately well-drained, deep clayey soils and moderately deep, loamy soils on moderately steep to steep mountain slopes underlain by metamorphic rock in the Siskiyou Mountains. It makes up about 1 percent of the inventory area.

The (712) Jumpoff soils occupy approximately 90 percent of the unit. (718) Beekman soils occupy about 10 percent of the unit and occur on the steeper slopes.

These soils are forested but have a low site class for commercial timber. Gravelly surface conditions hinder establishment of bare-root tree plantings. The soils contribute large amounts of colloidal material to major streams.

10. (706) Medco - (36) Witzel - 705 General Unit

This unit is made up of moderately well-drained, clayey soils; shallow, cobbly, loamy soils; and moderately deep, cobbly, clayey soils on moderately steep to very steep slopes in the Western Cascade Mountains. The unit occupies about 12 percent of the inventory area.

The (706) Medco soils comprise about 45 percent of the unit and occur on benched sideslopes and lower slope positions. (36) Witzel soils make up about 35 percent of this unit and are mixed with the 705 soils that make up about 20 percent of the unit.

These soils are mostly used for range, wildlife and watershed. Southerly aspects are in critical deer winter range where management of livestock will affect suitability for wildlife. Low timber sites on northerly aspects are important cover habitat for wildlife.

11. (745) Laurelhurst - (706) Medco General Unit

This unit consists of moderately well-drained and well-drained clayey soils on moderately sloping to steep slopes underlain by volcanic rocks of the Western Cascade Mountains. The unit makes up about 4 percent of the inventory area.

The (745) Laurelhurst soils comprise about 60 percent of the unit and occur on steeper, convex-shaped slopes. The (706) Medco soils comprise about 40 percent of the unit and occupy the benched and lower slope positions.

Timber site classes are low on this unit. The regeneration hazard from bare-root planting is severe. This unit is transitional to deer winter areas and conflicts between wildlife-cover requirements and timber harvest may occur. These soils contribute large amounts of colloidal sediments to streams and reservoirs.

Warm Soils Receiving More Than 35 Inches Precipitation

12. 371 - 372 - 370 General Unit

This unit is made up of very gravelly, loamy soils on steep to very steep terrain underlain by metamorphic and sedimentary rocks in the Siskiyou Mountains. The unit comprises about 17 percent of the inventory area.

The moderately deep 371 soils make up about 45 percent of the unit; the shallow 372 soils make up about 35 percent of the unit; and the deep 370 soils make up about 20 percent of the unit. The soils are randomly mixed throughout the unit but generally the shallow soils are on the steeper slopes and sharp ridges. Deeper soils occur on benches, lower slopes, and adjacent to drainageways. Important inclusions of clayey soils occupy rounded ridges, benched sideslopes and lower slope positions with the 370 soils.

These soils are used for timber production. The dominant soils have a low site class for commercial timber due to a low water-holding capacity. Large amounts of gravel in the surface layer hinder establishment of tree seedlings.

13. 370 - 382 - 371 General Unit

This unit consists of deep, very gravelly loamy and clayey soils, and moderately deep, very gravelly loamy soils on moderately steep to very steep slopes underlain by metamorphic and sedimentary rocks of the Siskiyou Mountains. This unit comprises about 7 percent of the inventory area.

The loamy 370 soils make up about 40 percent of the unit and are randomly mixed with the clayey 382 soils that make up about 35 percent of the unit. The loamy 371 soils occupy the steeper slopes and higher positions on the landscape and make up about 25 percent of the unit.

The soils are used for timber production. Road failure is common, especially where the deep soils are dominant on lower slope positions and near drainageways. The unstable soils usually are the most productive timber sites.

14. 381 - (380) Pollard General Unit

This unit comprises moderately deep and deep clayey soils on steep to very steep terrain underlain by metamorphic and sedimentary rocks in the Siskiyou Mountains. The unit comprises about 3 percent of the inventory area.

The very gravelly 381 soils make up about 70 percent of the unit on steeper slope positions. The (380) Pollard soils make up about 30 percent of this unit and usually occupy the less steep positions. Inclusions of loamy soils are randomly mixed with the 381 soils.

These soils are used for timber production. They are subject to compaction when wet and are an important source of stream sediments.

15. (721) Siskiyou - (R) Rock Land General Unit

This unit occurs on very steep slopes underlain by granitoid rocks of the Siskiyou Mountains. The unit is in the northwestern part of the District south and west of the Rogue River. It comprises about 1 percent of the inventory area.

The (721) Siskiyou soils make up about 95 percent of the unit. (R) Rock land makes up about 5 percent of the unit and occupies the steepest sideslopes. Rock outcrop is a prominent feature within the (R) rock land portion of the unit.

The soils are used for watershed, wildlife and timber production. They have a low site class for timber because of droughty soil conditions. The surface erosion is severe.

16. (721) Siskiyou - (722) Holland General Unit

This unit consists of moderately deep and deep soils on foothills and mountain slopes underlain by granitoid rocks in the Siskiyou Mountains. This unit makes up about 4 percent of the inventory area.

The (721) Siskiyou soils mostly occur on steep to very steep mountain sideslopes and make up about 75 percent of the unit. The (722) Holland soils occupy the gently sloping to moderately steep, lower slope positions of the foothills and make up about 25 percent of the unit.

Soils of this unit are used for timber, watershed and wildlife. They are droughty and have a severe forest regeneration hazard. The soils and bedrock are subject to mass wasting when disturbed.

17. (731) Straight - (741) Freezner General Unit

This unit consists of deep clayey soils and moderately deep loamy soils underlain by andesite and basalt flows in the Western Cascade Mountains northeast of Medford. The unit makes up about 2 percent of the inventory area.

The (731) Straight soils occur on steep to very steep mountain slopes and constitute about 65 percent of the unit. The (741) Freezner soils occupy the moderately steep to steep, benched sideslopes and lower slope positions. They constitute about 35 percent of the unit. Inclusions of 732 soils are mixed with (731) Straight soils.

Soils of this unit are used for timber, watershed and wildlife. The unit is marked by bare precipitous cliff and rounded boulders north of the Rogue River. Erosion is a severe hazard. These soils can contribute

large amounts of sediments to streams and reservoirs. Slumping and mass wasting occur where deep road cuts are made on (741) Freezner soils. The regeneration hazard is moderate to severe in this unit.

18. (750) Dumont - (740) Geppert General Unit

This unit occurs on nearly level terraces and moderately sloping to steep mountainous sideslopes in the Cascade Range. The soils are underlain by andesite and basalt flows interbedded with tuff and breccia. The unit comprises about 4 percent of the inventory area.

Deep, clayey (750) Dumont soils make up about 75 percent of the unit and occur on less sloping terrain. The deep, loamy (740) Geppert soils are on the steep to very steep ridges and sideslopes. They make up about 25 percent of the unit.

These soils are used mostly for timber production. Soil compaction and surface erosion are the major hazards associated with timber harvest.

Frigid Soils Receiving More Than 35 Inches Precipitation

19. 824 - 825 General Unit

This unit is comprised of very cobbly or gravelly soils underlain by metamorphic rocks on steep to very steep slopes in the highest parts of the Siskiyou Mountains. They make up about 1 percent of the inventory area.

The moderately deep 824 soils occupy about 55 percent of the general unit. They occur on all slope positions. The shallow 825 soils occupy about 45 percent of the unit. They mostly are on the steepest slopes randomly mixed with the 824 soils.

Soils of this unit mostly are used for timber, watershed and wildlife. They have a low productive capacity because of cool temperatures and droughty soil conditions. Soil erosion and tree regeneration by bare-root planting are severe hazards.

20. (861) Rogue General Unit

This unit occurs on steep to very steep slopes on the highest slope positions underlain by granitoid rock in the Siskiyou Mountains. The unit makes up about 1 percent of the inventory area.

The (861) Rogue soils make up most of the general unit. The soils are used for timber, watershed and wildlife. The soils have a severe erosion hazard and are extremely droughty on southerly aspects. Saturated fill slopes are subject to massive failure.

21. 809 - 810 General Unit

This unit is comprised of very cobbly loamy soils underlain by andesite and basalt flows on the plateau of the Cascade Range. Slope gradients range from nearly level through moderately steep and steep to very steep. The unit occupies about 6 percent of the inventory area.

The moderately deep 809 soils make up about 55 percent of the unit. The soils are randomly mixed on all slope positions. The deep 810 soils make up about 45 percent of the unit.

These soils are used for timber, grazing and wildlife. Tree growth is slow, and grass and rodent invasions occur after timber harvest. Large, buried boulders are encountered during road construction. Most drainage-ways are dry for long periods of time but sediments can be carried to larger streams during snowmelt.

22. 840 - 850 - 842 General Unit

This unit consists of clayey soils underlain by old volcanic rocks of the Western Cascade Mountains. Slope gradients range from gently sloping to very steep. The unit comprises about 2 percent of the inventory area.

The deep 840 soils make up about 45 percent of the unit. The moderately well-drained 850 soils make up about 30 percent of the unit and mostly occur on terraces, lower slopes and in concave positions. The moderately deep, very cobbly 842 soils make up 25 percent of the unit. They usually occur mixed at random with the 840 soils and are on the steepest slopes.

Soils of this unit are used for timber, grazing and wildlife. Tree growth is very slow and natural regeneration and bare-root tree plantings are difficult to establish. Grass and rodent invasions often occur after timber harvest. Soil compaction is a severe hazard. These soils can contribute large amounts of colloidal sediments to streams and reservoirs.

Frigid Soils Receiving Less Than 35 Inches Precipitation

23. 882 - 880 General Unit

This unit is comprised of loamy soils underlain by dense volcanic flows on gently sloping terraces, moderately steep sideslopes and very steep canyon walls of the Cascade Range. The unit makes up about 5 percent of the inventory area.

The very cobbly 882 soils make up about 55 percent of the unit. They occur dominantly on steeper slopes. Rock outcrop is a common inclusion with the 882 soils on canyon walls. The 880 soils make up about 45 percent of the unit. They mostly occur on the nearly level terraces and moderately sloping gradients.

Soils of this unit are used mostly for timber and grazing. The growing season is short but natural regeneration and bare-root pine plantations are successful. Large boulders are encountered during road construction. Soil and bedrock stability is high.

B. Descriptions of Soils Series, Soil Behavior and Mapping Units

In this section, the soils of the Medford District inventory area are listed in numerical order and described. Each soil description has six distinct parts in the following order: (1) an opening paragraph that describes some major soils properties and landscape features; (2) a condensed description of a typical profile of that series; (3) variations or range in characteristics of important physical properties; (4) a discussion of the soil setting that includes general location, geology, land form, climate and comparison with other soils; (5) a discussion of how the soil behaves for different uses; and (6) a description of all the mapping units in which the subject soil is dominant.

Soils names, as well as numbers, are included for those soil series named and commonly used by the Soil Conservation Service. Numbers appear in parenthesis with the named soils for easy reference.

1. Legend for Soil Phases

<u>Slope Symbol</u>	<u>Dominant Slope Range (%)</u>	<u>Slope Name</u>
none	0- 3	nearly level
V	0-10	gently sloping
W	10-35	moderately steep
X	35-60	steep
Y	60+	very steep

<u>Aspect Symbol*</u>	<u>Aspect Name</u>
none	southerly
n	northerly

*No aspect symbol has been used for the serpentinitic (770) Pearsoll soils.

2. Definitions for Soil Depth

<u>Inches</u>	<u>Descriptive Term</u>
0-12	very shallow - included in (R) rock land units
12-20	shallow
20-40	moderately deep
40+	deep

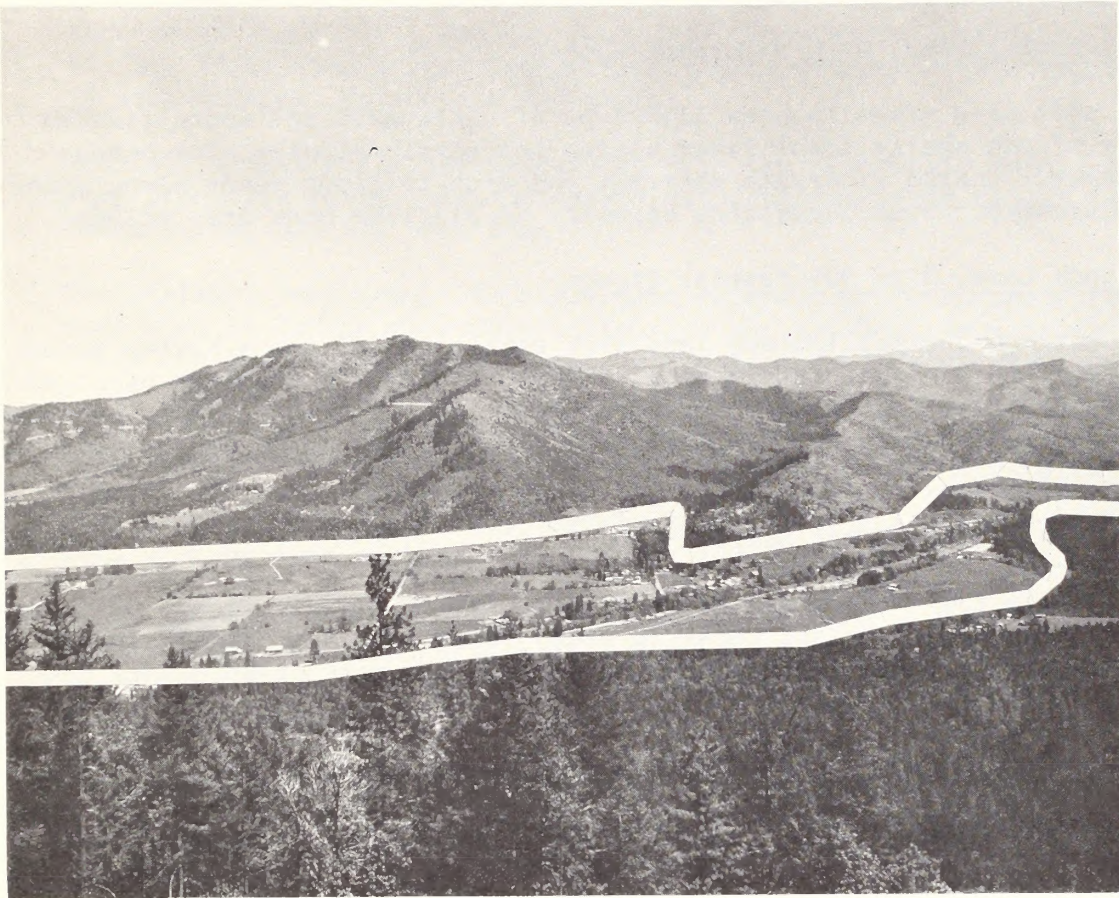


Figure 2. Alluvial soils on nearly level valley terraces and flood-plains are mapped as (1) miscellaneous land type (center). The low hills in the background show the vegetative pattern on 701, (718) Beekman, (719) Manzanita and (781) Colestine soils. They occur in the low precipitation zone of the Siskiyou Mountains.

3. Miscellaneous Land Types

(1) Alluvial Land, 0 to 3 Percent Slopes

This unit is a miscellaneous land type of cultivated and noncultivated soils of the nearly level flood plains and gently sloping, low stream terraces. Coarse riverwash material and mine tailings occur along major drainageways. Some lacustrine deposits in old lake beds are included.

(R) Rock Land, 0 to 90+ Percent Slopes

This unit is a miscellaneous land type consisting of areas having enough rock outcrop and soil less than 12 inches in depth to submerge other soil characteristics. Rock land may offer some light grazing. Trees are usually sparse and scrubby even where the climatic and other conditions are favorable.

4. (36) Witzel Series

The (36) Witzel series consists of shallow, very stony, well-drained soils from basic volcanic rocks in areas receiving less than 35 inches of precipitation. They generally occur on steep to very steep mountainous slopes.

Profile Description: (36) Witzel very stony, silty clay loam.

Surface Soil:	0-4"	Dark brown ¹ , very stony, silty clay loam, friable, neutral. 2-6" thick.
Subsoil:	4-18"	Dark reddish brown, very stony, silty clay loam, firm, slightly acid. 7-18" thick.
Substratum:	18"+	Bedrock.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 70 percent. Surface soil colors are dark brown, brown, or dark grayish brown. Subsoil colors are dark reddish brown, reddish brown, dark brown, or brown. Textures of the surface and sub-surface layers are loam, clay loam, or silty clay loam.

Setting: The (36) Witzel soils occur on moderately steep to very steep foothills at elevations between 1,500 and 6,000 feet. Most areas are on south-facing slopes and all the areas above 4,000 feet have a southerly aspect. Slope gradients range from 35 to 85+ percent. The soils formed in colluvium from basic igneous rocks.

¹Colors are for moist conditions unless noted otherwise.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation is 20 to 35 inches. The mean annual air temperature ranges from 45 to 54 degrees F.: the mean January temperature centers on 37 degrees F., and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 120 to 180 days. The vegetation is oak, madrone, poison oak and grass.

The (36) Witzel soils are associated with the moderately deep, clayey, very stony 705 soils; the moderately well-drained, very clayey (706) Medco soils; and (R) rock land.

The shallow, very stony 732 soils from volcanic rocks in areas receiving more than 35 inches of precipitation and the shallow, very stony 701 soils overlying metamorphic rocks differ from the (36) Witzel soils by being lighter in color.

Soil Behavior: The (36) Witzel soils have a very low moisture-holding capacity because of shallow depth and a high coarse-fragment content. They support open grasslands, brush and hardwood species. Scrubby conifers grow on some northerly aspects. Stones and cobbles limit usage.

Roads are very stable. Side-cast material is very stony and will extend far downslope on steep gradients. Vegetation will not grow on fill slopes because of fractured rock on the surface. Blasting is often necessary during road building.

Good quarry sites are often located in the substratum. The soil mantle is thin but not good material for fills or embankments. The soils are poor sites for stock-watering ponds. Erosion susceptibility is severe.

Recreation development potential is severely limited by soil depth and steep slopes.

Wildlife habitat is good.

Mapping Units:

36-R/XY 12,730 acres. Slopes dominantly are southerly. About 70 percent of the area has slope gradients of 35 to 60 percent and 30 percent of 60 to 85+ percent. This unit contains about 60 percent (36) Witzel soils and 40 percent (R) rock land. The (R) rock land is on the steeper ridge tops and around the rims of flat-topped hills.

Minor inclusions of light colored, shallow 732 soils occur at random; and of the moderately deep 705 soils occur on the lower, uneven slopes.

36-R/XYn 1,770 acres. Slopes dominantly are northerly. About 70 percent of the area has slope gradients of 35 to 60 percent and 30 percent of 60 to 85+ percent. This unit contains about 60 percent (36) Witzel soils and 40 percent (R) rock land. The (R) rock land is on the steeper ridge tops and around the rims of flat-topped hills.

Minor inclusions of light colored, shallow 732 soils occur at random; and of the moderately deep 705 soils occur on the lower, uneven slopes.

36-R/Y 3,770 acres. Slopes dominantly are southerly and with gradients of 60 to 85+ percent. This unit contains about 55 percent (36) Witzel soils and 45 percent (R) rock land. The (R) rock land is on the sharp crests of mountain ridges.

Minor inclusions of moderately deep 705 soils occur on the lower parts of the areas.

36-705/XY 8,140 acres. Slopes dominantly are southerly. About 70 percent of the slopes are 35 to 60 percent, and 30 percent are 60 to 85+ percent. This unit contains about 60 percent of the shallow (36) Witzel soils and 40 percent moderately deep 705 soils. The (36) Witzel soils are on the steeper slopes.

Minor inclusions of the very clayey (704) Carney and of the moderately well-drained (706) Medco soils are mingled with the 705 soils on less steep positions.

36-705/XYn 550 acres. Slopes dominantly are northerly. About 70 percent of the slopes have gradients of 35 to 60 percent and 30 percent of 60 to 85+ percent. This unit contains about 60 percent (36) Witzel soils and 40 percent 705 soils. The (36) Witzel soils are on the steeper slopes.

Minor inclusions of the very clayey (704) Carney and of the moderately well-drained (706) Medco soils are mingled with the 705 soils on the northerly slopes. Small areas of the deep (745) Laurelhurst soils also occur on benches of the lower slopes.

5. 370 Series

The 370 series consists of deep, very gravelly, loamy, well-drained soils from sedimentary and metamorphic rocks in areas receiving over 35 inches of precipitation. They occur on moderately steep to steep and very steep mountainous slopes.

Profile Description: 370 gravelly loam.

Surface Soil:	0-8"	Very dark grayish brown, gravelly loam, friable, medium acid. 2-10" thick.
Subsoil:	8-45"	Brown, very gravelly loam, friable, medium acid. 30-50" thick.
Substratum:	45'+	Fractured metamorphic bedrock.

Variations: Depth to bedrock ranges from 40 to more than 60 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are very dark brown, dark brown, or very dark grayish brown. Subsoil colors are dark brown, brown, dark yellowish brown, or strong brown. Surface textures are silt loam, gravelly silt loam, loam, or gravelly loam. Subsoil textures are very gravelly silt loam, very gravelly loam, or very gravelly light clay loam.

Setting: The 370 soils occur on moderately steep to very steep sideslopes of the Siskiyou Mountains at elevations of 1,500 to 4,000 feet. Areas below 2,500 are on north-facing slopes. Slope gradients range from 10 to 85 percent but most are steeper than 35 percent. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The winters are cool and moist and the summers are warm and dry. Mean annual precipitation ranges from 35 to 70 inches. The mean annual air temperature ranges from 50 to 54 degrees F.; the mean January temperature centers on 35 degrees F., and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 110 to 150 days. The native vegetation consists of Douglas-fir, incense-cedar and ponderosa pine with an understory of shrubs and forbs.

The 370 soils are associated with soils of the moderately deep, very gravelly, loamy 371 series; the shallow, very gravelly 372 series; the moderately deep, clayey, very gravelly 381 series; and the deep, clayey (330) Pollard and very gravelly, clayey 382 series. On adjacent drier sites and south slopes, the 370 soils are associated with soils of the 701, (718) Beekman, (719) Manzanita and (781) Colestine series.

The 370 soils are lighter colored than the deep, very cobbly (740) Geppert soils which are from volcanic rocks.

Soil Behavior: The 370 soils are forested with a dominant overstory of Douglas-fir. Mixed stands, including pine and hardwood species, generally occur where there is less available soil moisture, although big-leaf maple indicates more moist spots. Available moisture content is mainly affected by the amount of coarse fragments in the soil profile. Other factors, such as plant competition, depth and aspect, are important. Site class is higher where water seeping from rock strata keeps

the subsoil, or rooting zone, moist during the growing season. Water-holding capacity is low.

Conditions that affect the success of regeneration are the amount of coarse fragments in the surface layer and the kind and amount of plant competition. The regeneration hazard generally is slight. When total plant cover is removed, soil material is washed away, leaving gravel and cobbles on the surface that hinders reestablishment of trees. Brush is a strong competitor for available moisture where annual precipitation is high. Erosion susceptibility is severe.

Loss of organic matter in the thin surface layer by scalping will drastically lower productive capacity. Cable yarding should be used on slopes greater than 35 percent. Tractor yarding on more gentle slopes usually will not cause adverse compaction because of dominantly loamy soils with a high coarse-fragment content. Benched and concave slopes should be avoided when the soils are wet. Water bars for erosion control are very difficult to construct on steep slopes in this gravelly, loamy material.

Moisture content, depth of excavation and position on slope are important factors influencing stability of these soils. Some raveling occurs on deep cut slopes. Small pockets of 370 soils will slump onto roadways when excavated. Massive slides may occur when they become saturated. Seeps and springs are common in large bodies of 370 soils. Small drainageways contain water late into the dry season.

Upper layers of bedrock usually are highly fractured and easily excavated. The rock is of poor quality for road surfacing.

The soil and substrata material are not suitable for ponds. Fills made of this material will fail when culverts become plugged.

Recreation development potential is limited because of steep slopes and very gravelly or cobbly soil material. These soils are adequate for subsurface sewage disposal if slope gradient is not limiting.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

370-382-371/XW 11,850 acres. Slopes dominantly are southerly. About 70 percent of the slopes are 35 to 60 percent gradients and 30 percent are 10 to 35 percent. This unit contains about 40 percent of the loamy 370 soils, 35 percent of the very gravelly, clayey 382 soils and 25 percent of the moderately deep, very gravelly 371 soils. The 370 and 382 soils mostly occur intermingled on benches and on middle and lower slope positions. The 371 soils are on the steeper slopes.

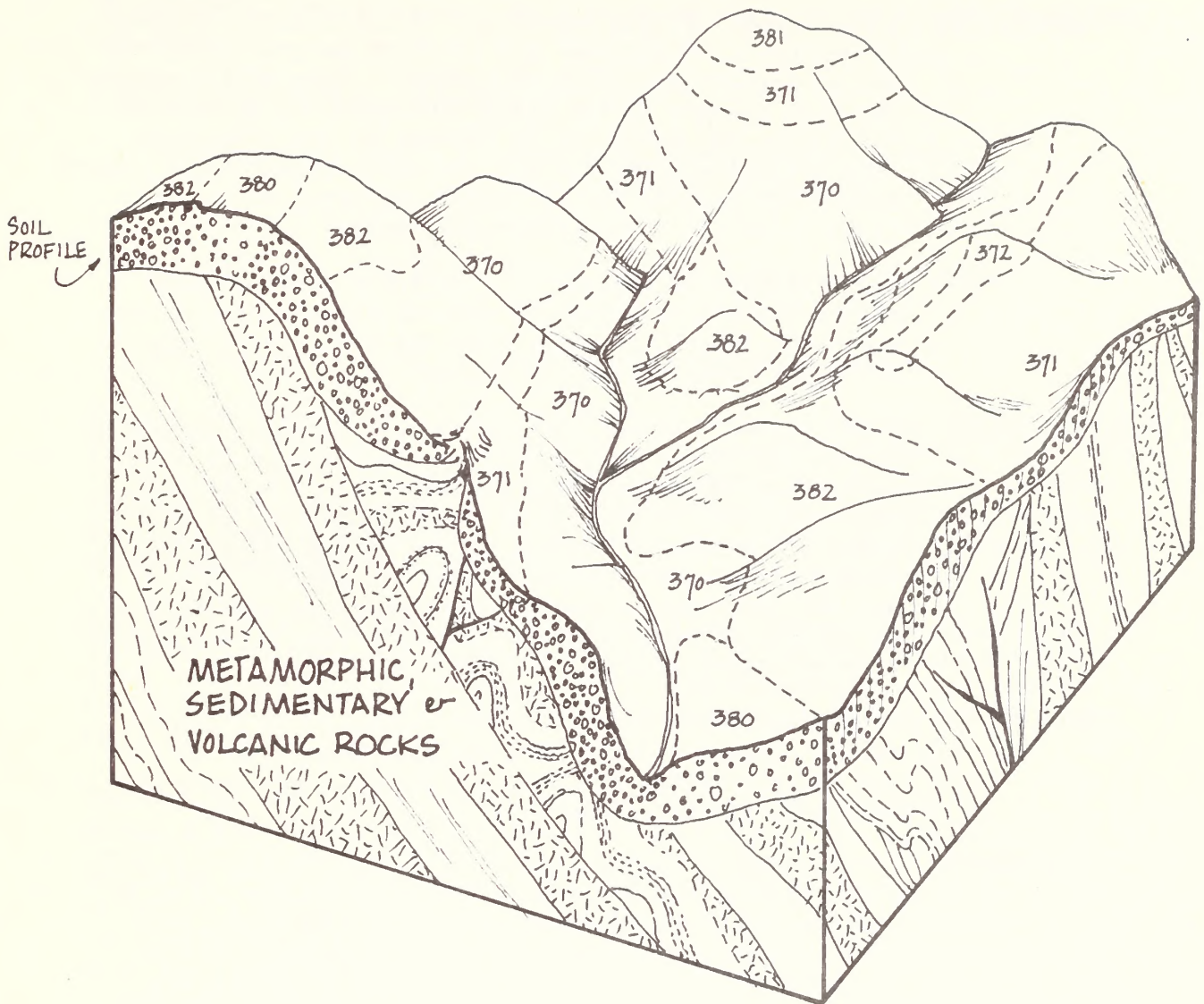


Figure 3. Block diagram depicting where soils 370, 382 and 371 mostly occur upon various topographic positions within the 370-382-371 association.

Minor inclusions consist of the clayey (380) Pollard series mingled with the 370 and 382 series; and of the clayey 381 series with the 371 series. Wet spots are common on gentle slopes.

370-382-371/XWn 8,740 acres. Slopes dominantly are northerly. About 70 percent of the slopes are 35 to 60 percent gradients and 30 percent are 10 to 35 percent. This unit contains about 40 percent of the loamy 370 soils, 35 percent of the clayey 382 soils and 25 percent of the moderately deep 371 soils. The 370 and 382 soils mostly occur intermingled on benches and on middle and lower slope positions. The 371 soils are on the steeper slopes.

Minor inclusions consist of the clayey (380) Pollard series mingled with the 370 and 382 series; and of the moderately deep 381 series with the 371 series. Wet spots are common on gentle slopes.

370-382-371/XY 28,990 acres. Slopes dominantly are southerly and about 70 percent of the area has slope gradients of 35 to 60 percent and 30 percent has gradients of 70 to 85 percent. This unit consists of about 35 percent of the loamy 370 soils, 35 percent of the clayey 382 soils and 30 percent of the moderately deep 371 soils. The 370 and 382 soils mostly occur intermingled on benches and on middle and lower slope positions. The 371 soils are on the steeper slopes.

Minor inclusions consist of the clayey (380) Pollard series mingled with the 370 and 382 series; and of the 381 and 372 series with the 371 series. Wet spots are common on gentle slopes.

370-382-371/XYn 47,950 acres. Slopes dominantly are northerly and about 70 percent of the area has slope gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85 percent. This unit consists of about 35 percent of the loamy 370 soils, 35 percent of the clayey 382 soils and 30 percent of the moderately deep 371 soils. The 370 and 382 soils mostly occur intermingled on benches and on middle and lower slope positions. The 371 soils are on the steeper slopes.

Minor inclusions consist of the clayey (380) Pollard series mingled with the 370 and 382 series; and of the moderately deep 381 and shallow 372 series with the 371 series. Wet spots are common on gentle slopes.

6. 371 Series

The 371 series consists of moderately deep, very gravelly, loamy, well-drained soils from metamorphic rocks in areas receiving more than 35 inches of precipitation. They occur on steep to very steep mountainous slopes.

Profile Description: 371 gravelly loam.

Surface Soil:	0-7"	Very dark grayish brown, gravelly loam, friable, medium acid. 2-10" thick.
Subsoil:	7-35"	Brown, very gravelly loam, friable, medium acid. 10-35" thick.
Substratum:	35"+	Fractured metamorphic bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are very dark brown, dark brown, or very dark grayish brown. Subsoil colors are dark brown, brown, dark yellowish brown, or strong brown. Surface textures are silt loam, gravelly silt loam, loam, or gravelly loam. Subsoil textures are very gravelly silt loam, or very gravelly loam.

Setting: The 371 soils occur on steep to very steep sideslopes of the Siskiyou Mountains at elevations of 1,500 to 4,000 feet. Areas below 2,500 feet are on north-facing slopes. Slope gradients range from 35 to 85 percent. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The winters are cool and moist and the summers are warm and dry. Mean annual precipitation ranges from 35 to 70 inches. The mean annual air temperature ranges from 50 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period ranges from 110 to 150 days. The native vegetation consists of Douglas-fir, incense-cedar and ponderosa pine with an understory of shrubs, forbs and grasses.

The 371 soils are associated with soils of the shallow, very gravelly 372 series; the deep, very gravelly, loamy 370 series; the moderately deep, clayey, very gravelly 381 series; the deep, clayey (380) Pollard and very gravelly, clayey 382 series. On adjacent drier sites at lower elevations and on south-facing slopes are soils of the 701, (718) Beekman, (719) Manzanita and (781) Colestine series. At higher elevations are the colder 824 and 825 soils.

The 371 soils are more acid than the similar (718) Beekman soils. They are browner than the (731) Straight soils from volcanic rocks. The (781) Colestine soils are less acid and less gravelly than the 371 soils.

Soil Behavior: The 371 soils support a mixed stand of conifer and hardwood species. Douglas-fir and ponderosa pine are dominant. Madrone, black oak and tanoak become more abundant where available soil moisture for plants is less. This is usually on steeper slopes, southerly aspects and near zones of lower rainfall. Available moisture is mostly affected by the amount of coarse fragments in the soil profile and depth of soil. Productivity is low and directly affected by these factors. Available water-holding capacity is low. The regeneration hazard is severe.

Large amounts of coarse fragments in the surface layer restrict the success of bare-root plantings. Removal of plant cover will result in a loss of soil material by erosion and the buildup of coarse fragments. This reduces water-storage capacity as well as productivity. Erosion susceptibility is severe.

Cable yarding causes the least disturbance of the surface layer. Although tractor logging does not adversely affect soil structure, bare soil in skid trails is a source of stream pollution. Construction of effective water bars is very difficult on steep slopes in this very gravelly, loamy material.

Cut-slope stability is good but minor failures may occur where the bedrock is highly fractured or where rock layers are inclined toward the excavation. Some slumping of the soil mantle onto the roadway may occur.

Most roadbeds will be in the rock substratum and surfacing of these places may not be necessary. On very steep slopes, side-cast material will extend far downslope and reduce productivity. Coarse rock material is not a suitable seedbed and fill slopes will remain devoid of vegetation for several years.

Some sources of good pit run rock occur in the substratum of 371 soils. In most places, the bedrock is easily excavated by earth-moving equipment. The soil does not make good fill or embankment material. Ponds often fail.

Recreation development potential is limited because of steep slopes and very gravelly or cobbly soils. Steep drainageways usually do not contain water except when runoff is diverted from roads.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

371-372-370/XY 101,410 acres. Slopes dominantly are southerly. About 70 percent of the area has slope gradients of 35 to 60 percent and 30 percent has 60 to 90+ percent. This unit consists of about 45 percent moderately deep 371 soils, 35 percent shallow 372 soils, 20 percent deep 370 soils, and minor clayey-skeletal 382 soils and clayey (380) Pollard soils.

The 371 soils occupy the middle and upper slope positions of this unit. The 372 soils occur on the ridges and steepest sideslopes. The 370 soils mostly occur on benches, in drainageways and below very steep headwalls. Soils of the 382 and (380) Pollard series are on lower slopes adjacent to streams.

Minor inclusions of the moderately deep, clayey, very gravelly 381 soils occur at random on rounded ridges and steeper slopes with the 371 soils. Small amounts of (R) rock land occur with the 372 soils. Some unclassified coarse-loamy soils occur in the Evans Creek watershed.

371-372-370/XYn 86,940 acres. Slopes dominantly are northerly. About 70 percent of the area has slope gradients of 35 to 60 percent and 30 percent has 60 to 90+ percent. This unit consists of about 45 percent moderately deep 371 soils, 35 percent shallow 372 soils, 20 percent deep 370 soils, and minor amounts of clayey-skeletal 382 soils and clayey (380) Pollard soils.

The 371 soils occupy the middle and upper slope positions of this unit. The 372 soils occur on the ridges and steepest positions. The 370 soils mostly occur on benches, in drainageways and below very steep headwalls. Soils of the 382 and (380) Pollard series are on lower slopes adjacent to major tributary streams.

Minor inclusions of the moderately deep, clayey 381 soils occur at random on rounded ridges and steeper slopes with the 371 soils. Small amounts of (R) rock land occur with the 372 soils. Some unclassified coarse-loamy soils occur in the Evans Creek watershed.

7. 372 Series

The 372 series consists of shallow, very gravelly, well-drained soils from metamorphic rocks in areas receiving more than 35 inches of precipitation. They occur on steep to very steep mountainous slopes.

Profile Description: 372 very gravelly loam.

Surface Soil:	0-4"	Dark yellowish brown, gravelly loam, friable, slightly acid. 2-6" thick.
Subsoil:	4-18"	Brown, very gravelly, clay loam, friable, moderately acid. 6-18" thick.
Substratum:	18"+	Fractured metamorphic rock.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 70 percent. Surface soil colors are dark brown, brown, or dark yellowish brown. Subsoil colors are yellowish brown, strong brown, brown, or reddish brown. Textures of the surface and subsoil layers are very gravelly loam or very gravelly clay loam.

Setting: The 372 soils occur on steep to very steep mountainous slopes at elevations of 1,500 to 4,000 feet. Areas below 2,500 feet are generally on north slopes. Slope gradients range from 35 to 85+ percent with most areas being steeper than 50 percent. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 80 inches. The mean annual air temperature ranges from 47 to 52 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period ranges from 100 to 160 days. Vegetation consists of Douglas-fir, ponderosa pine, madrone, incense-cedar and an understory of shrubs and forbs.

The 372 soils are associated with the moderately deep, very gravelly 371 soils; the deep, very gravelly 370 soils; and (R) rock land. Adjacent areas receiving less than 35 inches of precipitation and on south-facing slopes have soils of the shallow, very gravelly 701 series; the moderately deep, very gravelly (718) Beekman series; and the moderately deep, non-skeletal (781) Colestine series.

The 372 soils differ from the shallow, very gravelly 732 soils that overlie basic volcanic rocks by being more brown or yellow. They differ from the shallow, skeletal soils of the (36) Witzel and 701 soils by being more acid. Soils of the (36) Witzel and 701 series are in areas receiving less than 35 inches of precipitation and support more oak and open grassland than the 372 soils.

Soil Behavior: Soils of the 372 series are extremely droughty and have a low capacity to produce timber. The soils support mixed stands of hardwoods and conifers. Ponderosa pine, Douglas-fir, tanoak, madrone and canyon live oak are the dominant tree species. Conifers may be nonexistent on south aspects or near zones of low precipitation.

Bare-root plantings usually are failures because of the very low moisture availability of the soils. This is caused by shallow depth and high coarse-fragment content.

Cable and tractor yarding on these soils will result in exposed areas susceptible to severe erosion. Excessive slope gradients and soil physical properties preclude construction of effective water bars.

Roads are very stable except where bedrock is deeply fractured in fault zones. Side-cast material usually extends far downslope and consists mostly of fractured rock. Roadbeds are in the rock substratum and

surfacing may not be necessary. Good construction rock generally occurs beneath 372 soils. The bedrock can be ripped in some places but blasting is usually necessary.

The soil does not make good fill or embankment material. Ponds will fail.

Recreation development potential is severely limited because of very steep slopes and very gravelly or cobbly shallow soils. Rock outcrop is commonly associated with these soils. Drainageways usually do not contain water except when runoff is diverted from roads.

Food and cover for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

372-371/Y 23,150 acres. Slopes dominantly are southerly and have gradients of 60 to 90+ percent. This unit contains about 60 percent of the shallow 372 soils and 40 percent of the moderately deep 371 soils. Both soils occur on all slope positions in a complexly mixed pattern.

Inclusions of (R) rock land occupy the steepest slopes and ridges. The deep 370 soils occur in spots at random on middle and lower slope positions. Some gradients are less than 60 percent.

372-371/Yn 43,570 acres. Slopes dominantly are northerly and have gradients of 60 to 90+ percent. This unit contains about 60 percent of the shallow 372 soils and 40 percent of the moderately deep 371 soils. Both soils occur on all slope positions in a complexly mixed pattern.

Inclusions of (R) rock land occupy the steepest slopes and ridges. The deep 370 soils occur in spots at random on middle and lower slope positions. Some gradients are less than 60 percent.

372-R/Y 23,690 acres. Slopes dominantly are southerly and have gradients of 60 to 90+ percent. This unit contains about 70 percent of the shallow 372 series and 30 percent of (R) rock land. The (R) rock land is on the steeper slopes that generally are near the tops of foothills and mountains.

Minor inclusions of the moderately deep 371 soils are randomly mingled with the 372 soils. Some gradients are less than 60 percent.

372-R/Yn 2,650 acres. Slopes dominantly are northerly and have gradients of 60 to 90+ percent. This unit contains about 70 percent of the shallow 372 series and 30 percent of (R) rock

land. The (R) rock land is on the steeper slopes that generally are near the tops of foothills and mountains.

Minor inclusions of the moderately deep 371 soils are randomly mingled with the 372 soils. Some gradients are less than 60 percent.

8. (380) Pollard Series

The (380) Pollard series consists of deep, red, clayey, well-drained soils from metamorphic and sedimentary rocks in areas receiving more than 35 inches of precipitation. They occur on moderately sloping to very steep mountainous slopes.

Profile Description: (380) Pollard clay loam.

Surface Soil:	0-9"	Dark brown clay loam, friable, slightly acid. 6-15" thick.
Subsoil:	9-55"	Yellowish red clay, firm, very sticky, very plastic, medium acid. 25-50" thick.
Substratum:	55"+	Fractured metamorphic bedrock.

Variations: Depth to bedrock ranges from 40 to 60+ inches. Coarse-fragment content ranges from 5 to 35 percent. Surface colors are dusky red, very dusky red, dark reddish brown, or very dark brown. Subsoil colors are dark reddish brown, dark red, red, reddish brown, or yellowish red. Surface soil textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are clay, gravelly clay, or heavy clay loam.

Setting: The (380) Pollard soils occur on moderately steep to very steep slopes in the Siskiyou Mountains at elevations of 1,500 to 4,000 feet. Most areas below 2,500 feet are on north-facing slopes. Gradients range from 10 to 85 percent, with slopes of 35 to 60 percent being most common. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 80 inches. The mean annual air temperature ranges from 48 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period ranges from 110 to 160 days. Vegetation consists of Douglas-fir, ponderosa pine, madrone and an associated understory of shrubs and forbs.

The (380) Pollard soils are associated with soils of the very gravelly clayey 382 series; the moderately deep, very gravelly clayey 381 series; the deep, loamy, very gravelly 370 series; and the moderately deep, loamy, very gravelly 371 series. Adjacent areas with less than 35 inches of

precipitation are occupied by soils of the (718) Beekman, (719) Manzanita and (781) Colestine series. Adjacent areas from serpentine have soils of the (770) Pearsoll series, and adjacent areas from granitoid rocks have soils of the (721) Siskiyou and (722) Holland series.

The (380) Pollard soils are distinguished from the similar 381 soils by being deeper and less gravelly, and from the 382 soils by being less gravelly. The similar (719) Manzanita soils are distinguished by being less acid than the (380) Pollard soils. The (750) Dumont soils from volcanic rocks are very similar to the (380) Pollard soils but are higher in organic matter and more acid in the surface soil. The (741) Freezner and (745) Laurelhurst soils from volcanic rocks are less acid than the (380) Pollard soils.

Soil Behavior: The (380) Pollard soils are forested with a dominant overstory of Douglas-fir and ponderosa pine. Hardwood species, such as madrone and tanoak, become more abundant near zones of low precipitation.

Regeneration hazard is slight especially on northerly aspects. Brush competition for available soil moisture is greater in zones of higher precipitation.

Compaction by tractor logging during wet soil conditions will lower productivity and cause surface erosion. These clayey soils retain moisture longer than loamy soils, therefore, they take longer to dry out in spring. Some concave and benched slopes remain wet throughout the year and should be avoided. Cable yarding can be safely accomplished most of the time. Effective water bars can be built where slope does not exceed 35 percent.

Soils of this series exhibit a high mantle stability when excavated, however, soil slips and landslides may occur where deep cuts are made, in places of surface water concentration and in deep pockets adjacent to shallow soils over hard rock.

Exposed soil material is an important source of colloidal sediments that will lower water quality and deteriorate aquatic habitat. Side-cast material usually can be revegetated by grass or trees. However, it is difficult to maintain a grass cover on southerly slopes and on cut slopes unless they are shaded or are close to ground water.

The soil mantle usually is quite thick and bedrock is poor construction material. The soil is fair for fills and embankments if used at proper moisture content to achieve adequate compaction. These soils are good sites for reservoirs.

Recreation development potential is good. The soils are subject to compaction by foot traffic and bare surfaces are dusty when dry. Excessive slope gradient is the most limiting factor for subsurface sewage disposal. Minor drainageways maintain flow late into the dry season.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

380/W 10,870 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. The soils of this unit dominantly are of the deep, clayey (380) Pollard series. They occur on moderately sloping terraces or lower sideslope positions.

Inclusions of the deep, very gravelly 382 soils occur at random. Some slope gradients are less than 10 percent.

380/Wn 3,710 acres. Slopes dominantly are northerly and have gradients of 10 to 35 percent. The soils of this unit dominantly are of the deep, clayey (380) Pollard series. They occur on moderately sloping terraces or lower sideslope positions.

Inclusions of the deep, very gravelly 382 soils occur at random. Some slope gradients are less than 10 percent.

380-382/WX 22,610 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of about 65 percent of the clayey (380) Pollard series and 35 percent of the clayey, very gravelly 382 soils. The 382 soils are mostly on the steeper positions intermingled with the (380) Pollard soils.

Minor inclusions of the deep, loamy, very gravelly 370 soils and the moderately deep, loamy, very gravelly 371 soils occur on the steep to very steep sideslopes of incised drainage-ways. The moderately deep, clayey, very gravelly 381 soils occupy the rounded or benched spur ridges.

380-382/WXn 18,670 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of about 65 percent of the clayey (380) Pollard soils and 35 percent of the clayey, very gravelly 382 soils. The 382 soils mostly are on the steeper positions intermingled with the (380) Pollard soils.

Minor inclusions of the deep, loamy, very gravelly 370 soils and the moderately deep, loamy, very gravelly 371 soils occur on the steep to very steep sideslopes of incised drainage-ways. The moderately deep, clayey, very gravelly 381 soils occupy the rounded or benched spur ridges.

9. 381 Series

The 381 series consists of moderately deep, red, clayey, very gravelly, well-drained soils from metamorphic and sedimentary rocks in areas receiving more than 35 inches of precipitation. They occur on moderately steep to very steep mountainous slopes.

Profile Description: 381 gravelly clay loam.

Surface Soil:	0-7"	Dark reddish brown, gravelly clay loam, friable, slightly acid. 6-14" thick.
Subsoil:	7-34"	Yellowish red, very gravelly clay, firm, sticky, plastic, medium acid. 10-34" thick.
Substratum:	34"+	Fractured metamorphic rocks.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface colors or dusky red, dark reddish brown, or very dark brown. Subsoil colors are dark reddish brown, dark red, red, reddish brown, or yellowish red. Surface soil textures are gravelly loam, gravelly clay loam, very gravelly loam, or very gravelly clay loam. Subsoil textures are very gravelly clay or very cobbly clay.

Setting: The 381 soils occur on moderately steep to very steep slopes in the Siskiyou Mountains at elevations of 1,500 to 4,000 feet. Most areas below 2,500 feet are on north-facing slopes. Gradients range from 10 to 85 percent, with slopes over 35 percent being most common. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 80 inches. The mean annual air temperature ranges from 48 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; the mean July temperature centers on 68 degrees F. The frost-free period is 110 to 160 days. Vegetation consists of Douglas-fir, ponderosa pine, madrone and an associated understory of shrubs and forbs.

The 381 soils are associated with soils of the deep, very gravelly 382 series; the deep, clayey (380) Pollard series; the deep, loamy, very gravelly 370 series; the moderately deep, loamy, very gravelly 371 series; and the shallow, loamy, very gravelly 372 series. Adjacent areas with less than 35 inches of precipitation, underlain by metamorphic and sedimentary rocks, have soils of the (718) Beekman, (719) Manzanita and (781) Colestine series. Adjacent areas of soils from serpentine are of the (770) Pearsoll series and those from granitoid rocks have soils of the (721) Siskiyou and (722) Holland series.

The 381 soils are distinguished from the similar 382 soils by being shallower to bedrock. They differ from the (380) Pollard soils by being shallower and more gravelly. They are more gravelly and more acid than the (719) Manzanita soils. The similar 371 soils are less clayey than the 381 soils. The 705 soils from volcanic rocks are darker colored and less acid than the 381 soils. The (731) Straight soils from volcanic rocks are less clayey.

Soil Behavior: Soils of the 381 series support mixed stands of conifers and hardwoods. Productivity ranges from moderate in high-precipitation zones to low where precipitation is near 35 inches annually. Other factors affecting productivity are soil depth and amount of coarse fragments.

Regeneration hazard is moderate on northerly aspects and severe on southerly aspects and where there is a thick, gravel layer on the surface. Brush competition is greater in zones of higher precipitation.

These soils mostly occupy slopes best suited for cable yarding. They are subject to compaction when wet. Severe erosion occurs when 381 soils are disturbed, causing a buildup of coarse fragments on the surface. Effective water bars are difficult to build on steep slope gradients.

Cut-bank stability is high but the soil mantle and fractured bedrock will slump onto roadway where rock-bedding planes are inclined toward the excavation. Cut slopes with $\frac{1}{2}$:1 angle are quite stable within one year after construction.

Exposed soil material is a source of high sediment yield that can lower the water quality and fisheries habitat. Fill slope surfaces will be covered with a thick layer of coarse fragments which will hinder establishment of a protective cover.

Quality of bedrock for road construction is variable. The soil material is fair for fills and embankments if coarse fragments do not exceed cobble size and about 50 percent of the volume. Ponds generally will fail when located in 381 soils.

Recreation development potential is limited mostly because of steep slopes and soil depth. The soils are subject to compaction by foot traffic and bare surfaces are dusty when dry.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

381-380/X 21,680 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 70 percent of the moderately deep, clayey, very gravelly 381 soils; about 30 percent of the deep, clayey (380) Pollard soils; and lesser amounts of the deep, clayey, very gravelly 382 soils, and the moderately deep, loamy, very gravelly 371 soils. The 381 soils occupy the middle and upper slopes and the (380) Pollard soils are on benches and lower slopes.

The 382 and 371 soils are major inclusions. The 382 soils are intermingled with the (380) Pollard soils and the 371 soils occur at random on the steeper slopes.

Minor inclusions of the deep, loamy 370 soils occur at random in drainageways. Some gradients are less sloping than 35 percent.

381-380/Xn 7,040 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 70 percent of the moderately deep, clayey, very gravelly 381 soils; about 30 percent of the deep, clayey (380) Pollard soils; and lesser amounts of the deep, clayey, very gravelly 382 soils, and the moderately deep, loamy, very gravelly 371 soils. The 381 soils occupy the middle and upper slopes and the (380) Pollard soils are on benches and lower slopes.

The 382 and 371 soils are major inclusions. The 382 soils are intermingled with the (380) Pollard soils and the 371 soils occur at random on the steeper slopes.

Minor inclusions of the deep, loamy 370 soils occur at random in drainageways. Some gradients are less sloping than 35 percent.

381-380/XY 16,470 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and about 30 percent has gradients of 60 to 90 percent. This unit contains about 75 percent of the moderately deep, clayey, very gravelly 381 soils; about 25 percent of the deep, clayey (380) Pollard soils; and lesser amounts of the deep, clayey, very gravelly 382 soils and the moderately deep, loamy, very gravelly 371 soils. The 381 soils occupy the middle and upper slopes and the (380) Pollard soils are on benches and lower slopes.

The 382 and 371 soils are major inclusions. The 382 soils are intermingled with the (380) Pollard soils and the 371 soils occur at random on the steepest slopes.

Minor inclusions of the deep, loamy 370 soils occur in drainageways; and of the shallow 372 soils on the steepest slopes with the 371 soils.

381-380/XYn 9,360 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and about 30 percent has gradients of 60 to 90 percent. This unit contains about 75 percent of the moderately deep, clayey, very gravelly 381 soils; about 25 percent of the deep, clayey (380) Pollard soils; and lesser amounts of the deep, clayey, very gravelly 382 soils and the moderately deep, loamy, very gravelly 371 soils. The 381 soils occupy the middle and upper slopes and the (380) Pollard soils are on benches and lower slopes.

The 382 and 371 soils are major inclusions. The 382 soils are intermingled with the (380) Pollard soils and the 371 soils occur at random on the steepest slopes.

Minor inclusions of the deep, loamy 370 soils occur in drainageways; and of the shallow 372 soils on the steepest slopes with the 371 soils.

10. 382 Series

The 382 series consists of deep, red, clayey, very gravelly, well-drained soils from metamorphic and sedimentary rocks in areas receiving more than 35 inches of precipitation. They occur on strongly sloping to very steep mountainous slopes.

Profile Description: 382 gravelly clay loam.

Surface Soil:	0-9"	Dark reddish brown, gravelly clay loam, friable, slightly acid. 5-15" thick.
Subsoil:	9-48"	Yellowish red, very gravelly clay loam, firm, very sticky, very plastic, medium acid. 25-59" thick.
Substratum:	48"+	Fractured metamorphic rocks.

Variations: Depth to bedrock ranges from 40 to 60+ inches. Coarse-fragment content ranges from 35 to 75 percent. Surface colors are dusky red, dark reddish brown, or very dark brown. Subsoil colors are dark reddish brown, dark red, red, reddish brown, or yellowish red. Surface soil textures are gravelly loam, gravelly clay loam, very gravelly loam, or very gravelly clay loam. Subsoil textures are very gravelly clay, or very cobbly clay.

Setting: The 382 soils occur on strongly sloping to very steep slopes in the Siskiyou Mountains at elevations of 1,500 to 4,000 feet. Most areas below 2,500 feet are on north-facing slopes. Gradients range from 10 to 85 percent, with slopes of 10 to 65 percent being most common. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 80 inches. The mean annual air temperature ranges from 48 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period is 110 to 160 days. Vegetation consists of Douglas-fir, ponderosa pine, madrone and an associated understory of shrubs and forbs.

The 382 soils are associated with soils of the deep, clayey (380) Pollard series; the moderately deep, clayey, very gravelly 381 series; the deep,

loamy, very gravelly 370 series; and the moderately deep, loamy, very gravelly 371 series. Adjacent areas with less than 35 inches of precipitation, underlain by metamorphic and sedimentary rocks have soils of the (718) Beekman, (719) Manzanita and (781) Colestine series. Adjacent areas underlain by serpentine have soils of the (770) Pearsoll series and those underlain by granitoid rocks have soils of the (721) Siskiyou and (722) Holland series.

The 382 soils are distinguished from the 381 soils by being deeper to bedrock. They differ from the (380) Pollard soils by being more gravelly. They are more acid and more gravelly than the (719) Manzanita soils. The 382 soils are more clayey and generally redder than the 370 and 371 soils. The deep, clayey soils of the (741) Freezner, (745) Laurelhurst and (750) Dumont series, all of which are formed in volcanic materials, are less gravelly than the 382 soils. The (722) Holland soils from granite are less clayey and less gravelly than the 382 soils.

Soil Behavior: The 382 soils are forested with mixed stands of conifers and hardwoods. Douglas-fir, ponderosa pine, madrone, tanoak and chinquapin are the dominant tree species. Hardwoods and drought-resistant species are more abundant where gravel content of soil is higher, on southerly aspects or where annual precipitation nears 35 inches. Site class is higher on benches and on lower slope positions that receive moisture by seepage.

Bare-root plantations are moderately successful but failure can be expected where a thick layer of gravel occurs on the surface. Brush competition is greater in high-precipitation zones.

The compaction hazard is moderate to severe, and heavy equipment usage during wet soil conditions will lower productivity and increase surface erosion. Some concave and benched slopes remain moist in the surface foot of soil throughout the year and should be avoided. Cable yarding can be safely accomplished most of the time. Water bars can be effectively constructed where slope gradients do not exceed 35 percent.

Excavation reduces mantle stability and slumping of cut slopes can be expected. Landslides will occur more often where deep cuts are made, where surface runoff concentrates and near seeps and springs.

Erosion susceptibility is severe. Exposed surface soil is an important source of fine sediments that will lower water quality and damage habitat for all aquatic life. Fill slopes usually can be revegetated by grass or trees. However, it is difficult to maintain a grass cover on southerly aspects and on cut slopes unless they are shaded or ground water is near the surface.

The overburden usually is thick and the bedrock is poor construction material. The soil material is good for fills and embankments if the coarse fragments do not exceed cobble size and about 50 percent of the volume. These soils are good sites for ponds.

Recreation development potential is good on gentle slopes. The soils are subject to compaction by foot traffic and bare surfaces are dusty when dry. Gravel and cobble, as well as excessive slope gradient, limit recreation potential in some places. Minor drainageways maintain flow late into the dry season.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units: Soils of the 382 series are not dominant in any mapping unit and occur as secondary soils or inclusions in mapping units where the 370 and (380) Pollard series are dominant.

11. 701 Series

The 701 series consists of shallow, very gravelly, well-drained soils from metamorphic rocks in areas receiving less than 35 inches of precipitation. They occur on steep to very steep slopes.

Profile Description: 701 very gravelly loam.

Surface Soil:	0-4"	Brown, very gravelly, loam, friable, neutral. 2-6" thick.
Subsoil:	4-13"	Brown, very gravelly loam, friable, slightly acid. 6-18" thick.
Substratum:	13"+	Fractured metamorphic rock.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 70 percent. Surface soil colors are dark brown, brown, or reddish brown. Subsoil colors are brown, strong brown, or yellowish red. Textures of the surface and subsurface layers are loam or clay loam.

Setting: The 701 soils occur on steep to very steep foothills at elevations between 1,200 and 4,000 feet. Most areas are on south-facing slopes. Slope gradients range from 35 to 85+ percent. The soils formed in colluvium from medisedimentary and medivolcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation is 20 to 35 inches. The mean annual air temperature ranges from 45 to 54 degrees F.; the mean January temperature centers on 37 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 120 to 180 days. Vegetation is oak, madrone, ponderosa pine, poison oak and grass.

The 701 soils are associated with the moderately deep, very gravelly (718) Beekman soils; the moderately deep, nonskeletal (781) Colestine soils; and (R) rock land. Adjacent soils in areas receiving more than 35 inches of precipitation include those of the shallow, very gravelly 372 series

and the moderately deep, very gravelly 371 series.

The 701 soils differ from the shallow (36) Witzel soils by being lighter colored and from the shallow 372 and 732 soils by being less acid.

Soil Behavior: Soils of the 701 series are extremely droughty and have a low capacity to produce timber. The soils support mixed stands of hardwoods and conifers on northerly aspects and mostly open grassland or brush on southerly aspects. Site class for Douglas-fir is very low.

Bare-root regeneration hazard is severe because of low annual precipitation, very low soil moisture availability and grass competition.

Timber harvest on these soils will result in exposed areas which are susceptible to erosion. Excessive slope gradients and shallow, gravelly soil profiles do not permit construction of effective water bars.

Roads are stable. Side-cast material usually extends far downslope and contains mostly fractured rock. A vegetative cover is difficult to establish in this material. Roadbeds are in the rock substratum and surfacing may not be necessary. Good construction rock occurs in the substratum of the 701 soils. Bedrock can be ripped in many places but blasting may be necessary near rock outcrop.

The soil does not make good fill or embankment material. Ponds generally will fail when located in 701 soils.

Recreation development potential is severely limited because of very steep slopes and very gravelly or cobbly soils. Rock outcrop is commonly associated with these soils. Drainageways usually do not contain water except when runoff is diverted from roads.

Southerly aspects are critical deer winter range where there are abundant browse species and open grasslands. An area of major importance is the Little Applegate River watershed. Roads in this area where deer concentrate will contribute to game harassment.

Mapping Units:

701-R/Y 8,650 acres. Slopes dominantly are southerly and have gradients of 60 to 85+ percent. This unit contains about 70 percent 701 soils and 30 percent (R) rock land. The (R) rock land is on the steeper slopes that generally are near the tops of foothills and mountains.

Minor inclusions of the moderately deep (718) Beekman and (781) Colestine soils are randomly mingled with the 701 soils. Some gradients are less sloping than 60 percent. Dark colored, very gravelly, loamy, shallow unclassified soils are mixed with 701 soils where a grass cover is dominant.

12. (704) Carney Series

The (704) Carney series consists of moderately deep, very clayey, well-drained soils from volcanic flows and tuffs and shaly sedimentary rocks in areas receiving less than 35 inches of precipitation. They occur on gently sloping to steep fans and slumps.

Profile Description: (704) Carney clay.

Surface Soil:	0-12"	Dark brown clay, firm, very sticky, very plastic, neutral. 10-15" thick.
Subsoil:	12-35"	Dark brown clay, very firm, very sticky, very plastic, neutral. 10-28" thick.
Substratum:	35"+	Weathered tuff that is calcareous in the fractures.

Variations: Depth to soft, weathered bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 0 to 15 percent. Colors of the surface and subsoil layers are very dark grayish brown, dark grayish brown, dark brown, or brown. Clay content is over 60 percent throughout the soil.

Setting: The (704) Carney soils are on nearly level to rolling outwash fans and terraces and on moderately steep slump or soil creep areas in the uplands at elevations between 1,300 and 3,000 feet. Slope gradients range from 3 to 70 percent. The soils formed in colluvium from volcanic flows and tuffs and from shaly sedimentary rocks.

The summers are warm and dry and the winters are cool and moist. The mean annual precipitation ranges from 18 to 30 inches. The mean annual air temperature is about 53 degrees F.; the mean January temperature centers on 36 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 140 to 180 days. Native vegetation consists of white oak, wedgeleaf ceanothus, poison oak and forbs and grasses.

The (704) Carney soils are associated with the moderately deep, very clayey, moderately well-drained (706) Medco soils; and the deep, very clayey, somewhat poorly-drained (710) Coker soils on the alluvial fans and slumps. The shallow, very stony, loamy (36) Witzel and moderately deep, very stony, clayey 705 soils occur on headwalls and mountainous slopes above the (704) Carney soils.

The (704) Carney soils differ from the (706) Medco soils by being finer textured in the surface soil and by shrinking more in the summer and thereby developing deep cracks. The (704) Carney soils differ from the (710)

Coker soils by having stronger or brighter colors and by being less than 40 inches deep to bedrock. The (704) Carney soils are inextensive on public land in the Medford BLM District.

Soil Behavior: Soils of the (704) Carney series dominantly support open grasslands and white oak. They are subject to moderate frost heaving.

These soils have a high shrink/swell ratio and large cracks usually appear during the dry season. Where the clay content is extremely high, cracks may not close during the wet season.

The compaction hazard is severe and livestock will compact the surface when wet. Exposed areas are an important source of colloidal sediments. The erosion hazard is moderate to severe.

Cutbanks are unstable and continuously slough onto roadways. Large amounts of crushed rock as base coarse are necessary to provide all-weather roads. Most precipitation is absorbed by the soil and released through evaporation and transpiration.

Soil and bedrock material are very poor for construction purposes. The soil is satisfactory for stock-water ponds if not allowed to become dry.

Recreation development potential is seriously limited by the physical properties of the (704) Carney soils.

Wildlife habitat is fair.

Mapping Units:

704/W 1,490 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. This unit contains predominantly the moderately deep, very clayey (704) Carney soils.

Inclusions consist of the shallow (36) Witzel soils; the moderately deep, very cobbly 705 soils; and the deep, somewhat poorly-drained (710) Coker soils on benches and in drainage-ways. Some gradients are less sloping than 10 percent.

704-36/XY 5,750 acres. Slopes dominantly are southerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85+ percent. This unit contains about 75 percent of the moderately deep, very clayey (704) Carney soils and 25 percent of the shallow, loamy (36) Witzel soils.

Inclusions consist of (R) rock land on the ridges and steep positions and of the moderately well-drained (706) Medco soils on less steep positions. Unclassified moderately deep, very stony, loamy soils are mixed at random with the (36) Witzel soils on steeper positions.

13. 705 Series

The 705 series consists of moderately deep, clayey, very cobbly, well-drained soils from volcanic rocks in areas receiving less than 35 inches of precipitation. They occur on sloping to very steep foothills and mountains.

Profile Description: 705 cobbly clay loam.

Surface Soil:	0-7"	Dark reddish brown, cobbly clay loam, firm, sticky, plastic, neutral. 10-15" thick.
Subsoil:	7-31"	Dark brown, very cobbly clay, very firm, very sticky, very plastic, slightly acid. 10-30" thick.
Substratum:	31"+	Volcanic bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface colors are black, very dark gray, very dark brown, or dark brown. Subsoil colors are dark reddish brown, reddish brown, or dark brown. Textures of the surface layer are gravelly loam, gravelly clay loam, cobbly loam, or cobbly clay loam. Subsoil textures are very gravelly clay loam, very gravelly clay, very cobbly clay loam, or very cobbly clay.

Setting: The 705 soils are on moderately sloping to very steep foothills and mountain slopes at elevations of 1,200 to 4,000 feet. Slope gradients range from 10 to 85+ percent. The soils formed in colluvium from basic volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature is from 50 to 54 degrees F.; the mean January temperature centers on 36 degrees F.; and the mean July temperature centers on 72 degrees F. The frost-free period is 140 to 170 days. Native vegetation is white oak, black oak, madrone, ponderosa pine, Douglas-fir and associated shrubs, forbs and grasses.

The 705 soils are associated with the shallow, stony (36) Witzel soils; the moderately deep, very clayey, well-drained (704) Carney soils; the moderately deep, very clayey, moderately well-drained (706) Medco soils; and the deep, clayey, reddish, well-drained (745) Laurelhurst soils. All of these soils have dark, neutral surface soils and occur under an oak/grassland-type vegetation.

The 705 soils are distinguished from the (704) Carney soils by being less clayey and more cobbly or gravelly. They differ from the (706) Medco soils by being less clayey, more cobbly and better drained. The (745) Laurelhurst soils are redder in the subsoil, are deep and less cobbly

than the 705 soils. In zones receiving less than 20 inches of precipitation, the 790 soils resemble the 705 soils but are less acid in the subsoil and browner colored.

Soil Behavior: Soils of the 705 series have a low moisture-holding capacity. They mostly support open grasslands with scattered hardwood and conifer species occurring on northerly aspects near higher-precipitation zones. Timber will not become reestablished for many years when once removed.

Cutbanks are stable but some slumping of the soil mantle will occur. The surface-erosion hazard is severe. The bedrock can be ripped in places but blasting is often necessary during road construction. Fractured rock will cover the surface of side cast on steep slopes. Fill slopes are an important sediment source and are difficult to revegetate because of a high coarse-fragment content.

Quality of bedrock for construction material is variable. Soil material is fair for fills and embankments.

Recreation development potential is limited in most areas because of soil physical properties.

Wildlife habitat is good. Deer use timbered north aspects for cover. Important browse species occur on south aspects.

Mapping Units:

705-36/X 2,140 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 65 percent moderately deep 705 soils and 35 percent shallow (36) Witzel soils. The (36) Witzel soils are mostly on slopes over 45 percent.

Minor inclusions of (R) rock land and unclassified, moderately deep, loamy soils occur with the (36) Witzel soils. Mingled with the 705 soils are small bodies of the very clayey (704) Carney series, the moderately well-drained (706) Medco soils and the deep (745) Laurelhurst soils.

705-36/Xn 4,440 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 65 percent moderately deep 705 soils and 35 percent shallow (36) Witzel soils. The (36) Witzel soils are mostly on slopes over 45 percent.

Minor inclusions of (R) rock land and unclassified, moderately deep, loamy soils occur with the (36) Witzel soils. Mingled with the 705 soils are small bodies of the very clayey (704) Carney series, the moderately well-drained (706) Medco soils and the deep (745) Laurelhurst soils.

705-36/XY 21,380 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and about 30 percent has gradients of 60 to 85 percent. This unit consists of about 60 percent of the moderately deep 705 soils and 40 percent of the shallow (36) Witzel soils. The (36) Witzel soils are on the steeper slopes.

Minor inclusions of the very clayey (704) Carney series, the moderately well-drained (706) Medco series; and the deep (745) Laurelhurst series are mingled with the 705 soils. Small amounts of (R) rock land and unclassified, moderately deep, loamy soils occur with the (36) Witzel soils.

705-36/XYn 12,760 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and about 30 percent has gradients of 60 to 85 percent. This unit consists of about 60 percent of the moderately deep 705 soils and about 40 percent of the shallow (36) Witzel soils. The (36) Witzel soils are on the steeper slopes.

Minor inclusions of the very clayey (704) Carney series; the moderately well-drained (706) Medco series; and the deep (745) Laurelhurst series are mingled with the 705 soils. Small amounts of (R) rock land and unclassified, moderately deep, loamy soils occur with the (36) Witzel soils.

705-36/Y 1,840 acres. Slopes dominantly are southerly and have gradients of 60 to 85+ percent. This unit contains about 55 percent of the moderately deep 705 series and 45 percent of the shallow (36) Witzel soils. The (36) Witzel soils occur on the upper part of the slopes near the rims of flat-topped ridges.

Minor inclusions of (R) rock land are mingled with the (36) Witzel soils; and of the very clayey (704) Carney soils and unclassified, moderately deep, loamy soils with the 705 soils. Some gradients are less sloping than 60 percent.

14. (706) Medco Series

The (706) Medco series consists of moderately deep, very clayey, moderately well-drained soils from volcanic rocks in areas receiving less than 35 inches of precipitation. They occur on gently sloping to steep foothills.

Profile Description: (706) Medco clay loam.

Surface Soil: 0-13"	Dark brown clay loam, firm, sticky, plastic, slightly acid. 10-19" thick.
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Subsoil:	13-36"	Dark grayish brown clay, very firm, very sticky, very plastic, slightly acid. 10-30" thick.
Substratum:	36"+	Weathered tuff.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 5 to 35 percent. Surface colors are very dark brown, very dark grayish brown, or dark brown. Subsoil colors are olive brown, grayish brown, dark grayish brown, or brown. Surface textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are clay, gravelly clay, or cobbly clay.

Setting: The Medco soils are on gently sloping to steep hillsides at elevations of 1,200 to 4,000 feet. Slope gradients range from 1 to 60 percent with 5 to 35 percent being most common. The soils formed in colluvium from tuffs and other basic volcanic rocks.

The climate consists of warm, dry summers and cool, moist winters. The mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature is 50 to 54 degrees F.; the mean January temperature centers on 36 degrees F.; and the mean July temperature centers on 72 degrees F. The frost-free period is 140 to 170 days. Native vegetation consists of white oak, madrone, ponderosa pine and Douglas-fir with associated shrubs, forbs and grasses.

The (706) Medco soils are associated with the shallow, very stony (36) Witzel soils; the moderately deep, cobbly, clayey well-drained 705 soils; the moderately deep, very clayey, well-drained (704) Carney soils; and the deep, reddish, clayey, well-drained (745) Laurelhurst soils.

The (706) Medco soils are distinguished from the (704) Carney soils by being less clayey in the surface layer and by being moderately well-drained. They differ from the 705 soils by being more clayey in the subsoil and less cobbly. The (745) Laurelhurst soils are redder in the subsoil, are deep and are well drained. At elevations above 4,000 feet, the 850 soils resemble the (706) Medco soils but are deeper and colder.

Soil Behavior: The (706) Medco soils dominantly support oak and grass on southerly aspects and mixed stands of hardwoods and scrubby conifers on northerly aspects. A dense clay subsoil and a seasonal high-water table limit tree growth. Frost-heave potential is moderate.

These soils are subject to compaction by equipment and livestock. Skid trails and jeep roads left bare are susceptible to moderate erosion and are important sources of colloidal sediment.

Road cutbanks are unstable, especially during the wet season. Water seeps out of soil profile above the clay layer causing the soil mantle to slough onto roadway. Side-cast material is an important source of sediments but will support a protective grass cover.



Figure 4. A dense clay layer at depths of 10 to 15 inches in (706) Medco soils causes a high seasonal water table. The clay layer is restrictive to most tree roots. Note the severe erosion in the cut slope.

Soft bedrock is easily ripped but of poor quality for construction material. The soil material is poor for fills or embankments. Stock-water ponds are satisfactory if kept full. The soil will crack if allowed to become dry.

Recreation development potential is seriously limited by physical properties of the (706) Medco soils. Flooding in low spots from surface runoff is common during the wet season.

Wildlife habitat is good. Wooded areas offer cover for deer when they are on winter range.

Mapping Units:

706/W 16,010 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. This unit contains predominantly (706) Medco soils on alluvial fan and toe slope positions.

Minor inclusions consist of poorly-drained (710) Coker soils in drainageways; moderately deep 705 soils on the steeper slopes; and very clayey (704) Carney soils mingled at random. Some slope gradients are less than 10 percent.

706-36/WV 10,240 acres. Slope gradients are 10 to 35 percent on 70 percent of the area and 0 to 10 percent on 30 percent of the area. This unit contains about 60 percent of the moderately well-drained (706) Medco soils and about 40 percent of the shallow (36) Witzel soils. The (36) Witzel soils occur on low hill crests.

Minor inclusions of moderately deep, very cobbly, clayey 705 soils and very clayey (704) Carney soils are mingled with these soils. (R) Rock land and unclassified, moderately deep, loamy soils are associated with the (36) Witzel soils.

706-36/W 2,250 acres. Slope gradients dominantly are 10 to 35 percent. This unit contains about 60 percent of the moderately well-drained (706) Medco soils and about 40 percent of the shallow (36) Witzel soils. The (36) Witzel soils occur on low hill crests.

Minor inclusions of moderately deep, very cobbly 705 soils and very clayey (704) Carney soils are mingled with these soils. (R) Rock land and unclassified, moderately deep, loamy soils are associated with the (36) Witzel soils.

706-36/WX 19,010 acres. Slopes dominantly are southerly and about 70 percent of the area has slope gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of about 60 percent of the moderately well-drained (706) Medco soils and 40 percent of the shallow (36) Witzel soils on the steeper slopes.

Inclusions of the very clayey (704) Carney soils, of the very cobbly 705 soils, and unclassified, moderately deep, loamy soils and (R) rock land are mingled at random on the steeper slopes.

706-36/WXn 10,130 acres. Slopes dominantly are northerly and about 70 percent of the area has slope gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of about 60 percent of the moderately well-drained (706) Medco soils and 40 percent of the shallow (36) Witzel soils on the steeper slopes.

Inclusions of the very clayey (704) Carney soils, of the very cobbly 705 soils, and unclassified, moderately deep, loamy soils and (R) rock land are mingled at random on the steeper slopes. The deep, well-drained (745) Laurelhurst soils occur at random on the less steep slopes with the 705 soils.

706-710/VW 6,630 acres. Slopes dominantly are southerly and about 70 percent have gradients of 0 to 10 percent and 30 percent have gradients of 10 to 35 percent. This unit contains about 60 percent of moderately well-drained (706) Medco soils and 40 percent of somewhat poorly-drained (710) Coker soils in drainageways and on gently sloping alluvial fans.

Inclusions of the moderately deep, well-drained (704) Carney soils and the very cobbly, clayey 705 soils are mingled with the (706) Medco series on steeper, convex positions.

706-710/WV 8,870 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and 30 percent have gradients of 0 to 10 percent. This unit consists of about 70 percent moderately well-drained (706) Medco soils and 30 percent of the somewhat poorly-drained (710) Coker soils in drainageways.

Inclusions of the very clayey (704) Carney soils and the very cobbly, clayey 705 soils are mingled at random with the (706) Medco soils on the steeper positions.

706-745/WV 10,110 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 0 to 10 percent. This unit contains about 70 percent of moderately well-drained (706) Medco soils and 30 percent of deep, well-drained (745) Laurelhurst soils. The (745) Laurelhurst soils are on the steeper, convex slopes.

Minor inclusions of the shallow (36) Witzel series and the moderately deep 705 soils are mingled with soils of the (745) Laurelhurst series. Small amounts of the very clayey (704) Carney and (710) Coker soils are associated with the (706) Medco soils.

706-745/WX 10,030 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 35 to 60 percent. This unit contains about 70 percent of moderately well-drained (706) Medco soils and 30 percent of deep, well-drained (745) Laurelhurst soils. The (745) Laurelhurst soils are on the steeper, convex slopes.

Minor inclusions of the shallow (36) Witzel series and the moderately deep 705 soils are mingled with the soils of the (745) Laurelhurst series. Small amounts of the very clayey (704) Carney and (710) Coker soils are associated with the (706) Medco soils.

706-745/X 7,600 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the moderately well-drained (706) Medco soils and 40 percent of the deep, well-drained (745) Laurelhurst soils on the steep, convex slopes.

Inclusions of the shallow (36) Witzel soils, the clayey, cobbly 705 soils and the very clayey (704) Carney soils are randomly mixed on steeper slope positions. Some gradients are less than 35 percent.

706-745/Xn 5,350 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the moderately well-drained (706) Medco soils and 40 percent of the deep, well-drained (745) Laurelhurst soils on the steep, convex slopes.

Inclusions of the shallow (36) Witzel soils, the clayey, cobbly 705 soils and the very clayey (704) Carney soils are randomly mixed on steeper slope positions. Some gradients are less than 35 percent.

15. (710) Coker Series

The (710) Coker series consists of deep, very clayey, somewhat poorly-drained soils formed in colluvium from soft tuffaceous sandstone and local alluvium from upland clayey soils on the east side of Bear Creek Valley. They occur on nearly level to rolling alluvial fans.

Profile Description: (710) Coker clay.

Surface Soil:	0-25"	Very dark gray clay, firm, very sticky, very plastic, neutral. 20-42" thick.
Subsoil:	25-58"	Dark grayish-brown clay, firm, very sticky, very plastic, moderately alkaline, calcareous in lower part. 20-36" thick.

Substratum: 58-70"+ Dark grayish brown clay, massive, firm, very sticky, very plastic, moderately alkaline, calcareous.

Variations: Depth to bedrock ranges from 40 to over 100 inches. Coarse-fragment content ranges from 0 to 5 percent. Surface soil colors are very dark gray or black. Subsoil colors are very dark grayish brown, dark grayish brown, or olive brown. Clay content is over 60 percent in all horizons.

Setting: The (710) Coker soils occur on smooth, nearly level to rolling alluvial fans at elevations of 1,100 to 2,000 feet. Slope gradients range from 0 to 10 percent. The soils formed in local alluvium from upland clayey soils. The underlying bedrock is highly-weathered, soft tuffaceous sandstone.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation is 18 to 25 inches. The mean annual air temperature is about 54 degrees F.; the mean January temperature centers on 38 degrees F.; and the mean July temperature centers on 72 degrees F. The frost-free period ranges from 160 to 180 days. Native vegetation is white oak, poison oak, rushes, sedges and annual weeds.

The (710) Coker soils are associated with the very clayey, well-drained (704) Carney soils and the very clayey, moderately well-drained (706) Medco soils. The (710) Coker soils are of minor extent on public land in the District.

The (710) Coker soils differ from the (704) Carney and (706) Medco soils by being grayer or more dull colored.

Soil Behavior: Soils of the (710) Coker series dominantly support a mixture of sedges and grasses. Overstory hardwood species occur where soil drainage is somewhat better. There is high potential for frost heaving.

Livestock will compact these soils when wet. The (710) Coker soils are extremely high in clay that shrinks and swells, but are wet in place long enough to prevent deep cracks from forming. Although the erosion hazard is slight on gentle slopes, these soils are an important source of colloidal sediment. These soils are high in clays that stay suspended in water for long periods of time.

Cutbanks are unstable and continuously ravel and slough into ditchline and roadway. Large amounts of crushed rock as base coarse are necessary to provide all-weather roads.

Soil material is poor for construction purposes such as fills and embankments. However, stock-water reservoirs will hold water if not allowed to become dry.

Recreation development potential is severely limited in every way because of soil physical properties.

Wildlife habitat is fair.

Mapping Units: Soils of the (710) Coker series are not dominant in any mapping units and occur as inclusions, or secondary soils, in mapping units of the (704) Carney, 705 and (706) Medco series.

16. (712) Jumpoff Series

The (712) Jumpoff series consists of deep, clayey, moderately well-drained soils from metamorphosed volcanic rocks in the Siskiyou Mountains. They occur on moderately steep to steep terrain marked by benched sideslopes.

Profile Description: (712) Jumpoff gravelly clay loam.

Surface Soil:	0-5"	Brown, gravelly clay loam, slightly acid. 2-5" thick.
Subsoil:	5-52"	Yellowish brown, clay, firm, very sticky and plastic, slightly acid. 35-55" thick.
Substratum:	52-60"	Soft, weathered, metamorphic rock. The rock can be squeezed by the fingers into a sticky, clayey material when wet.

Variations: Depth to soft, weathered bedrock ranges from 40 to more than 60 inches. Coarse-fragment content ranges from 10 to 35 percent. Surface colors are brown and dark grayish brown. Subsoil colors dominantly are yellowish brown but range to grayish brown, olive brown and brown. Textures of the surface layer are generally clay loam or cobbly clay loam. Subsoil textures are clay, gravelly clay or cobbly clay.

Setting: The (712) Jumpoff soils are on moderately sloping to steep foothills and mountain slopes at elevations of 1,500 to 4,000 feet. Slope gradients range from 1 to 60 percent with 10 to 35 percent being most common. The soils formed in colluvium from basic volcanic rocks that have been metamorphosed. They mostly occur in the vicinity of Sexton, Walker and Roberts Mountains north of the city of Grants Pass.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 30 to 50 inches. The mean annual temperature is 48 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 130 to 170 days. Native vegetation consists of white oak, ponderosa pine, Douglas-fir, madrone and an understory of shrubs, forbs and grasses.

The (712) Jumpoff soils are associated with soils of the relatively dry (718) Beekman, (719) Manzanita and (781) Colestine series and with the relatively moist 371, 370 and 372 series. Adjacent areas underlain by serpentine bedrock have soils of the shallow (770) Pearsoll series.

The (712) Jumpoff soils differ from the (718) Beekman, (781) Colestine and 701 soils by being finer textured in the subsoil; from the (719) Manzanita soils by having yellow colors and lower pH values in the upper 30 inches; and from the (770) Pearsoll soils by developing from nonserpentinitic rock. The (706) Medco soils are moderately deep on volcanic rock and are more clayey in the subsoil.

Soil Behavior: The forested (712) Jumpoff soils support a mixed stand of conifers and hardwoods. They have a low to very low site class for Douglas-fir. Regeneration for bare-root plantings is severe. Success is affected by amount of gravel in the surface layer and by aspect. Thick gravel deposits cover the surface in places and restrict regeneration of conifer species.

These clayey soils occupy slope gradients that can be tractor yarded, but they are subject to compaction. Wet spots on benched and concave slopes should be avoided. A cable yarding system should be used where possible.

Raveling and slumping of cutbanks is common. Erosion susceptibility is moderate to severe. The soft bedrock in the ditchline is easily eroded to form gullies. Unprotected surfaces are sources of high sediment yield that can degrade aquatic habitat.

The soil material can be used for fills and embankments but it is not the most suitable because of its high clay content. Reservoirs usually are effective without use of manufactured material. The soft, clayey bedrock is easily ripped. No suitable construction rock occurs in the substratum.

Recreation development potential is limited mostly by steep slope gradients. The soils are subject to compaction by foot traffic and bare surfaces are dusty when dry.

Habitat for wildlife is good.

Mapping Units:

712/WX 8,610 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and 30 percent have gradients of 35 to 60 percent. This unit is predominantly made up of the moderately well-drained (712) Jumpoff series on moderately sloping benches and steep sideslopes.

Inclusions consist of the moderately deep, loamy (718) Colestine soils mixed with the very gravelly (718) Beekman soils

on the steeper slopes; of the deep, well-drained, clayey (719) Manzanita soils mingled with (712) Jumpoff soils; and of the (770) Pearsoll soils from serpentine rock mingled at random. Wet spots are common on benches.

712/WXn 2,300 acres. Slopes dominantly are northerly and about 70 percent have gradients of 10 to 35 percent and 30 percent have gradients of 35 to 60 percent. This unit is predominantly made up of the (712) Jumpoff series on moderately sloping benches and steep sideslopes.

Inclusions consist of the moderately deep, loamy (781) Colestine soils mixed with the very gravelly (718) Beekman soils on steeper slopes; of the deep, well-drained, clayey (719) Manzanita soils mingled with (712) Jumpoff soils; and of the (770) Pearsoll soils from serpentine rock mingled at random. Wet spots are common on benches.

712-718/X 3,600 acres. Slopes dominantly are southerly with gradients of 35 to 60 percent. This unit consists of about 70 percent of the deep, moderately well-drained (712) Jumpoff soils on benches and 30 percent of the moderately deep, very gravelly (718) Beekman soils. The (718) Beekman soils occur on the steeper slopes.

Inclusions consist of the moderately deep, loamy (781) Colestine soils mixed with the (718) Beekman soils; of the deep, well-drained, clayey (719) Manzanita soils mingled with (712) Jumpoff soils; and of the (770) Pearsoll soils from serpentine rock mingled at random. Wet spots are common on benches.

712-718/Xn 2,090 acres. Slopes dominantly are northerly with gradients of 35 to 60 percent. This unit consists of about 70 percent of the deep, moderately well-drained (712) Jumpoff soils on benches and 30 percent of the moderately deep, very gravelly (718) Beekman soils. The (718) Beekman soils occur on the steeper slopes.

Inclusions consist of the moderately deep, loamy (781) Colestine soils mixed with the (718) Beekman soils; of the deep, well-drained, clayey (719) Manzanita soils mingled with (712) Jumpoff soils; and of the (770) Pearsoll soils from serpentine rock mingled at random. Wet spots are common on benches.

17. (715) Brader Series

The (715) Brader series consists of shallow, loamy, well-drained soils from sandstone in areas receiving less than 30 inches of precipitation. They occur on gently sloping to very steep foothills and knolls that project above the valley floor north of Sams Valley.

Profile Description: (715) Brader loam.

Surface Soil:	0-4"	Dark brown loam, friable, slightly acid. 2-6" thick.
Subsoil:	4-15"	Dark brown clay loam, firm, slightly acid. 6-18" thick.
Substratum:	15"+	Weathered, partially consolidated, massive sandstone.

Variations: Depth to weathered bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from a trace to 25 percent. Surface soil colors are dark brown, brown, or dark yellowish brown. Subsoil colors are dark brown, brown, strong brown, or yellowish brown. Textures of the surface and subsoil layers range from loam to clay loam.

Setting: The (715) Brader soils occur on gently sloping to very steep foothills, ridges and knolls at elevations between 1,200 and 3,000 feet. Slope gradients range from 5 to 85 percent; however, most areas occur on slopes steeper than 35 percent. The soils formed in colluvium from sandstone, shale and conglomerates.

The summers are warm and dry and the winters are cool and moist. The mean annual precipitation is 18 to 30 inches. The mean annual air temperature is about 53 degrees F.; the mean January temperature centers on 37 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 140 to 180 days. Native vegetation is white oak, ponderosa pine, madrone and associated forbs and grasses.

The (715) Brader soils are associated with the moderately deep (716) Debenger soils from sandstone. Adjacent areas underlain by metamorphic rocks are occupied by soils of the 701, (718) Beekman and (781) Colestine series. Other adjacent areas underlain by volcanic rocks are covered with soils of the 705, (706) Medco and (745) Laurelhurst series.

The (715) Brader soils differ from the soils of the shallow (36) Witzel, 701, 732 and 372 soils by being nonskeletal and by being underlain by soft bedrock instead of hard bedrock. The 372 and 732 soils are in areas receiving more than 35 inches of precipitation and are more acid. They also support more coniferous trees than the (715) Brader soils.

Soil Behavior: The (715) Brader soils dominantly support open grassland with scattered brush and hardwood trees. They have a high frost-heave potential.

These soils are very droughty and the thin soil mantle is easily eroded if overgrazed or left bare. The water-holding capacity is very low and surface runoff is rapid. Stability of the soil mantle is high.

Soil and bedrock are easily excavated but these materials are poor for construction purposes. Ponds and reservoirs are not suited on Brader soils.

Recreation development potential is severely limited because of shallow soil depth.

Wildlife habitat is fair.

Mapping Units:

715-716/X 2,070 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit consists of about 60 percent of shallow, loamy (715) Brader soils and about 40 percent of moderately deep, loamy (716) Debenger soils randomly mixed in a very complex pattern.

Inclusions consist of the very clayey (704) Carney soils and (R) rock land. Some slope gradients exceed 60 percent.

715-716/Xn 190 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit consists of about 60 percent of shallow, loamy (715) Brader soils and about 40 percent of moderately deep, loamy (716) Debenger soils randomly mixed in a very complex pattern.

Inclusions consist of the very clayey (704) Carney soils and (R) rock land. Some slope gradients exceed 60 percent.

715-R/XY 510 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 80 percent. This unit consists of about 60 percent of the shallow, loamy (715) Brader soils and about 40 percent of (R) rock land. The (R) rock land is on the steeper slopes and crests of foothills.

Inclusions consist of the moderately deep, loamy (716) Debenger soils on lower slope positions.

18. (716) Debenger Series

The (716) Debenger series consists of moderately deep, loamy, well-drained soils from sandstone in areas receiving less than 30 inches of precipitation. They occur on foothills and knolls north of Sams Valley.

Profile Description: (716) Debenger loam.

Surface Soil: 0-5"	Dark brown loam, friable, slightly acid. 4-6" thick.
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Subsoil: 5-30" Reddish brown clay loam, firm,
slightly acid. 14-34" thick.

Substratum: 30+" Weathered sandstone.

Variations: Depth to weathered bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 0 to 25 percent. Surface soil colors are dark brown, brown, or dark yellowish brown. Subsoil colors are reddish brown, yellowish red, brown, or strong brown. Textures of the surface and subsurface layers are loam or clay loam.

Setting: The (716) Debenger soils occur on gently sloping to very steep foothills, ridges and knolls at elevations between 1,200 and 3,000 feet. Slope gradients range from 5 to 60 percent. The soils formed in colluvium from sandstone, shale and conglomerate.

The summers are warm and dry and the winters are cool and moist. The mean annual precipitation is 18 to 30 inches. The mean annual air temperature is about 53 degrees F.; the mean January temperature centers on 37 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 140 to 180 days. Native vegetation is white oak, madrone, ponderosa pine and associated shrubs, forbs and grasses.

The (716) Debenger soils are associated with the shallow (715) Brader soils from sandstone. Adjacent areas underlain by metamorphic rocks are occupied by soils of the 701, (718) Beekman, (781) Colestine and (719) Manzanita series. Other adjacent areas underlain by volcanic rocks are covered with soils of the 705, (706) Medco and (745) Laurelhurst series.

The (716) Debenger soils are similar to the (721) Siskiyou soils from granite but are more clayey and less sandy. They also resemble the (781) Colestine soils from metamorphic rocks, which generally are slightly gravelly in the subsoil. Other moderately deep, well-drained, light colored soils in the District are very gravelly or cobbly in the subsoil.

Soil Behavior: The (716) Debenger soils dominantly support open grassland with scattered brush and hardwoods. Scrubby ponderosa pine and Douglas-fir mixed with oak occur on northerly aspects and at higher elevations. Frost-heave susceptibility is severe.

Stability of the soil mantle is high. Unprotected surfaces have moderate to high erosion ratings. Drainageways are dry most of the time but contain water during periods of heavy rainfall.

Soil and bedrock are easily excavated but these materials are poor for construction purposes. Lack of suitable depth limits use for ponds or reservoirs.

Recreation development potential is limited mostly because of excessive slope gradients or lack of suitable soil depth.

Wildlife habitat is fair to good.

Mapping Units:

716-715/V 1,940 acres. Slopes dominantly are southerly and have gradients of 0 to 10 percent. This unit contains about 60 percent of the moderately deep (716) Debenger soils and 40 percent of the shallow (715) Brader soils mixed at random.

Inclusions consist of (1) alluvial land on the valley floor and of the deep, clayey (719) Manzanita soils on lower slope positions.

716-715/W 7,230 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. This unit contains about 60 percent of the moderately deep (716) Debenger soils and 40 percent of the shallow (715) Brader soils mixed at random.

Inclusions consist of (1) alluvial land on the valley floor and of the deep, clayey (719) Manzanita soils on lower slope positions.

19. (718) Beekman Series

The (718) Beekman series consists of moderately deep, loamy, very gravelly soils from metamorphic rocks in areas receiving less than 35 inches of precipitation. They occur on mountainous slopes in the Siskiyou Mountains.

Profile Description: (718) Beekman very gravelly loam.

Surface Soil:	0-8"	Dark brown, very gravelly loam, friable, neutral. 6-18" thick.
Subsoil:	8-34"	Brown, very gravelly loam, friable, slightly acid. 12-32" thick.
Substratum:	34"+	Fractured bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are dark brown, brown, or grayish brown. Subsoil colors are dark yellowish brown, brown, or reddish brown. Textures are very gravelly loam, or very gravelly clay loam. The soils are slightly acid to neutral.

Setting: The (718) Beekman soils occur on moderately steep to very steep mountainous slopes at elevations of 1,000 to 4,000 feet. Areas above 2,500 feet generally are on south-facing slopes. Slope gradients range from 20 to 85 percent with 35 to 85 percent slopes being most common. The soils formed in colluvium from metamorphosed sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 20 to 35 inches. The mean annual temperature is 48 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 72 degrees F. The frost-free period ranges from 140 to 180 days. Native vegetation consists of madrone, ponderosa pine, Douglas-fir and an understory of shrubs, forbs and grasses.

The (718) Beekman soils are associated with the shallow, very gravelly 701 soils; the moderately deep, loamy (781) Colestine soils; and the deep, clayey, reddish (719) Manzanita series. Adjacent areas receiving more than 35 inches of precipitation have soils of the shallow 372 series, the moderately deep 371 series and the deep 370 series, all of which are very gravelly.

The (718) Beekman soils differ from the (781) Colestine soils by containing more than 35 percent coarse fragments. They differ from the 371 soils from metamorphic rocks and the 731 soils from volcanic rocks by being less acid, or higher in bases.

Soil Behavior: The (718) Beekman soils have a low production capacity for conifers on northerly aspects. They support scrubby conifers mixed with hardwood species on southerly aspects and mostly brush and grass near drier zones.

Regeneration by bare-root planting is very difficult because of low annual precipitation, low soil moisture availability and grass competition. Some success will occur at higher elevations and near zones of higher precipitation. Removal of plant cover by excessive disturbance results in loss of soil material and buildup of coarse fragments, thus limiting water-storage capacity as well as lowering productivity.

Cable yarding causes the least disturbance of the surface layer. Although tractor logging does not adversely affect soil structure, erosion susceptibility is severe and bare soil in skid trails is a source of stream pollution. Construction of effective water bars is nearly impossible on steep slopes in this very gravelly, loamy material.

Cut-slope stability is high but minor failures will occur where the bedrock has been highly fractured or where rock layers are inclined toward the excavation. Some slumping of the soil mantle onto the roadway will occur.

Excavation on steep slopes will result in fractured substratum material covering the surface of fill slopes. This coarse rock material is not a suitable seedbed and will remain devoid of vegetation for several years. Most roadbeds will be in the rock substratum and surfacing in some places may not be necessary. On very steep slopes, side-cast material will extend far downslope and damage productive land.

Some sources of good pit-run rock occur in the substratum of (718) Beekman soils. In most places the bedrock is easily excavated by earth-moving equipment. The soil makes poor fill or embankment material. Ponds often fail.

Recreation development potential is limited because of steep slopes and very gravelly or cobbly soils. Steep drainageways usually do not contain water except when runoff is diverted from roads.

Southerly aspects are critical deer winter range. An area of major importance is the upper Little Applegate River watershed where there are abundant browse species. A conflict between wildlife-cover requirements and timber-harvest practices may occur.

Mapping Units:

718-701/XY 55,360 acres. Slopes dominantly are southerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85+ percent. This unit contains about 75 percent of moderately deep, very gravelly, loamy (718) Beekman soils and 25 percent of shallow 701 soils. The 701 soils occupy the steeper slopes and ridges.

Inclusions of moderately deep, fine-loamy (781) Colestine soils are mixed with the (718) Beekman soils: and of (R) rock land and unclassified, dark colored, very gravelly, loamy, shallow soils are mixed with the 701 soils. Adjacent to the more moist areas, these soils merge with the loamy, very gravelly soils of the 370, 371 and 372 series.

718-701/XYn 17,650 acres. Slopes dominantly are northerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85+ percent. This unit contains about 80 percent of moderately deep, very gravelly, loamy (718) Beekman soils and 20 percent of shallow 701 soils. The 701 soils occupy the steeper slopes and ridges.

Inclusions of moderately deep, fine-loamy (781) Colestine soils are mixed with the (718) Beekman soils: and of (R) rock land are mixed with the 701 soils. Adjacent to areas of higher precipitation, these soils merge with the loamy, very gravelly soils of the 371, 372 and 370 series.

718-701/Yn 12,260 acres. Slopes dominantly are northerly and have gradients of 60 to 85+ percent. This unit contains about 80 percent of moderately deep, very gravelly, loamy (718) Beekman soils and 20 percent of shallow 701 soils. The 701 soils occupy the steeper slopes and ridges.

Inclusions of moderately deep, fine-loamy (781) Colestine soils are mixed with the (718) Beekman soils: and of (R)

rock land are mixed with the 701 soils. Adjacent to areas of higher precipitation, these soils merge with the loamy, very gravelly soils of the 371, 372 and 370 series. Some gradients are less than 60 percent.

718-719/WX 7,600 acres. Slopes dominantly are southerly. Slope gradients for about 70 percent of the area are 10 to 35 percent, and for about 30 percent of the area are 35 to 65 percent. This unit contains about 55 percent of moderately deep, very gravelly, loamy (718) Beekman soils and 45 percent deep, clayey (719) Manzanita soils. The (718) Beekman soils are on the steeper slopes or ridges. The (719) Manzanita soils are at the head of drainageways and on lower slopes.

Minor inclusions consist of soils of the loamy, moderately deep (781) Colestine series and unclassified, dark colored, shallow soils. Small bodies of unclassified, somewhat poorly-drained soils are mingled with the (719) Manzanita soils.

718-781/Xn 2,420 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of moderately deep, very gravelly, loamy (718) Beekman soils and 40 percent of moderately deep, loamy (781) Colestine soils that are intermingled at random.

Inclusions consist of soils of the shallow 701 series on ridges and upper slopes, and of the deep, clayey (719) Manzanita soils on benches and lower slope positions. In the vicinity of Sexton, Walker and Roberts Mountains, north of the City of Grants Pass, the moderately well-drained (712) Jumpoff soils occupy benches and less steep slopes with the (719) Manzanita soils.

718-781/XY 43,820 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains about 70 percent of moderately deep, very gravelly, loamy (718) Beekman soils randomly mixed with about 30 percent of moderately deep, loamy (781) Colestine soils.

Minor inclusions consist of unclassified, dark colored, very gravelly, shallow 701 soils and (R) rock land on the steeper slopes and ridges. The deep, clayey (719) Manzanita soils occur on lower slope positions. In the vicinity of Sexton, Walker and Roberts Mountains, north of the City of Grants Pass, the moderately well-drained (712) Jumpoff soils occupy benches and less steep slopes with the (719) Manzanita soils. Some unclassified coarse-loamy soils occur in the Evans Creek watershed.

718-781/XYn 48,820 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains about 70 percent of moderately deep, very gravelly, loamy (718) Beekman soils randomly mixed with about 30 percent of moderately deep, loamy (781) Colestine soils.

Minor inclusions consist of shallow 701 soils and (R) rock land on the steeper slopes and ridges. The deep, clayey (719) Manzanita soils occur on lower slope positions. In the vicinity of Sexton, Walker and Roberts Mountains, north of the City of Grants Pass, the moderately well-drained (712) Jumpoff soils occupy benches and less steep slopes with the (719) Manzanita soils. Some unclassified coarse-loamy soils occur in the Evans Creek watershed.

20. (719) Manzanita Series

The (719) Manzanita series consists of deep, red, clayey, well-drained soils from metamorphic rocks in areas receiving less than 35 inches of precipitation. They occur on gently sloping to steep alluvial fans and upland slopes.

Profile Description: (719) Manzanita clay loam.

Surface Soil:	0-9"	Dark reddish brown clay loam, friable, slightly acid. 6-15" thick.
Subsoil:	9-50"	Yellowish red clay, firm, very sticky, very plastic, slightly acid. 25-50" thick.
Substratum:	50"+	Fractured metamorphic bedrock.

Variations: Depth to bedrock ranges from 40 to more than 60 inches. Coarse-fragment content ranges from 5 to 35 percent. Surface colors are dusky red, dark reddish brown, or very dark brown. Subsoil colors are dark reddish brown, dark red, red, reddish brown or yellowish red. Surface soil textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are clay, gravelly clay, or heavy clay loam.

Setting: The (719) Manzanita soils occur on gently sloping to steep alluvial fans and upland slopes in the Siskiyou Mountains at elevations of 1,500 to 3,000 feet. Most areas higher than 2,500 feet are on south-facing slopes. Gradients range from 3 to 60 percent, with slopes of 10 to 35 percent being most common. The soils formed in colluvium from metamorphosed, sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 20 to 35 inches. The annual air temperature ranges from 48 to 54 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period ranges from 130 to 170 days. Vegetation consists of madrone, white oak, ponderosa pine, Douglas-fir and an associated understory of shrubs, forbs and grasses.

The (719) Manzanita soils are associated with soils of the moderately well-drained, deep, clayey (712) Jumpoff series; the moderately deep, loamy (781) Colestine series; the moderately deep, loamy, very gravelly (718) Beekman series; and the shallow 701 series. On adjacent areas receiving more than 35 inches of precipitation are soils of the 370, 371, 372, (380) Pollard, 381 and 382 series. Adjacent areas underlain by granitoid rocks have soils of the (721) Siskiyou and (722) Holland series.

The (719) Manzanita soils are distinguished from the similar (380) Pollard and (750) Dumont soils by being less acid. They differ from the 382 soils by having fewer coarse fragments and being less acid. The (741) Freezner soils from volcanic rocks are lighter colored and slightly more acid. The (745) Laurelhurst soils are less red and darker in the surface than the (719) Manzanita soils. The (722) Holland soils from granite are more sandy than the (719) Manzanita soils.

Soil Behavior: The (719) Manzanita soils support mixed stands of conifer and hardwood species on northerly aspects. Mostly brush and grass occurs on southerly aspects but some mixed fir and pine species occur near wetter zones. The soils have a low site class for Douglas-fir.

Regeneration is severe for bare-root planting. Grass is a strong competitor for available moisture.

Compaction by heavy equipment is a severe hazard during wet soil conditions and will lower productivity and increase surface erosion. Water bars can be effectively constructed where slope gradients do not exceed 35 percent. Cable yarding can be safely accomplished most of the time. These clayey soils retain moisture longer than loamy soils and remain moist until late in the spring.

Soils of this series exhibit a high mantle stability when excavated. However, soil slips and landslides will occur where deep cuts are made, in places of surface-water concentration and in pockets adjacent to shallow soils over hard rock.

The erosion hazard is high. Exposed soil material is an important source of colloidal sediments that will lower water quality and can damage aquatic habitat. Side-cast material usually can be revegetated by grass or trees. However, it is difficult to maintain a grass cover on southerly aspects and on cut slopes unless they are shaded, or unless ground water is near the surface.

The soil mantle usually is quite thick and bedrock is poor for construction material. The soil is satisfactory for fills and embankments if used at proper moisture content to achieve adequate compaction. These soils are good sites for ponds.

Recreation development potential is good on gentle slopes. The soils are subject to compaction by foot traffic and bare surfaces are dusty when dry.

Southerly aspects are critical deer winter range. An area of major importance is the upper Little Applegate watershed where there are abundant browse species. A conflict between wildlife-cover requirements and timber-harvest practices may occur.

Mapping Units:

719/VW 18,090 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 0 to 10 percent and 30 percent has gradients of 10 to 35 percent. The soils predominantly are the deep, red, clayey (719) Manzanita series on gently sloping to moderately steep alluvial fans and lower slope positions.

Minor inclusions of the very gravelly, loamy (718) Beekman soils and loamy (781) Colestine soils occur randomly mixed on steeper slopes. (1) Alluvial land occupies the gently sloping alluvial fans adjacent to major streams and valley bottoms.

719/W 22,010 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. The soils predominantly are the deep, red, clayey (719) Manzanita series on moderately steep alluvial fans and lower slope positions.

Minor inclusions of the very gravelly, loamy (718) Beekman soils and loamy (781) Colestine soils occur randomly mixed on steeper slopes. (1) Alluvial land occupies the gently sloping alluvial fans adjacent to major streams and valley bottoms.

719/Wn 14,720 acres. Slopes dominantly are northerly and have gradients of 10 to 35 percent. The soils predominantly are the deep, red, clayey (719) Manzanita series on moderately steep alluvial fans and lower slope positions.

Minor inclusions of the very gravelly, loamy (718) Beekman soils and loamy (781) Colestine soils occur randomly mixed on steeper slopes. (1) Alluvial land occupies the gently sloping alluvial fans adjacent to major streams and valley bottoms.

719/WX 10,680 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. The soils predominantly are the deep, red, clayey (719) Manzanita soils on benches and terraces of lower slope positions.

Inclusions of the very gravelly, loamy (718) Beekman soils and loamy (781) Colestine soils occur randomly mixed on steep, upper slope positions.

719/WXn 3,600 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. The soils predominantly are the deep, red, clayey (719) Manzanita soils on benches and terraces of lower slope positions.

Inclusions of the very gravelly, loamy (718) Beekman soils and loamy (781) Colestine soils occur randomly mixed on steep, upper slope positions.

719-781/WX 7,750 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of about 60 percent of deep, clayey (719) Manzanita soils on benches and 40 percent of moderately deep, loamy (781) Colestine soils on steeper slopes.

Inclusions of very gravelly, loamy (718) Beekman soils are mixed with the (781) Colestine soils. The moderately well-drained (712) Jumpoff soils occur on benches in the vicinity of Walker and Elk Mountains. Wet spots occur at random.

719-781/WXn 3,910 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of 60 percent deep, clayey (719) Manzanita soils mostly on benches and 40 percent of moderately deep, loamy (781) Colestine soils on steeper slopes.

Inclusions of very gravelly, loamy (718) Beekman soils are mixed with the (781) Colestine soils. The moderately well-drained (712) Jumpoff soils occur on benches in the vicinity of Walker and Elk Mountains. Wet spots occur at random.

21. (721) Siskiyou Series

The (721) Siskiyou series consists of moderately deep, sandy, somewhat excessively-drained soils from granitoid rocks in the Siskiyou Mountains. They occur on strongly sloping to very steep slopes.

Profile Description: (721) Siskiyou sandy loam.

Surface Soil:	0-10"	Dark yellowish brown sandy loam, very friable, slightly acid. 5-15" thick.
Subsoil:	10-30"	Yellowish brown gravelly sandy loam, massive, very friable, medium acid. 5-30" thick.
Substratum:	30"+	Weathered granitic bedrock.

Variations: Depth to massive weathered bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 5 to 35 percent. Surface colors are dark yellowish brown, yellowish brown, dark brown, or brown. Subsoil colors are dark yellowish brown, yellowish brown, olive brown, or light olive brown. Textures of surface and subsurface soils are sandy loam, or gravelly sandy loam.

Setting: The (721) Siskiyou soils occur on moderately steep to very steep hills and mountains at elevations of 1,200 to 4,000 feet. Slope gradients range from 10 to 85 percent with slopes over 35 percent being most common. The soils formed in colluvium from granitoid rocks.

Summers are warm and dry and winters are cool and moist. The mean annual precipitation ranges from 30 to 50 inches. The mean annual temperature ranges from 47 to 54 degrees F.; the mean January temperature centers on 36 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 130 to 170 days. Native vegetation consists of ponderosa pine, Douglas-fir, madrone and associated shrubs and forbs.

The (721) Siskiyou soils are associated with soils of the deep, fine-loamy (722) Holland series from granitoid rocks. At elevations above 4,000 feet underlain by granitoid rocks, the soils are of the (861) Rogue series. Adjacent areas with soils from metamorphic rocks are occupied by soils of the relatively dry (718) Beekman, (719) Manzanita and (781) Colestine series; and the relatively moist soils of the 370, 371, 372, (380) Pollard and 381 series. Adjacent areas with soils from serpentine are mainly covered with soils of the (770) Pearsoll series and (R) rock land.

The (721) Siskiyou soils are sandier than all the other moderately deep soils in the District. They also contain fewer coarse fragments than most of these. Thus, they are easily distinguished from soils of the 371, 731 and (718) Beekman series. The (716) Debenger soils from sandstone are most like (721) Siskiyou soils but are redder and less sandy.

Soil Behavior: Soils of the (721) Siskiyou series support a mixed stand of conifers and hardwoods. Near Grants Pass, precipitation is low and the soil productivity is low. An area of relatively high productivity

for these soils is on the long, north slopes of Sugarloaf Peak where more precipitation and cooler air temperatures favor tree growth and natural regeneration.

The regeneration hazard is moderate for bare-root plantings on northerly aspects. However, the regeneration hazard is severe in low-precipitation zones and on south aspects. The sandy surface layer has a low moisture-holding capacity.

Cable yarding has the least impact of conventional harvest systems on soil structure and stability. Tractor yarding, particularly, causes excessive disturbance and reduces soil mantle stability. Water bars made from these coarse materials have a high incidence of failure.

Saturated cutbanks and fill slopes are subject to slumping and massive failure. Soil particles are easily detached by moving water and unprotected surfaces are susceptible to severe erosion. Gullies often form in unsurfaced roadways and ditchlines. Coarse sediments of the (721) Siskiyou soils generally do not cause much turbidity but biological activity is adversely affected where sediments contribute to stream bedload. Grass cover is easily established on fill slopes but needs periodic fertilization for maintenance.

Bedrock can be ripped but is not suitable for construction material. Ponds generally will fail. Manufactured material or suitable clayey soils must be used for embankments and fills.

The soils are not susceptible to compaction by foot traffic and there is little dust problem. Some cobbles and stones occur on the surface on very steep slope gradients. There are few springs, and wells often are inadequate for domestic use.

Wildlife habitat is good.

Mapping Units:

721/X 10,680 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit predominantly contains the moderately deep (721) Siskiyou soils on steep foothill and mountain sideslopes.

Minor inclusions consist of the deep, loamy (722) Holland soils randomly mingled on benches and lower slope positions. The deep, sandy unclassified soils occur in drainageways and on alluvial fans. Some slope gradients are less than 35 percent.

721/Xn 3,220 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit predominantly contains the moderately deep (721) Siskiyou soils on steep foothill and mountain sideslopes.

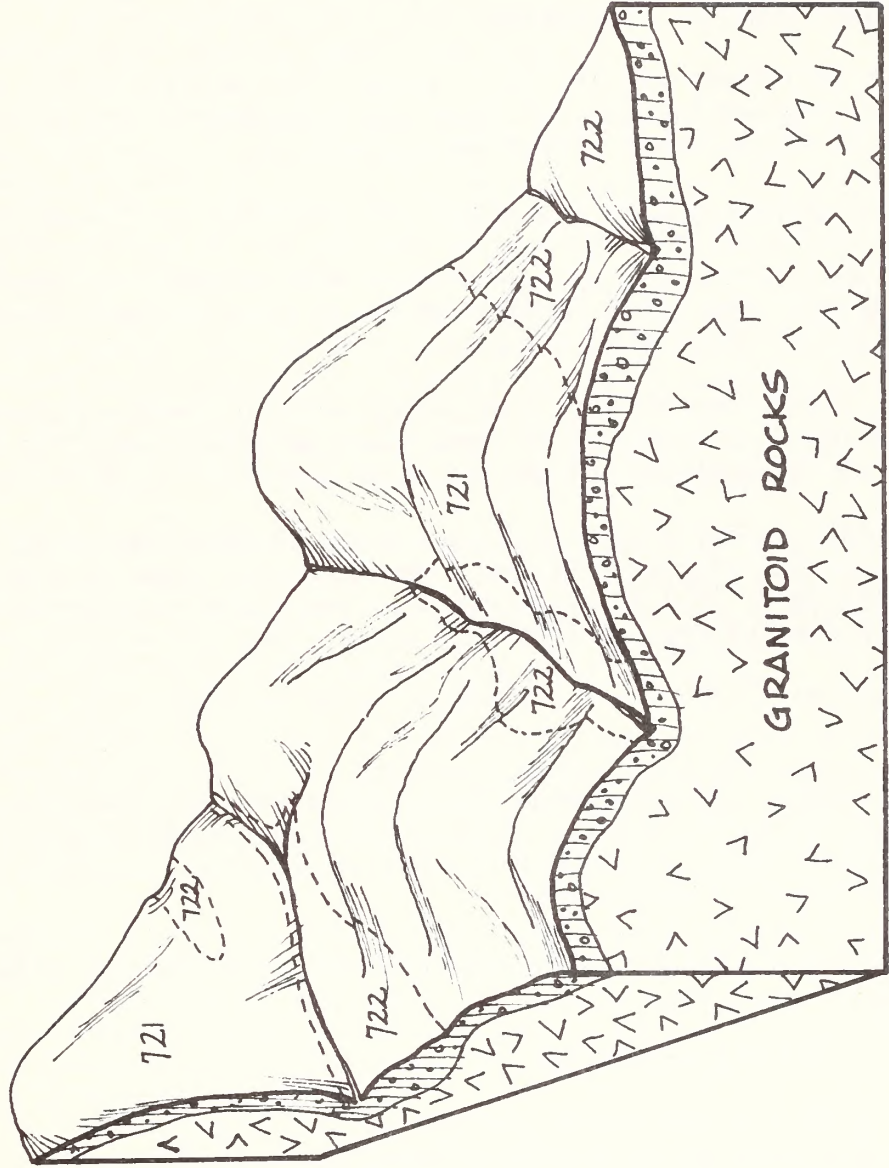


Figure 5. Block diagram showing the typical landscape positions for (721) Siskiyou and (722) Holland soil series.

Minor inclusions consist of the deep, loamy (722) Holland soils randomly mingled on benches and lower slope positions. The deep, sandy unclassified soils occur in drainageways and on alluvial fans. Some slope gradients are less than 35 percent.

721/XY 18,300 acres. Slopes dominantly are southerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85 percent. This unit predominantly contains the moderately deep (721) Siskiyou soils on steep to very steep foothill and mountain sideslopes.

Minor inclusions are the deep, loamy (722) Holland soils randomly mixed on benches and lower slope positions, and (R) rock land on the steepest slopes and ridge tops.

721/XYn 11,050 acres. Slopes dominantly are northerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85 percent. This unit predominantly contains the moderately deep (721) Siskiyou soils on steep to very steep foothill and mountain sideslopes.

Minor inclusions are the deep, loamy (722) Holland soils randomly mixed on benches and lower slope positions, and (R) rock land on the steepest slopes and ridge tops.

721/Y 860 acres. Slopes dominantly are southerly and have gradients of 60 to 90 percent. This unit predominantly contains the moderately deep (721) Siskiyou soils on very steep mountain sideslopes west of Peggler Butte.

Inclusions of (R) rock land mostly occur on ridges and steeper slopes.

721/Yn 1,940 acres. Slopes dominantly are northerly and have gradients of 60 to 90 percent. This unit predominantly contains the moderately deep (721) Siskiyou soils on very steep mountain sideslopes west of Peggler Butte.

Inclusions of (R) rock land mostly occur on ridges and steeper slopes.

22. (722) Holland Series

The (722) Holland series consists of deep, loamy, reddish brown, well-drained soils from granitic materials in the Siskiyou Mountains. They occur on gently sloping to steep footslopes and alluvial fans.

Profile Description: (722) Holland loam.

Surface Soil: 0-10"	Dark brown loam, friable, slightly acid. 8-20" thick.
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Subsoil: 10-65" Dark reddish brown clay loam, firm, slightly acid. 30-60" thick.

Substratum: 65"+ Strongly weathered granitic rock.

Variations: Depth to weathered bedrock is from 40 to 100 inches and usually is deeper than 60 inches. Coarse-fragment content ranges from 3 to 25 percent. Surface soil colors are grayish brown, dark brown, or brown. Subsoil colors are reddish brown, reddish yellow, yellowish red, brown, or strong brown. Surface soil textures are loam or sandy loam. Subsoil textures are clay loam or sandy clay loam.

Setting: The (722) Holland soils occur on gently sloping to steep alluvial fans and foothills at elevations of 1,200 to 3,000 feet. Slope gradients range from 3 to 60 percent but slopes between 3 and 35 percent are most common. The soils formed in colluvium from granitoid rocks.

The summers are warm and dry and the winters are cool and moist. The mean annual precipitation ranges from 30 to 50 inches. The mean annual temperature ranges from 50 to 54 degrees F.; the mean January temperature centers on 36 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 130 to 170 days. Native vegetation consists of ponderosa pine, Douglas-fir, madrone, white oak and an associated understory of shrubs, forbs and grasses.

The (722) Holland soils are associated with soils of the moderately deep (721) Siskiyou soils from granitoid rocks. Adjacent areas with soils from metamorphic, sedimentary and volcanic rocks are occupied by soils of the relatively dry (781) Colestine and (719) Manzanita series and the relatively moist 370, 371, (380) Pollard and 382 soils.

The (722) Holland soils are similar to the deep, reddish soils of the (380) Pollard, 382 and (719) Manzanita series from metamorphosed rocks, but all of these are more clayey in the subsoil. The deep, reddish soils of the (741) Freezner, (745) Laurelhurst and (750) Dumont series from volcanic rocks are all more clayey in the subsoil than (722) Holland soils.

Soil Behavior: Soils of the (722) Holland series support a mixed stand of conifers and hardwoods. Near Grants Pass, precipitation is low and the soil productivity is very low. An area of relatively high productivity for these soils is on the lower north slopes of Sugarloaf Peak where more precipitation and cooler air temperatures favor tree growth and natural regeneration.

Moderate success from bare-root plantings can be expected. However, regeneration is poor in low-precipitation zones and on south aspects. The sandy surface layer has a low moisture-holding capacity.

Cable yarding has the least impact of conventional harvest systems on soil structure and stability. Tractor yarding, particularly, causes

excessive disturbance and reduces soil mantle stability. Water bars made in these soils have a high incidence of failure but can be effectively constructed on gentle slopes.

Saturated cutbanks and fill slopes are subject to slumping and failure. Accelerated erosion occurs on exposed surfaces. Soft bedrock in ditch-lines is easily eroded to form deep gullies. Coarse sediments in streams cause moderate turbidity and aquatic habitat is degraded where sediments contribute to bedload. Grass cover is easily established on fill slopes but needs periodic fertilization for maintenance.

Bedrock can be ripped but is not suitable for construction material. Ponds generally will fail. Manufactured material or suitable clayey soils must be used for embankments and fills.

Recreation development potential is moderate. The soils are not easily compacted by foot traffic but there is some dust problem. There are few springs, and wells often are inadequate for domestic use.

Wildlife habitat is good.

Mapping Units:

722/V 4,150 acres. Slopes dominantly have gradients of 0 to 10 percent. This mapping unit contains predominantly loamy (722) Holland soils on gently sloping alluvial fans and lower slope positions.

Minor inclusions of deep, sandy unclassified soils occur in drainageways and adjacent to major tributary streams. Some gradients are more sloping than 10 percent.

722/VW 7,390 acres. Slopes dominantly are southerly and about 70 percent have gradients of 0 to 10 percent and 30 percent have gradients of 35 to 60 percent. This mapping unit contains predominantly loamy (722) Holland soils on gently sloping fans and moderately sloping, benched, lower slope positions.

Minor inclusions of the deep, sandy unclassified soils occur in drainageways and adjacent to major tributary streams; and of the moderately deep (721) Siskiyou soils on the steeper positions.

722/W 4,930 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. The soils predominantly are of the loamy (722) Holland series on moderately sloping, benched, lower slope positions.

Minor inclusions of the deep, sandy unclassified soils occur in drainageways and adjacent to major tributary streams; and of the moderately deep (722) Siskiyou soils occur on the steeper positions. Some gradients are more sloping than 35 percent.

722/Wn 920 acres. Slopes dominantly are northerly and have gradients of 10 to 35 percent. The soils predominantly are of the loamy (722) Holland series on moderately sloping, benched, lower slope positions.

Minor inclusions of deep, sandy unclassified soils occur in drainageways and adjacent to major tributary streams; and of the moderately deep (721) Siskiyou soils occur on the steeper positions. Some gradients are more sloping than 35 percent.

23. (731) Straight Series

The (731) Straight series consists of moderately deep, loamy, very gravelly, well-drained soils from volcanic rocks in areas receiving more than 35 inches of precipitation. They occur on steep to very steep slopes.

Profile Description: (731) Straight gravelly loam.

Surface Soil:	0-8"	Dark reddish brown, gravelly loam, friable, slightly acid. 6-10" thick.
Subsoil:	8-30"	Yellowish red, very gravelly light clay loam, friable, medium acid. 10-30" thick.
Substratum:	30"+	Fractured volcanic rock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are dark reddish brown, reddish brown, or brown. Subsoil colors are reddish brown, yellowish red, strong brown, or red. Textures of the surface layer are gravelly loam or very gravelly loam. Textures of the subsurface are very gravelly loam or very gravelly light clay loam.

Setting: The (731) Straight soils occur on steep to very steep mountainous slopes at elevations of 2,000 to 4,000 feet. Areas below 2,500 feet are generally on north-facing slopes. Slope gradients range from 35 to 85 percent. The soils formed in colluvium from basic volcanic rocks. The (731) Straight soils are common in the Elk Creek and Trail Creek watersheds.

The summers are warm and dry and the winters are cool and moist. The mean annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 47 to 52 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period ranges from 100 to 150 days. Native vegetation consists of Douglas-fir, ponderosa pine, incense-cedar, madrone and an understory of shrubs and forbs.

The (731) Straight soils are associated with soils of the shallow, very gravelly 732 series and the deep, red, clayey (741) Freezner series. Adjacent areas receiving less than 35 inches of precipitation have soils of the (36) Witzel, 705, (706) Medco and (745) Laurelhurst series. Adjacent areas at elevations above 4,000 feet have soils of the 809 and 810 series.

The (731) Straight soils are distinguished from the similar 371 soils, which are from metamorphic and sedimentary rocks, by being redder colored and lower in organic matter in the surface layer. The 740 soils are deeper than the 731 soils, as well as being darker colored. The (718) Beekman soils are browner and less acid than the Straight soils.

Soil Behavior: Soils of the (731) Straight series support a mixed stand of conifer and hardwood species. Douglas-fir and pine are dominant. Madrone and black oak become more abundant where available soil moisture for plants is less. This usually is on steeper slopes, southerly aspects and near zones of lower rainfall. Available moisture is mostly affected by the amount of coarse fragments in the soil profile and depth of soil. Productivity is directly affected by these factors.

The amount of gravel in the surface layer has the dominant influence on success of bare-root plantings. Regeneration hazard is moderate to severe. Removal of plant cover by excessive disturbance will result in loss of soil material and buildup of coarse fragments. This will limit water-storage capacity as well as lower the productivity.

Cable yarding causes the least disturbance of the surface layer. Although tractor logging does not seriously affect soil structure by compaction, there is a hazard for excessive disturbance of the surface. Bare soil in skid trails is a source of stream pollution. Construction of effective water bars is nearly impossible on steep slopes in this very gravelly and cobbly soil.

Cut-slope stability is high but minor failures will occur where the bedrock has been highly fractured or where rock layers are inclined toward the excavation. Some slumping of the soil mantle onto the roadway will occur.

Excavation on steep slopes will result in a cover of fractured substratum material on the surface of fill slopes. This coarse rock material is not a suitable seedbed and will remain devoid of vegetation for several years. Most roadbeds will be in the rock substratum and surfacing in some places may not be necessary. On very steep slopes, side-cast material will extend far downslope and damage productive land.

Some sources of good pit-run rock occur in the substratum of (731) Straight soils. Bedrock can be ripped but occasional blasting is necessary. The soil is poor for fill or embankment material. Fills may fail if culverts become plugged. Ponds often fail.

Recreation development potential is limited because of steep slopes and very gravelly or cobbly soils. Steep drainageways usually do not contain water except when runoff is diverted from roads.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

731-732/XY 5,640 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and about 30 percent has gradients of 60 to 85 percent. This unit consists of about 60 percent of the moderately deep (731) Straight soils and 40 percent of the shallow 732 soils. The 732 soils are on the steeper slopes.

Minor inclusions of the deep, clayey (741) Freezner soils are mingled with the (731) Straight soils. (R) Rock land occurs with the 732 soils. The moderately deep, clayey 705 soils and the shallow, loamy 701 soils occur at random where they merge with the (731) Straight and 732 soils.

731-732/XYn 11,360 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and about 30 percent has gradients of 60 to 85 percent. This unit consists of about 60 percent of the moderately deep (731) Straight soils and 40 percent of the shallow 732 soils. The 732 soils are on the steeper slopes.

Minor inclusions of the deep, clayey (741) Freezner soils are mingled with the (731) Straight soils. (R) Rock land occurs with the 732 soils. The moderately deep, clayey 705 soils and the shallow, loamy 701 soils occur at random where they merge with the (731) Straight and 732 soils.

24. 732 Series

The 732 series consists of shallow, very gravelly, well-drained soils from volcanic rocks in areas receiving more than 35 inches of precipitation. They occur on steep to very steep slopes.

Profile Description: 732 very gravelly loam.

Surface Soil:	0-4"	Brown, very gravelly loam, friable, moderately acid. 2-6" thick.
Subsoil:	4-16"	Reddish brown, very gravelly loam, friable, moderately acid. 8-18" thick.
Substratum:	16"+	Fractured rock.



Figure 6. Typical land form of (731) Straight - 732 soil association. Inclusions of (R) rock land are on the steeper slopes and (741) Freezner soils are lower slope positions.



Figure 7. Weathering of volcanic rocks with different mineralogy causes a random mixture of soil profiles in a short linear distance. The solid line is the soil-bedrock contact. (731) Straight soils are on the left, and 732 soils and (R) rock land are on the right.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 70 percent. Surface soil colors are brown or reddish brown. Subsoil colors are reddish brown, yellowish red, or strong brown. Textures of the surface and subsurface layers are very gravelly loam, very gravelly clay loam, or very gravelly silty clay loam.

Setting: The 732 soils occur on steep to very steep mountainous slopes at elevations of 2,000 to 4,000 feet. Areas below 2,500 feet are on north-facing slopes. Slope gradients range from 35 to over 85 percent with most areas being steeper than 50 percent. The soils formed in colluvium from tuff, breccia and volcanic flow rocks. They are common in the Trail Creek and Elk Creek watersheds.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 55 inches. The mean annual air temperature ranges from 47 to 52 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 68 degrees F. The frost-free period ranges from 100 to 150 days. Vegetation is Douglas-fir, ponderosa pine, madrone, incense-cedar and an understory of shrubs and forbs.

The 732 soils are associated with the moderately deep, very gravelly (731) Straight soils; the deep, red, clayey (741) Freezner soils; and (R) rock land.

The 732 soils differ from the similar (36) Witzel soils by being lighter colored and more acid and from the 701 soils by being more acid. Soils of the (36) Witzel and 701 series are all in areas receiving less than 35 inches of precipitation and supporting more open grassland.

Soil Behavior: Soils of the 732 series are extremely droughty and have a low capacity to produce timber. These soils support scrubby stands of conifers and hardwoods. Ponderosa pine, madrone and Douglas-fir are dominant tree species. Conifers are nonexistent on some southerly aspects and near zones of low precipitation.

Bare-root plantations usually are failures because of the very low moisture availability of the soils. This is caused by shallow depth and high coarse-fragment content.

Cable and tractor yarding on these soils will result in exposed areas susceptible to severe erosion. Excessive slope gradients and soil physical properties preclude construction of effective water bars.

Roads are very stable and good construction rock occurs in the substratum of 732 soils. Blasting usually is necessary but some ripping can be accomplished for shallow excavations. Side-cast material usually extends far downslope and contains mostly fractured rock. This material will not become revegetated. Roadbeds are in the rock substratum and surfacing may not be necessary.



Figure 8. Roads on steep terrain usually result in deep cuts into the rock substratum. Side-cast material with high rock fragment content will not become revegetated.



Figure 9. Very stony side-cast material on steep terrain extends far downslope reducing the productive land base.

The soil is poor for fill or embankment material. Ponds may fail.

Recreation development potential is severely limited because of steep slopes and shallow, very gravelly or cobbly soils. Rock outcrop is commonly associated with these soils. Drainageways usually do not contain water except when runoff is diverted from roads.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

732-R/Y 1,310 acres. Slopes dominantly are southerly and have gradients of 60 to 85+ percent. This unit contains about 60 percent 732 soils and 40 percent (R) rock land. The (R) rock land is on the steeper slopes that generally are near the tops of foothills and mountains.

Minor inclusions of the moderately deep (731) Straight soils are mingled with the 732 soils. The deep, clayey (741) Freezner soils occur on benches and lower slope positions. Some gradients are less than 60 percent.

25. (740) Geppert Series

The (740) Geppert series consists of moderately deep, loamy, cobbly, well-drained soils from basic volcanic rocks in the Cascade Mountains. They occur on steep to very steep slopes.

Profile Description: (740) Geppert cobbly loam.

Surface Soil:	0-13"	Dark brown cobbly loam, friable, slightly acid. 6-18" thick.
Subsoil:	13-30"	Dark reddish brown, very cobbly clay loam, friable, medium acid. 11-25" thick.
Substratum:	30"+	Volcanic bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface colors are dark brown, brown, or dark reddish brown. Subsoil colors are dark reddish brown, reddish brown, yellowish red, or strong brown. Textures of the surface soil are cobbly loam, gravelly loam, or very gravelly loam. Textures of the subsoil are very cobbly loam, very gravelly loam, very cobbly clay loam, or very gravelly clay loam.

Setting: The (740) Geppert soils occur on steep to very steep ridges, sideslopes and dissected slopes at elevations of 2,000 to 4,000 feet. Slopes range from 35 to 85 percent. The soils formed in colluvium from

basic volcanic rocks in the Dudley and Olson Mountain areas of the Cascade Range.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 46 to 50 degrees F.; the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 65 degrees F. The frost-free period is from 100 to 140 days. Native vegetation consists of Douglas-fir, incense-cedar, sugar pine and an understory of shrubs and forbs.

The (740) Geppert soils are associated with the deep, clayey, reddish (750) Dumont soils. Near the 4,000-foot elevation level, they merge with the colder, stony, loamy soils of the moderately deep 809 series and the deep 810 series.

The (740) Geppert soils are darker than the moderately deep, very gravelly, loamy soils of the 371 series that are from metamorphic rocks. The 809 soils are very similar to the (740) Geppert soils except they are colder.

Soil Behavior: The (740) Geppert soils are forested with a dominant overstory of Douglas-fir, madrone, sugar pine and incense-cedar. These soils are droughty on southerly aspects and on steep upper slopes. Some western hemlock and white fir occur near 4,000 feet elevation where temperatures are cooler and precipitation is higher.

A cobbly surface layer hinders success of natural and bare-root regeneration. Regeneration hazard is moderate on north slopes and severe on south slopes. At lower elevations, poison oak and grass compete for soil moisture. Frost-heave potential is high causing a high mortality in containerized seedlings.

Cable yarding will cause least disturbance on steep slopes. The surface layer is high in silt content and the erosion hazard is severe. Bare skid trails are sources of stream pollution.

Cut slopes are stable but some sloughing of the soil mantle will occur. Road surfacing often is necessary, especially where shallow cuts leave the road prism in soil material. Erosion from side-cast material near drainageways will adversely affect aquatic life.

Bedrock is rippable, but it is not a good construction material. The soil is not suitable for ponds. Embankments and fills have low strength.

Potential development for recreation is limited because of steep slopes and very cobbly soil material. Bare surfaces are very dusty when dry.

Wildlife habitat is excellent. Summer range for big-game species is good.

Mapping Units:

740-750/X 6,360 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the moderately deep, very cobbly (740) Geppert soils and about 40 percent of the deep, clayey (750) Dumont soils. The (750) Dumont soils are on the less steeply sloping areas.

Inclusions of moderately deep, cobbly unclassified soils occur on the steeper canyon walls with (740) Geppert soils. Some gradients are steeper than 60 percent.

740-750/Xn 6,240 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the moderately deep, very cobbly (740) Geppert soils and about 40 percent of the deep, clayey (750) Dumont soils. The (750) Dumont soils are on the less steeply sloping areas.

Inclusions of moderately deep, cobbly unclassified soils occur on the steeper canyon walls with (740) Geppert soils. Some gradients are steeper than 60 percent.

26. (741) Freezner Series

The (741) Freezner series consists of deep, clayey, red, well-drained soils from basic volcanic rocks in areas receiving more than 35 inches of precipitation. They occur on moderately steep to very steep mountainous slopes.

Profile Description: (741) Freezner loam.

Surface Soil:	0-10"	Dark reddish brown loam, friable, slightly acid. 7-15" thick.
Subsoil:	10-55"	Yellowish red clay, firm, sticky, plastic, slightly acid. 33-45" thick.
Substratum:	55"+	Fractured volcanic bedrock.

Variations: Depth to bedrock ranges from 40 to 60+ inches. Coarse-fragment content ranges from 0 to 35 percent and may exceed 35 percent below 40 inches. Surface soils colors are reddish brown, dark reddish brown, or dark brown. Subsoil colors are reddish brown, red, yellowish red, or reddish yellow. Surface soil textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are clay, gravelly clay, clay loam, or gravelly clay loam. Soil reaction becomes more acid with depth but never exceeds medium acidity below 60 inches.

Setting: The (741) Freezner soils occur on ridge tops and mountainous sideslopes at elevations between 2,000 and 4,000 feet. Slope gradients

range from 10 to 85 percent, but commonly are between 10 and 60 percent. The soils formed in colluvium from basic volcanic rocks. These soils are most common in the Trail Creek and Elk Creek watersheds.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 47 to 52 degrees F.; the mean January temperature centers on 34 degrees F.; and the mean July temperature centers on 65 degrees F. The frost-free period ranges from 120 to 150 days. Native vegetation consists of Douglas-fir, sugar pine, ponderosa pine, incense-cedar and an associated understory of shrubs and forbs.

The (741) Freezner soils are associated with the moderately deep, very gravelly, loamy (731) Straight soils and the shallow, very gravelly, loamy 732 soils. The deep, clayey, reddish brown (745) Laurelhurst soils occur on adjacent areas receiving less than 35 inches of precipitation. Small areas of moderately well-drained unclassified soils occur with (741) Freezner soils.

The (741) Freezner soils differ from the similar (750) Dumont soils that are also from volcanic rocks in moderate precipitation areas by being less acid and lighter colored. Many areas of (750) Dumont soils are also deeper than the (741) Freezner soils. The (741) Freezner soils are distinguished from the (745) Laurelhurst soils by being redder, lighter colored in the surface and more acid. The (745) Laurelhurst soils are in areas receiving less than 35 inches of precipitation.

Soil Behavior: Soils of the (741) Freezner series have a moderate productive capacity for Douglas-fir. Dominant conifer species are Douglas-fir, incense-cedar, sugar pine and grand fir. Chinquapin, madrone and other hardwoods are more common on southerly exposures and at lower elevations.

The regeneration hazard is moderate on north slopes and severe on south slopes. Brush competition for available moisture is greater where precipitation is higher.

Compaction by tractor logging during wet soil conditions will lower productivity and cause surface erosion in skid trails. These clayey soils take longer than loamy soils to dry out in spring. Some concave and benched slopes remain wet for long periods of time and should be avoided by tractors. Cable yarding can be accomplished most of the time without excessive disturbance. Effective water bars can be constructed where slopes do not exceed 35 percent.

The (741) Freezner soils usually exhibit a high mantle stability when excavated, although soil slips and landslides may occur where deep cuts are made. The landslide on Morine Creek is an example of an unstable area in these soils.

The erosion hazard is moderate to severe. Exposed soil material is an important source of colloidal sediments that will lower water quality

and damage aquatic habitat. Side-cast material usually can be revegetated by grass or trees. It is difficult to maintain a grass cover on cut slopes unless they are shaded or receive seepage water.

The soils provide good sites for ponds and are a satisfactory material for embankments and fills if adequate compaction is achieved. Bedrock is good for base material.

Recreation development potential is good. However, the soils are subject to compaction by foot traffic, and bare surfaces are dusty when dry. Excessive slope is the most limiting factor for subsurface sewage disposal. Minor drainageways maintain flow late into the dry season.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

741/W 480 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. The soils of this unit mostly are of the deep, red, clayey (741) Freezner series. They occur on moderately sloping terraces, benches and rounded ridges.

Inclusions of the moderately deep, loamy (731) Straight soils occupy the steepest positions. Some slopes are less than 10 percent.

741/WX 2,020 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. The soils of this unit mostly are of the (741) Freezner series. They occur on moderately sloping to steep terraces, benches and rounded ridges.

Inclusions of the moderately deep, loamy (731) Straight soils and the shallow 732 soils are randomly mixed on the steeper slope positions.

741-731/X 4,500 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the deep, clayey (741) Freezner soils and about 40 percent of the moderately deep, loamy (731) Straight soils. The (731) Straight soils are on the steeper slope positions.

Inclusions of the shallow 732 soils are mingled with the (731) Straight soils. The deep, clayey (745) Laurelhurst soils and the shallow, very stony (36) Witzel soils randomly occur where the precipitation approaches 35 inches. Some slope gradients exceed 60 percent.

741-731/Xn 2,850 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the deep, clayey (741) Freezner soils and about 40 percent of the moderately deep, loamy (731) Straight soils. The (731) Straight soils are on the steeper slope positions.

Inclusions of the shallow 732 soils are mingled with the (731) Straight soils. The deep, clayey (745) Laurelhurst soils and the shallow, very stony (36) Witzel soils randomly occur where the precipitation approaches 35 inches. Some slope gradients exceed 60 percent.

27. (745) Laurelhurst Series

The (745) Laurelhurst series consists of deep, clayey, reddish brown, well-drained soils from basic volcanic rocks in areas receiving less than 35 inches of precipitation. They occur on nearly level terraces and sloping to steep foothills.

Profile Description: (745) Laurelhurst clay loam.

Surface Soil:	0-15"	Dark brown clay loam, friable, slightly sticky, slightly plastic, neutral. 10-19" thick.
Subsoil:	15-44"	Reddish brown clay, firm, very sticky, very plastic, slightly acid. 20-55" thick.
Substratum:	44"+	Weathered volcanic bedrock.

Variations: Depth to bedrock ranges from 40 to over 60 inches. Coarse-fragment content ranges from 0 to 35 percent. Surface soil colors are very dark gray, very dark brown or dark brown. Subsoil colors are dark reddish brown, reddish brown, dark brown, or brown. Surface textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are fine clay loam, gravelly clay loam, clay, or gravelly clay.

Setting: The (745) Laurelhurst soils occur on nearly level terraces and gently sloping to steep foothills at elevations of 1,500 to 3,000 feet. Areas above 2,500 feet are generally on south-facing slopes. Slope gradients range from 0 to 65 percent. The soils formed in colluvium from basic volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature ranges from 50 to 54 degrees F.; the mean January temperature centers on 36 degrees F.; and the mean July temperature centers on 70 degrees F. The frost-free period ranges from 140 to 170 days. Native vegetation consists of ponderosa pine, Douglas-fir, madrone, white oak and an associated understory of shrubs, forbs and grasses.

The (745) Laurelhurst soils are associated with the moderately well-drained (706) Medco soils; the well-drained, very cobbly 705 soils; and the shallow, cobbly (36) Witzel soils. Adjacent areas with more than 35 inches of precipitation have soils of the deep, reddish, clayey (741) Freezner series and the moderately deep, very gravelly, loamy (740) Geppert series.

The (745) Laurelhurst soils are distinguished from the (706) Medco soils by being redder in the subsoil and well drained. The 705 soils are browner or more yellowish in the subsoil than (745) Laurelhurst soils and are very cobbly. The (745) Laurelhurst soils differ from the similar (741) Freezner soils by being darker in the surface and in the upper subsoil and by being less acid. The (750) Dumont soils are redder and much more acid than the (745) Laurelhurst soils.

Soil Behavior: The (745) Laurelhurst soils have a low site class for Douglas-fir. They support mixed stands of conifers and hardwoods. Dominant species are ponderosa pine, madrone, Douglas-fir and white oak. Most conifers occur on northerly aspects. Hardwoods are more abundant on southerly aspects and where annual precipitation is lower.

Natural regeneration is good locally but length of time for establishment is variable. The regeneration hazard of bare-root planting is severe on all aspects.

Compaction by heavy equipment is a severe hazard when these soils are wet. Unprotected mineral surfaces are sources of colloidal sediments that can degrade aquatic habitat. Surface erosion is moderate to severe depending upon the slope gradient.

Cutbanks are stable except where deep cuts are made or on slopes where surface water concentrates. Raveling of the soil mantle is common on all cutbanks.

Bedrock is rippable and mostly of poor quality for surface rock. Soil material is poor for fills and embankments but can be used if structure is built at proper moisture content and not allowed to become dry.

Recreation development potential is limited in most categories because of soil physical properties and slope gradient.

Wildlife habitat is good. Deer use timbered north slopes for cover. Important browse species occur on south aspects. Conflicts between timber harvest and deer habitat may occur.

Mapping Units:

745/V 990 acres. Slopes dominantly have gradients of 0 to 10 percent. This unit contains predominantly deep, clayey (745) Laurelhurst soils on gently sloping terraces.

Minor inclusions of the moderately well-drained (706) Medco soils occur in low spots and on concave positions.

- 745/WV 930 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 0 to 10 percent. This unit contains predominantly deep, clayey (745) Laurelhurst soils on terraces and broad ridge tops.
- Minor inclusions consist of the moderately well-drained (706) Medco soils in swales; and of the well-drained, moderately deep very cobbly, clayey 705 soils on low knobs.
- 745/Wn 3,350 acres. Slopes dominantly are northerly and have gradients of 10 to 35 percent. This unit mostly contains deep, clayey (745) Laurelhurst soils on terraces.
- Minor inclusions consist of the moderately well-drained (706) Medco soils in swales; and of the well-drained, moderately deep 705 soils on low knobs.
- 745/WX 1,990 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 35 to 60 percent. This unit contains mostly deep, clayey (745) Laurelhurst soils on terraces and sideslopes.
- Inclusions consist of the moderately deep 705 soils on the steeper positions; and of the moderately well-drained (706) Medco soils on concave positions.
- 745-36/X 1,860 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 70 percent of the deep (745) Laurelhurst soils and about 30 percent of the shallow (36) Witzel soils. The (36) Witzel soils occur on the steepest slopes.
- Minor inclusions consist of the moderately deep, very clayey (704) Carney soils and moderately deep, clayey 705 soils mixed with the (36) Witzel soils; and of the moderately well-drained (706) Medco soils on benches and in swales. Some gradients are less sloping than 35 percent.
- 745-705/WV 2,050 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 0 to 10 percent. This unit contains about 60 percent of the deep (745) Laurelhurst soils and about 40 percent of the moderately deep, very cobbly, clayey 705 soils. The 705 soils occupy the steepest slopes.
- Inclusions consist of the shallow (36) Witzel soils and (R) rock land mixed with the 705 soils; and of the moderately deep (704) Carney and (706) Medco soils.

745-705/WX 9,200 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 35 to 60 percent. This unit contains about 60 percent of deep (745) Laurelhurst soils and 40 percent of moderately deep, very cobbly, clayey 705 soils. The 705 soils mostly occur on the steepest slopes.

Inclusions consist of the shallow (36) Witzel soils and (R) rock land mixed with the 705 soils; and of the moderately deep (704) Carney and (706) Medco soils.

745-705/X 5,040 acres. Slopes are dominantly southerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of the deep (745) Laurelhurst soils and 40 percent of the moderately deep, very cobbly, clayey 705 soils. The 705 soils occur on the steeper slopes and ridges.

Minor inclusions consist of (R) rock land and the shallow (36) Witzel soils mixed with the 705 soils: of the moderately well-drained (706) Medco soils on lower slopes; and of the well-drained, very clayey (704) Carney soils occur at random. Some gradients are less than 35 percent.

745-706/WX 1,830 acres. Slopes dominantly are southerly and about 70 percent have gradients of 10 to 35 percent and about 30 percent have gradients of 35 to 60 percent. This unit consists of about 60 percent of well-drained (745) Laurelhurst soils on the steeper slopes and about 40 percent of moderately well-drained (706) Medco soils on lower slope positions.

Inclusions consist of the shallow (36) Witzel soils; of the moderately deep, clayey 705 soils; and of the very clayey (704) Carney soils randomly mingled on the steeper positions.

745-706/X 3,740 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of well-drained (745) Laurelhurst soils and about 40 percent of moderately well-drained (706) Medco soils. The (706) Medco soils occupy lower slope positions.

Inclusions consist of the shallow (36) Witzel soils; of the moderately deep, well-drained 705 soils; and of the very clayey (704) Carney soils randomly mingled on the steeper positions.

745-706/Xn 10,450 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 60 percent of well-drained (745) Laurelhurst soils and about 40 percent of moderately well-drained (706) Medco soils. The (706) Medco soils occupy lower slope positions.

Inclusions consist of the shallow (36) Witzel soils; of the moderately deep, well-drained 705 soils; and of the very clayey (704) Carney soils randomly mingled on the steeper positions.

28. (750) Dumont Series

The (750) Dumont series consists of deep, well-drained, red, clayey soils from basic volcanic rocks in the Cascade Mountains. They occur on nearly level terraces and on sloping to steep mountainous sideslopes.

Profile Description: (750) Dumont clay loam.

Surface Soil:	0-14"	Dark reddish brown, clay loam, friable, moderately acid. 7-16" thick.
Subsoil:	14-60"	Reddish brown, clay, firm, sticky, plastic, strongly acid. 33-75" thick.
Substratum:	60"+	Weathered andesite.

Variations: Depth to bedrock ranges from 40 to 90 inches. Coarse-fragment content ranges from 0 to 20 percent. Surface soil colors are dark reddish brown, or reddish brown. Subsoil colors are similar to those of the surface soil but may be slightly lighter. Textures of the surface soil are loam, clay loam, or silty clay loam. Subsoil textures are clay. Very deep profiles are clay loam in the lower part of the subsoil. Black coatings are common on ped faces in the subsoil.

Setting: The (750) Dumont soils occur on nearly level terraces and sloping to steep mountainous sideslopes at elevations between 2,200 and 4,000 feet. Slope gradients range from 0 to 60 percent but most areas have slopes less than 35 percent. The (750) Dumont soils are extensive in the vicinity of Butte Falls and on Dudley and Olson Mountains. They formed in colluvium from basic volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 47 to 52 degrees F.; the average January temperature centers on 34 degrees F.; and the mean July temperature centers on 65 degrees F. The frost-free period ranges from 100 to 130 days. Vegetation consists of Douglas-fir, sugar pine, ponderosa pine, incense-cedar and an understory of shrubs and forbs.

The (750) Dumont soils are associated with the moderately deep, loamy, very cobbly (740) Geppert soils on the steeper slopes; the deep, loamy, very cobbly 810 soils and the moderately deep, loamy, very cobbly 809 soils in the vicinity of the 4,000-foot elevation; and the deep, reddish

brown, clayey (745) Laurelhurst soils in areas receiving about 35 to 40 inches of precipitation. (R) Rock land, the shallow (36) Witzel soils and the moderately deep, cobbly 705 soils occur on some south-facing slopes adjacent to areas of (750) Dumont soils.

The (750) Dumont soils differ from the deep, red, clayey (741) Freezner soils by being darker and more acid. They differ from the deep, reddish brown, clayey (745) Laurelhurst soils by being much more acid. The (380) Pollard soils from metamorphic rocks are very similar to (750) Dumont soils but are lower in organic matter and less acid in the surface soil.

Soil Behavior: The (750) Dumont soils have high production capacity for Douglas-fir and ponderosa pine. These soils also support stands mixed with sugar pine and white fir. Some western hemlock occupies the zone of higher precipitation and indicates areas of higher productivity for Douglas-fir. Regeneration hazard is slight. Frost heave of bare-root plantings is a hazard, especially on gentle slopes.

Compaction by tractor logging during wet soil conditions is a severe hazard and will lower productivity as well as cause surface erosion. These clayey soils release moisture slower than loamy soils; therefore, they take longer to dry out in spring. Some concave and benched slopes remain wet throughout the year and should be avoided. Cable yarding can be safely accomplished most of the time. Effective water bars can be built where slope gradients do not exceed 35 percent.

Soils of this series exhibit a high mantle stability when excavated. However, some slumping will occur on deep cut slopes.

The erosion hazard is moderate. Exposed soil material is an important source of colloidal sediments that will lower water quality and damage aquatic habitat. Side-cast material usually can be revegetated by grass or trees. However, it is difficult to maintain a grass cover on cut slopes unless they are shaded or unless they receive seepage water.

The soil mantle usually is quite thick and the underlying bedrock is poor construction material. The soil is fair for fills and embankments if used at proper moisture content to achieve adequate compaction. These soils are good sites for ponds.

The (750) Dumont soils have limited potential for recreation development. They are subject to compaction by foot traffic and bare surfaces are dusty when dry. Excessive slope gradient is the most limiting factor for subsurface sewage disposal. Minor drainageways maintain flow late into the dry season.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

- 750/V 3,530 acres. Slopes dominantly have gradients of 0 to 10 percent. This unit mostly consists of deep, red, clayey (750) Dumont soils on terraces or plateaus.
- Inclusions consist of the loamy (740) Geppert soils or the clayey (745) Laurelhurst soils near drier regions.
- 750/VW 15,010 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 0 to 10 percent and 30 percent has gradients of 10 to 35 percent. This unit predominantly consists of the deep, red, clayey (750) Dumont soils on terraces or plateaus.
- Inclusions consist of the loamy (740) Geppert soils or the clayey, dark colored (745) Laurelhurst soils and very red unclassified soils near drier regions.
- 750/W 5,960 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. This unit mostly consists of deep, red, clayey (750) Dumont soils on benches and sideslopes.
- Inclusions consist of the loamy (740) Geppert soils or the clayey, dark colored (745) Laurelhurst soils and very red unclassified soils near drier regions.
- 750/Wn 870 acres. Slopes dominantly are northerly and have gradients of 10 to 35 percent. This unit mostly consists of deep, red, clayey (750) Dumont soils on benches and sideslopes.
- Inclusions consist of the loamy (740) Geppert soils or the clayey, dark colored (745) Laurelhurst soils and very red unclassified soils near drier regions.
- 750/WX 2,850 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit predominantly consists of the deep, red, clayey (750) Dumont soils on benches and sideslopes.
- Inclusions consist of the loamy, very cobbly (740) Geppert soils on the steeper slopes.
- 750-740/WX 4,800 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and about 30 percent has gradients of 35 to 60 percent. This unit consists of about 70 percent of the deep, clayey (750) Dumont soils and about 30 percent of the moderately deep, loamy (740) Geppert soils. The (740) Geppert soils occupy the steeper slopes.

Inclusions of unclassified moderately deep, loamy, very cobbly soils are mixed with the (740) Geppert soils.

750-740/WXn 7,940 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 10 to 35 percent and about 30 percent has gradients of 35 to 60 percent. This unit consists of about 70 percent of the deep, clayey (750) Dumont soils and about 30 percent of the moderately deep, loamy (740) Geppert soils. The (740) Geppert soils occupy the steeper slopes.

Inclusions of unclassified moderately deep, loamy, very cobbly soils are mixed with the (740) Geppert soils.

29. (770) Pearsoll Series

The (770) Pearsoll series consists of shallow, clayey, very cobbly, well-drained soils from serpentine in the Siskiyou Mountains. They occur on moderately steep to very steep slopes.

Profile Description: (770) Pearsoll cobbly clay loam.

Surface Soil:	0-4"	Dark brown cobbly clay loam, friable, slightly acid. 2-6" thick.
Subsoil:	4-18"	Reddish brown very cobbly clay, firm, very sticky, very plastic, medium acid. 6-18" thick.
Substratum:	18"+	Fractured serpentinitic bedrock.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are dark reddish brown, or dark brown. Subsoil colors are reddish brown, yellowish red, or strong brown. Surface textures are cobbly clay loam or very cobbly clay loam. Subsoil textures are very cobbly clay or very cobbly silty clay.

Setting: The (770) Pearsoll soils occur on moderately steep to very steep slopes in the Siskiyou Mountains at elevations of 1,000 to 5,000 feet. Slope gradients range from 10 to 85 percent. They formed in colluvium from serpentinitic rocks.

The winters are cool and moist and the summers are warm and dry. The mean annual precipitation ranges from 25 to 60 inches. The mean annual air temperature ranges from 47 to 54 degrees F.; the mean January temperature centers on 34 degrees F.; and the mean July temperature centers on 66 degrees F. The frost-free period ranges from 100 to 160 days. The native vegetation consists of Jeffrey pine, knobcone pine, chinquapin and incense-cedar with an understory of shrubs and grasses.

The (770) Pearsoll soils are associated with (R) rock land as well as minor inclusions of loamy, shallow soils; very gravelly, moderately deep, clayey soils; moderately well-drained, clayey soils; and very gravelly, deep, loamy soils from serpentine that have not been classified by soil series. Adjacent areas underlain by metamorphic, sedimentary and volcanic rocks have soils of the 370, 371, 372, (380) Pollard, 381, 382, 701, (712) Jumpoff, (718) Beekman, (719) Manzanita and (781) Colestine series. Adjacent areas underlain by granitoid rocks have soils of the (721) Siskiyou and (722) Holland series. At high elevations, the (770) Pearsoll soils are associated with soils of the 824, 825 and (861) Rogue series.

The (770) Pearsoll soils are distinguished from the shallow (36) Witzel, 701, (715) Brader and 732 soils by being redder and more clayey.

Soil Behavior: Soils of the (770) Pearsoll series support open brush fields, grassland and scattered conifers. Dominant vegetation consists of gray and green manzanita, wedgeleaf ceanothus, Jeffrey pine, knobcone pine and incense-cedar.

These soils are very droughty because of shallow depth, a very cobbly soil profile and a high clay content. Bare surfaces are easily eroded and are important sources of colloidal sediments.

Stability of the soil mantle and bedrock usually is high. Some failure of cutbanks may occur where bedrock is fractured. Springs commonly are associated with deep bedrock fractures.

Soil and bedrock are poor for construction material. The shallow soils are not suited for heliponds.

Recreation development potential is severely limited by soil physical properties, steep slopes and shallow depth.

Deer winter range is especially important below 2,500 feet elevation. Spring and winter ranges mostly occur on southerly aspects.

Mapping Units:

770-R/XY 39,900 acres. Slopes are both southerly and northerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 80 percent. This unit contains about 70 percent of the shallow (770) Pearsoll soils and 30 percent of (R) rock land mixed at random.

Inclusions of unclassified, moderately deep, clayey soils and moderately well-drained, clayey soils occur on lower slope positions. Shallow, loamy soils; very gravelly, moderately deep, clayey soils; and very gravelly, deep, loamy soils that have not been classified occur at random.

30. (781) Colestine Series

The (781) Colestine series consists of moderately deep, loamy, well-drained soils from metamorphic rocks in areas receiving less than 35 inches of precipitation. They occur on moderately steep to very steep mountainous slopes.

Profile Description: (781) Colestine loam.

Surface Soil:	0-8"	Brown loam, friable, neutral. 6-14" thick.
Subsoil:	8-34"	Reddish brown clay loam, firm, slightly acid. 12-32" thick.
Substratum:	34"+	Fractured bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 10 to 35 percent. Surface soil colors are dark brown, brown, or grayish brown. Subsoil colors are dark yellowish brown, yellowish brown, strong brown, brown, or reddish brown. Textures are loam or gravelly loam for the surface soil and loam, gravelly loam, clay loam, or gravelly clay loam for the subsoil. Soil reaction ranges from neutral to slightly acid with acidity increasing with depth.

Setting: The (781) Colestine soils occur on moderately steep to very steep mountainous slopes at elevations of 1,000 to 4,000 feet. Areas above 2,500 feet generally are on south-facing slopes. Slope gradients range from 20 to 85 percent with 35 to 60 percent slopes most common. The soils formed in colluvium from metamorphosed, sedimentary and volcanic rocks.

The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 20 to 35 inches. The mean annual temperature is 48 to 54 degrees F.: the mean January temperature centers on 35 degrees F.; and the mean July temperature centers on 72 degrees F. The frost-free period ranges from 140 to 180 days. Native vegetation consists of madrone, ponderosa pine, Douglas-fir and an understory of shrubs, forbs and grasses.

The (781) Colestine soils are associated with the shallow, very gravelly 701 soils; the moderately deep, very gravelly (718) Beekman soils; and the deep, clayey, reddish (719) Manzanita soils. Adjacent areas receiving more than 35 inches of precipitation have soils of the shallow 372 series; the moderately deep, very gravelly 371 series; and the deep, very gravelly 370 series.

The (781) Colestine soils differ from the (718) Beekman soils by consisting of less than 35 percent coarse fragments. They differ from the (721) Siskiyou soils from granitoid rocks by being less sandy and by having stronger

colors. The 371 soils from metamorphic rocks and the 731 soils from volcanic rocks are more gravelly and more acid than the (781) Colestine soils.

Soil Behavior: The (781) Colestine soils have low production for Douglas-fir on northerly aspects. They support scrubby conifers mixed with hardwoods on southerly aspects. Mostly brush and grass occur near drier zones.

Regeneration hazard from bare-root planting is severe on all aspects because of low annual precipitation, low soil-moisture availability and grass competition. Some success will occur at higher elevations and near zones of higher precipitation. Removal of plant cover by excessive disturbance results in loss of soil material and buildup of coarse fragments, thus limiting water-storage capacity as well as lowering productivity.

Cable yarding causes the least disturbance of the surface layer. The erosion hazard is high and although tractor logging does not adversely affect soil structure, bare soil in skid trails is a source of stream pollution. Construction of effective water bars is nearly impossible on steep slopes in this loamy material.

Cut-slope stability is high but minor failures may occur where the bedrock has been highly fractured or where rock layers are inclined toward the excavation. Some slumping of the soil mantle onto the roadway may occur.

Excavation on steep slopes will result in a cover of fractured substratum material on the surface of fill slopes. This coarse rock material is not a suitable seedbed and will remain devoid of vegetation for several years. Most roadbeds will be in the rock substratum and surfacing in some places may not be necessary. On very steep slopes, side-cast material will extend far downslope and damage productive land.

Some sources of good pit-run rock occur in the substratum of (781) Colestine soils. In most places the bedrock is easily excavated by earth-moving equipment. The soil is poor for fill or embankment material. Ponds often fail.

Recreation development potential is limited because of steep slopes and gravelly or cobbly soils. Steep drainageways usually do not contain water except when runoff is diverted from roads.

Southerly aspects are critical deer winter range. An area of major importance is the upper Little Applegate watershed where there are abundant browse species. A conflict between wildlife-cover requirements and timber-harvest practices may occur.

Mapping Units:

781-719/WX 9,750 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of 60 percent of the moderately deep, loamy (781)

Colestine soils and 40 percent of deep, clayey (719) Manzanita soils. The (719) Manzanita soils usually occur on benches and lower slope positions.

Inclusions consist of the moderately deep, very gravelly, loamy (718) Beekman soils randomly mixed with the (781) Colestine soils and of the shallow 701 soils on the steeper slopes and ridges.

781-719/WXn 3,450 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit consists of 60 percent of the moderately deep, loamy (781) Colestine soils and 40 percent of the deep, clayey (719) Manzanita soils. The (719) Manzanita soils usually occur on benches and lower slope positions.

Inclusions consist of the moderately deep, very gravelly, loamy (718) Beekman soils randomly mixed with the (781) Colestine soils and of the shallow 701 soils on the steeper slopes and ridges.

781-719/XY 15,680 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains about 70 percent of the moderately deep, loamy (781) Colestine soils and 30 percent of the deep, clayey (719) Manzanita soils. The (719) Manzanita soils occupy the benched sideslopes and lower slope positions.

Inclusions consist of the moderately deep, very gravelly, loamy (718) Beekman soils randomly mingled with the (781) Colestine soils and of the shallow 701 soils on the steeper slopes and ridges.

781-719/XYn 8,520 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains about 70 percent of the moderately deep, loamy (781) Colestine soils and 30 percent of the deep, clayey (719) Manzanita soils. The (719) Manzanita soils occupy the benched sideslopes and lower slope positions.

Inclusions consist of the moderately deep, very gravelly, loamy (718) Beekman soils randomly mingled with the (781) Colestine soils and of the shallow 701 soils on the steeper slopes and ridges.

31. 790 Series

The 790 series consists of moderately deep, clayey, very cobbly, well-drained soils from volcanic rock at elevations above 4,000 feet and receiving less than 20 inches annual precipitation.

Profile Description: 790 gravelly loam.

Surface Soil:	0-8"	Very dark grayish brown, gravelly loam, friable, neutral. 3-10" thick.
Subsoil:	8-25"	Dark brown, very cobbly clay, very firm, neutral. 13-31" thick.
Substratum:	25"+	Andesite bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 45 to 65 percent. Surface soil colors are very dark grayish brown, very dark brown, or dark brown. Subsoil colors are dark brown, brown, or dark yellowish brown. Textures of the surface layers are gravelly or very gravelly loam. The subsoil texture is very gravelly clay. Many areas are stony on the surface.

Setting: The 790 soils occur on moderately steep to steep hillslopes above the Klamath Basin floor. They primarily are on southerly aspects between elevations of 4,000 to 5,000 feet. Slope gradients range from 10 to 60 percent. The soils are formed on consolidated volcanic tuff and tuffaceous breccia, andesite, basalt and welded tuffs.

The climate is semiarid with about 12 to 16 inches average annual precipitation distributed mostly in winter and spring. The mean annual air temperature is 46 to 49 degrees F. The frost-free period ranges from 90 to 120 days. Native vegetation is juniper, big sagebrush, low sagebrush, currant, bluebunch wheatgrass, Idaho fescue and Sandberg bluegrass.

The 790 soils are associated with the deep 882 soils that occur on adjoining northerly slopes in a frigid temperature regime.

The 790 soils differ from the (36) Witzel soils by having clayey subsoils and being moderately deep. The 705 soils receive more than 20 inches precipitation.

Soil Behavior: The 790 soils have a low available-moisture capacity because they have a high clay content and an abundance of coarse fragments. They support mostly juniper, big sagebrush and bunchgrasses. Stones and cobbles limit mechanical equipment usage.

Roads are stable but much surface rock is necessary for all-weather use. The bedrock is a good base material.

Good quarry sites can be located where basalt or andesite rock occurs. The soil material is poorly suited for fill and embankments. The 790 soils are poor sites for stock-watering ponds.

Recreation development potential is severely limited by soil physical properties.

Wildlife habitat is fair.

Mapping Units:

790/WX 920 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit is made up predominantly of the moderately deep, very gravelly 790 soils.

Minor inclusions consist of the deep, very cobbly 882 soils on northerly aspects: (R) rock land mixed at random: and unclassified deep, loamy soils on lower slopes. Some gradients are more sloping than 60 percent.

32. 806 Series

The 806 series consists of shallow, loamy, very gravelly, well-drained soils from basic volcanic rocks in areas at elevations above 4,000 feet. They occur in mountainous slopes and ridge tops of the Cascade Mountains.

Profile Description: 806 very gravelly loam.

Surface Soil:	0-8"	Dark brown, very gravelly loam, very friable, slightly acid. 3-8" thick.
Subsoil:	8-19"	Dark reddish brown, very gravelly loam, friable, slightly acid. 4-16" thick.
Substratum:	19"+	Fractured volcanic bedrock.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface colors are dark brown, very dark grayish brown, or dark brown. Subsoil colors are dark brown, or dark reddish brown. Surface and subsurface textures are very gravelly loam, or very cobbly loam.

Setting: The 806 soils are on gentle to very steep slopes of the Cascade Mountains at elevations of 4,000 to 6,000 feet. Slope gradients range from 2 to 85 percent. The soils formed in colluvium from volcanic rocks.

Winters are cold and moist and summers are cool and dry. Average annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 43 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature is about 58 degrees F. The frost-free season ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir and an associated understory of shrubs and forbs. Some areas are brush land.

The 806 soils are associated with (R) rock land; the deep, clayey 840 soils; the loamy moderately deep 809 and deep 810 soils; and the relatively dry, very gravelly, loamy 882 soils.

The 806 soils are similar to the 825 soils from metamorphic rocks, but are not quite as acid as the 825 soils. The shallow, very gravelly 732 soils from volcanic rocks that occur below 4,000 feet are redder and warmer than the 806 soils.

Soil Behavior: The 806 soils support open grassland, brush and hardwood species. Scrubby conifers grow on some northerly aspects. These soils have a low available-moisture capacity because of shallow depth and a high coarse-fragment content.

Blasting is often necessary during road construction. Cutbanks are very stable.

Good quarry sites often are located where these soils occur. The soil mantle is thin but not good material for fills and embankments. The 806 soils are poor sites for stock-watering ponds.

Recreation development potential is severely limited by soil physical properties and steep slopes.

Wildlife habitat is good.

Mapping Units:

806-R/VW 1,840 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 0 to 10 percent and 30 percent has gradients of 10 to 35 percent. This unit contains about 80 percent of the shallow 806 soils and 20 percent of (R) rock land.

Inclusions consist of the moderately deep 809 soils and of somewhat poorly-drained unclassified soils in drainageways.

806-R/X 1,730 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 75 percent of shallow 806 soils and 25 percent of (R) rock land.

Inclusions consist of the moderately deep 809 soils.

33. 809 Series

The 809 series consists of moderately deep, loamy, very cobbly, well-drained soils from basic volcanic rocks at high elevations in the Cascade Mountains. They occur on gently sloping to steep ridge tops and sideslopes.

Profile Description: 809 gravelly loam.

Surface Soil:	0-17"	Very dark grayish brown, gravelly loam, very friable, slightly acid. 10-19" thick.
Subsoil:	17-36"	Dark brown, very gravelly clay loam, friable, medium acid. 10-30" thick.
Substratum:	36"+	Fractured volcanic bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are very dark brown, very dark grayish brown, or dark brown. Subsoil colors are dark brown, brown, or dark reddish brown. Surface textures are very cobbly loam, very cobby light clay loam, or very gravelly loam. Many areas are stony on the surface.

Setting: The 809 soils are on gently sloping ridge tops and moderately sloping to steep sideslopes of the Cascade Mountains at elevations of 3,500 to 6,000 feet. Areas less than 4,000 feet in elevation generally are on north slopes. Slope gradients range from 2 to 80 percent. The soils formed in colluvium from basic volcanic rocks.

Winters are cold and moist and summers are cool and dry. Average annual precipitation ranges from 40 to 60 inches. The mean annual air temperature ranges from 43 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir, hemlock and an associated understory of shrubs and forbs.

The 809 soils are associated with soils of the deep, very cobbly 810 series; the deep, clayey, 840 series; the moderately deep, loamy, very cobbly 842 series; and merge with the warmer, loamy, very cobbly (740) Geppert and clayey (750) Dumont soils below 4,000 feet.

The 809 soils are distinguished from the 810 soils simply by being moderately deep to bedrock instead of deep.

Soil Behavior: The 809 soils support mixed conifer stands of white fir, Douglas-fir and ponderosa pine. At higher elevations, Shasta fir, sugar pine and western white pine become more abundant. Productivity of these

soils for Douglas-fir is low because of cool temperatures and a short growing season. Frost-heave potential is high.

Natural regeneration is enhanced if mineral soil is exposed. This can be done by careful use of yarding equipment. Disturbance near drainage-ways and excessive gouging of the surface layer should be avoided. Grass and rodent invasions occur after timber harvest.

The compaction hazard is slight and tractor yarding can be applied on slope gradients up to 40 percent.

Bedrock and soil mantle stability is high. The rock substrata usually is rippable but some blasting is required near rock outcrop. Large boulders are often encountered during road construction. The erosion hazard is moderate to severe and unprotected mineral surfaces are important sources of siltation in streams, especially during spring snowmelt.

Rock substrata is adequate road base material. The soil is only fair for fills and embankments.

Gravelly and cobbly soils, excessive slope gradients, as well as dusty conditions when dry, are the major limitations to recreation development. There are few springs for domestic use.

These soils support vegetation important for deer summer range.

Mapping Units:

309-806/VW 8,210 acres. Slopes of about 70 percent of the area have gradients of 0 to 10 percent, and for 30 percent of the area have gradients of 10 to 35 percent. This unit consists of about 60 percent of the moderately deep, very cobbly, dark colored 809 soils and 40 percent of the shallow 806 soils randomly mixed with 809 soils on all slope positions.

Inclusions consist of (R) rock land mixed with the 806 soils, and unclassified loamy and clayey soils in wet meadows or glades.

809-810/V 4,560 acres. Slopes dominantly have gradients of 0 to 10 percent. This unit consists of about 70 percent of the moderately deep, very cobbly, dark colored 809 soils and 30 percent of the deep, very cobbly, dark colored 810 soils. The 810 soils occur at random on all slope positions.

Minor inclusions consist of the shallow 806 and unclassified clayey soils.

809-810/VW 12,760 acres. Slopes have gradients of 0 to 10 percent for about 70 percent of the area, and of 10 to 35 percent for about 30 percent of the area. This unit contains about 70



Figure 10. Brush fields on 809 and 810 soils. Grass and gopher invasions also occur in clearcut and partial cut areas on these soils.

percent of the moderately deep, very cobbly, dark colored 809 soils and 30 percent of the deep, very cobbly, dark colored 810 soils. The 810 soils mostly occur on the more gently sloping positions.

Minor inclusions consist of the shallow 806 soils and unclassified clayey soils.

809-810/W 3,360 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. This unit contains about 75 percent of the moderately deep, very cobbly, dark colored 809 soils and about 25 percent of the deep, very cobbly, dark colored 810 soils. The 810 soils occur on benches and lower slopes.

Minor inclusions consist of the shallow 806 soils and unclassified clayey soils mixed at random.

809-810/Wn 9,490 acres. Slopes dominantly are northerly and have gradients of 10 to 35 percent. This unit contains about 75 percent of the moderately deep, very cobbly, dark colored 809 soils and about 25 percent of the deep, very cobbly, dark colored 810 soils. The 810 soils occur on benches and lower slopes.

Minor inclusions consist of the shallow 806 soils and unclassified clayey soils mixed at random, and of the shallow 806 soils on steeper positions.

809-810/X 800 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit contains about 75 percent of the moderately deep, very cobbly, dark colored 809 soils and 25 percent of the deep, very cobbly, dark colored 810 soils. The 810 soils are on the less steep, lower slopes and adjacent to drainageways.

Minor inclusions consist of the shallow 806 soils and (R) rock land on steeper slopes and ridges.

809-810/Xn 4,620 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit contains about 75 percent of the moderately deep, very cobbly, dark colored 809 soils and 25 percent of the deep, very cobbly, dark colored 810 soils. The 810 soils are on the less steep, lower slopes and adjacent to drainageways.

Minor inclusions consist of the shallow 806 soils and (R) rock land on steeper slopes and ridges. Unclassified very cobbly, loamy soils occupy the upper slopes of the Surveyor Mountain and Aspen Butte areas.

34. 810 Series

The 810 series consists of deep, loamy, very gravelly well-drained soils from basic volcanic rocks at high elevations in the Cascade Mountains. They occur on gently sloping ridge tops to very steep sideslopes.

Profile Description: 810 gravelly loam.

Surface Soil:	0-22"	Dark reddish brown, gravelly loam, very friable, slightly acid. 20-25" thick.
Subsoil:	22-50"	Dark brown, very gravelly clay loam, very friable, medium acid. 20-40" thick.
Substratum:	50"+	Fractured volcanic bedrock.

Variations: Depth to bedrock ranges from 40 to 60 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are very dark brown, very dark grayish brown, or dark brown. Subsoil colors are dark brown, brown, or dark reddish brown. Surface textures are gravelly loam or very gravelly loam. Subsurface textures are very gravelly loam or very gravelly clay loam.

Setting: The 810 soils are on gently sloping to steep slopes of the Cascade Mountains at elevations of 3,500 to 6,000 feet. Areas less than 4,000 feet in elevation are generally on north-facing slopes. Slope gradients range from 2 to 80 percent. The soils formed in colluvium from basic volcanic rocks.

Winters are cold and moist and summers are cool and dry. Average annual precipitation ranges from 40 to 60 inches. The mean annual air temperature ranges from 43 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free season ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir, hemlock and an associated understory of shrubs and forbs.

The 810 soils are associated with soils of the moderately deep, very cobbly 809 series; the shallow 806 series; the deep, clayey 840 series; and merge with the very cobbly (740) Geppert and clayey (750) Dumont soils below 4,000 feet.

The 810 soils are deeper than the soils of the cool 809 series. The (740) Geppert soils are moderately deep and warmer than the 810 soils.

Soil Behavior: The 810 soils support mixed conifer stands of white fir, Douglas-fir and ponderosa pine. At higher elevations, Shasta fir, sugar pine and western white pine become more abundant. Productivity of these

soils for Douglas-fir is low because of cool temperatures and a short growing season. Potential for frost heave is high.

Natural regeneration is enhanced if mineral soil is exposed. This can be done by careful use of yarding equipment. Disturbance near drainage-ways and excessive gouging of the surface layer should be avoided. Grass and rodent invasions occur after timber harvest.

The compaction hazard is slight and tractor yarding can be applied on slope gradients up to 40 percent.

Bedrock and soil mantle stability is high. The rock substrata usually is rippable but some blasting is required near rock outcrop. Large boulders are often encountered during road construction. The erosion hazard is moderate to severe and unprotected mineral surfaces are an important source of siltation in streams, especially during spring snowmelt.

Rock substrata is adequate road base material. The soil is only fair for fills and embankments.

Gravelly and cobbly soils, excessive slope gradients, as well as dusty conditions when dry, are the major limitations to recreation development. There are few springs for domestic use.

These soils support vegetation important for deer summer range.

Mapping Units:

810-809/V 16,750 acres. Slopes dominantly have gradients of 0 to 10 percent. This unit contains about 75 percent of the deep, very cobbly, dark colored 810 soils and 25 percent of the moderately deep, very cobbly, dark colored 809 soils. The 809 soils occupy knobs and hillcrests.

Inclusions consist of the shallow 806 soils and unclassified clayey soils.

810-809/WV 8,100 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and about 30 percent has gradients of 0 to 10 percent. This unit contains about 70 percent of the deep, very cobbly, dark colored 810 soils and 30 percent of the moderately deep, very cobbly, dark colored 809 soils. The 809 soils occupy knobs and hillcrests.

Inclusions consist of the shallow 806 soils and unclassified clayey soils.

810-809/WX 15,000 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This

air temperature ranges from 43 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir, hemlock and an associated understory of shrubs and forbs.

The 824 soils are associated with the shallow 825 soils. Adjacent areas underlain by granitoid bedrock have soils of the (861) Rogue series; those underlain by serpentine have soils of the (770) Pearsoll series; and those underlain by volcanic rocks have soils of the 306 and 309 series. Areas at lower elevations with soils from metamorphic rocks have soils of the 370, 371 and 372 series. (R) Rock land also occurs on the mountain tops with 824 soils.

The 824 soils differ from the (861) Rogue soils by being less sandy and more gravelly and stony. They are lighter colored than the 309 soils.

Soil Behavior: The 824 soils support mixed stands of conifers and hardwoods. White fir, Douglas-fir, sugar pine and ponderosa pine are dominant. Madrone and tanoak are more abundant where available soil moisture is low. This is usually on steeper slopes and on southerly aspects. Productivity is low because of cool temperatures and a short growing season.

The amount of coarse fragments in the surface layer has the dominant influence on success of bare-root plantings. Regeneration hazard is moderate on north aspects and severe on south aspects. Removal of plant cover by excessive disturbance will result in loss of soil material and buildup of coarse fragments. This limits water-storage capacity as well as lowers productivity.

Cable yarding causes the least disturbance of the surface layer. The erosion hazard is severe and, although tractor logging does not adversely affect soil structure, bare soil in skid trails is a source of stream pollution. Construction of effective water bars is nearly impossible on steep slopes in this very gravelly, loamy material.

Cut-slope stability is high but minor failures may occur where the bedrock has been highly fractured or where rock layers are inclined toward the excavation. Some slumping of the soil mantle onto the roadway may occur.

Excavation on steep slopes will result in a cover of fractured substratum material on the surface of fill slopes. This coarse rock material is not a suitable seedbed and will remain devoid of vegetation for several years. Most roadbeds will be in the rock substratum and surfacing in some places may not be necessary. On very steep slopes, side-cast material will extend far downslope and damage productive land.

Some sources of good pit-run rock occur in the substratum of 824 soils. In most places, the bedrock is easily excavated by earth-moving equipment. The soil is poor fill or embankment material. Ponds often fail.

Recreation development potential is limited because of steep slopes and very gravelly or cobbly soils. Steep drainageways usually do not contain water except when runoff is diverted from roads and during snowmelt.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units:

824-825/XY 3,520 acres. Slopes dominantly are southerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85 percent. This unit contains about 55 percent of moderately deep 824 soils and 45 percent of shallow 825 soils mingled at random.

Inclusions of (R) rock land occupy the ridges and steeper slope positions. Small amounts of the shallow (770) Pearsoll soils and moderately deep unclassified soils from serpentine rock are associated with the 824 and 825 soils. Some gradients are less than 35 percent.

824-825/XYn 13,210 acres. Slopes dominantly are northerly and about 70 percent have gradients of 35 to 60 percent and 30 percent have gradients of 60 to 85 percent. This unit contains about 55 percent of moderately deep 824 soils and 45 percent of shallow 825 soils mingled at random.

Inclusions of (R) rock land occupy the ridges and steeper slope positions. Small amounts of the shallow (770) Pearsoll soils and moderately deep unclassified soils from serpentine rock are associated with the 824 and 825 soils. Some gradients are less than 35 percent.

36. 825 Series

The 825 series consists of shallow, very gravelly, loamy, well-drained soils from metamorphic rocks at high elevations in the Siskiyou Mountains. They occur on ridge tops and sideslopes.

Profile Description: 825 very gravelly loam.

Surface Soil:	0-5"	Dark brown, very gravelly loam, very friable, slightly acid. 4-6" thick.
Subsoil:	5-18"	Brown, very gravelly loam, friable, medium acid. 8-16" thick.
Substratum:	18"+	Fractured metamorphic bedrock.

Variations: Depth to bedrock ranges from 12 to 20 inches. Coarse-fragment content ranges from 35 to 75 percent. Surface soil colors are very dark brown, very dark grayish brown, or dark brown. Subsoil colors are dark brown, brown, or reddish brown. Surface soil textures are gravelly loam or very gravelly loam. Subsoil textures are very gravelly loam or very gravelly clay loam.

Setting: The 825 soils occur on moderately steep to very steep slopes in the Siskiyou Mountains at elevations of 3,500 to 6,000 feet. Areas with elevations below 4,000 feet are on north-facing slopes. Slope gradients range from 10 to 85+ percent. The soils formed in colluvium from metamorphic, sedimentary and volcanic rocks.

The summers are cool and dry and the winters are cold and moist. The mean annual precipitation ranges from 40 to 80 inches. The mean annual air temperature ranges from 43 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period is 70 to 100 days. Native vegetation consists of white fir, Douglas-fir and an associated understory of shrubs and forbs.

The 825 soils are associated with soils of the moderately deep, very gravelly 824 series and (R) rock land. On adjacent areas below 4,000 feet, the associated soils are of the 371 and 372 series. Soils of the (361) Rogue series occur on high elevation mountains underlain by granitoid rocks and the (770) Pearsoll soils are on like positions underlain by serpentine. High altitude areas underlain by volcanic rocks have soils of the 806, 809 and 810 series.

The 825 soils differ from the shallow 806 soils from volcanic rocks by being more acid. The 825 soils are colder than the shallow soils of the (36) Witzel, 701, (715) Brader and 732 series. The (770) Pearsoll soils are redder and more clayey than 825 soils.

Soil Behavior: Soils of the 825 series are extremely droughty and have a very limited capacity to produce timber. The soils support mixed stands of hardwoods and scrubby conifers. Sugar pine, ponderosa pine, madrone, Douglas-fir and tanoak are the dominant tree species. Conifers are non-existent on some southerly aspects where brush fields are more common.

Regeneration hazard is severe for bare-root plantations because of the very low moisture availability of the soils. This is caused by shallow depth and high coarse-fragment content.

Cable and tractor yarding on these soils will result in exposed areas susceptible to severe erosion. Excessive slope gradients and soil physical properties preclude construction of effective water bars.

Roads are very stable except where bedrock is deeply fractured in fault zones. Side-cast material usually extends far downslope and contains mostly fractured rock. This material damages productive land and is

difficult to revegetate. Roadbeds are in the rock substratum and surfacing may not be necessary. Good construction rock occurs in the substratum of 825 soils. The bedrock can be ripped in many places but blasting is usually necessary near rock outcrop.

The soil is poor fill or embankment material. Ponds will fail.

Recreation development potential is severely limited because of very steep slopes and very gravelly or cobbly soils. Rock outcrop is commonly associated with these soils. Drainageways usually do not contain water except when runoff is diverted from roads and during snowmelt.

Habitat for wildlife is excellent. Summer range for big-game species is good.

Mapping Units: Soils of the 825 series do not occur as dominant soils in any mapping units and occur as secondary soils in mapping units of the 824 series.

37. 840 Series

The 840 series consists of deep, brownish, clayey, well-drained soils from volcanic rocks at elevations above 3,500 feet in the Cascade Mountains. They occur on gently sloping to steep ridges and sideslopes.

Profile Description: 840 gravelly loam.

Surface Soil:	0-9"	Very dark grayish brown gravelly loam, friable, neutral. 9-18" thick.
Subsoil:	9-44"	Dark brown clay, firm, very sticky, very plastic, slightly acid. 30-60" thick.
Substratum:	44"+	Fractured volcanic bedrock.

Variations: Depth to bedrock ranges from 40 to 60+ inches. Coarse-fragment content ranges from 5 to 35 percent. Surface soil colors are very dark brown or very dark grayish brown. Subsoil colors are dark brown, brown, strong brown, or dark reddish brown. Surface textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are heavy clay loam, clay, or silty clay, and gravelly phases of each.

Setting: The 840 soils occur on gently sloping to steep ridge tops and sideslopes at elevations of 3,500 to 6,000 feet. Areas below 4,000 feet generally are on north-facing slopes. Slope gradients range from 5 to 80 percent. The soils formed in colluvium from basic volcanic rocks.

The winters are cold and moist and the summers are cool and dry. Mean annual precipitation ranges from 35 to 55 inches. The mean annual air

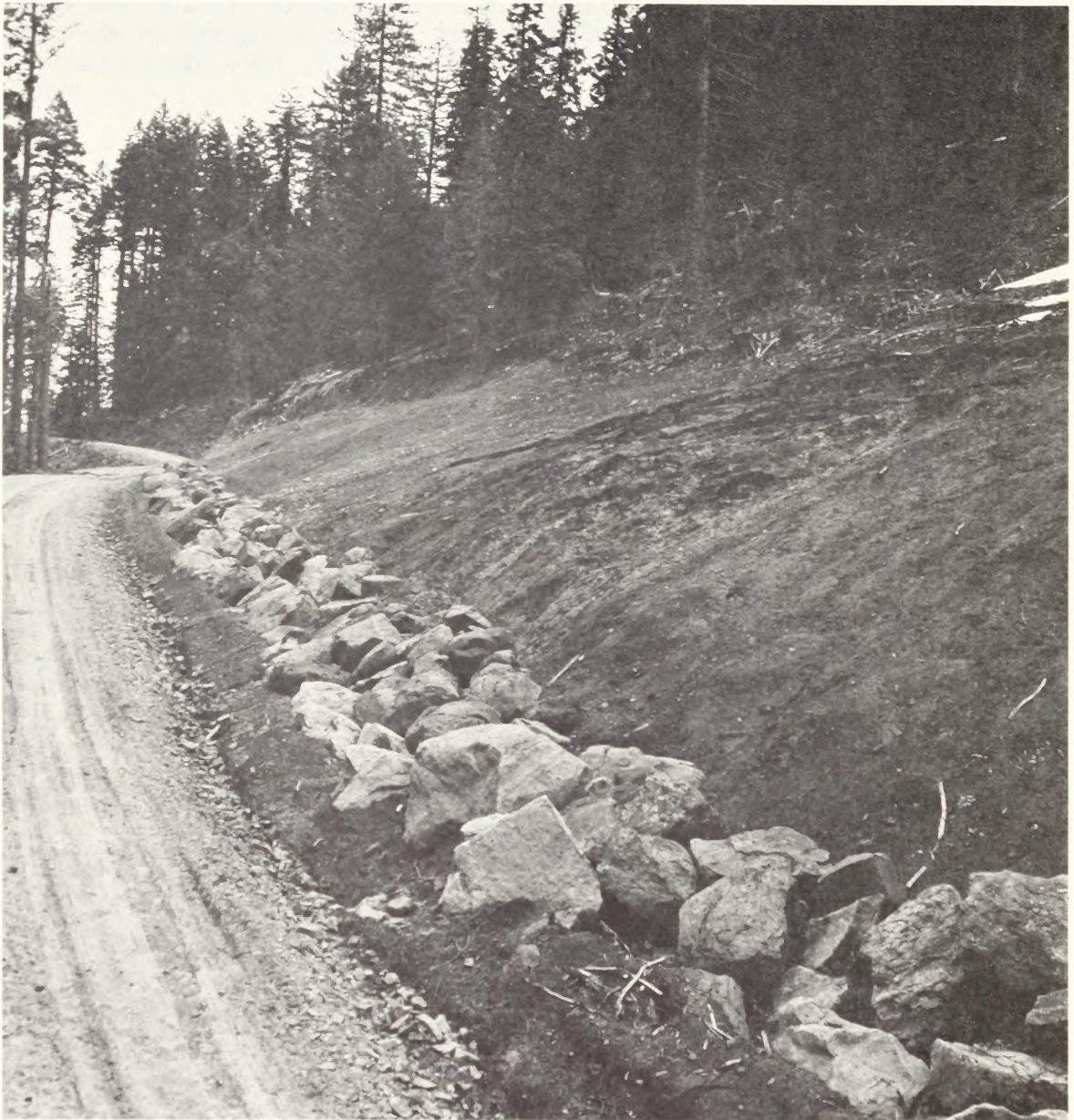


Figure 11. A rock buttress supports an unstable zone in 840 soils along Shale City Road. Failure of cut slope is common when excessive disturbance is made in deep soils.

temperature ranges from 43 to 47 degrees F.: the mean January temperature centers on 30 degrees F. and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir, incense-cedar and associated shrubs and forbs.

The 840 soils are associated with soils of the moderately deep, very cobbly 842 series; the moderately well-drained, very clayey 850 soils; the very cobbly, loamy 809 and 810 series; and minor amounts of unclassified soils that are similar to 840 soils except they are only moderately deep.

The 840 soils are distinguished from the 842 soils by being more clayey and less cobbly in the subsoil. The 850 soils are very clayey in the subsoil and are moderately well drained. Soils of the 705 series are similar but more shallow, more cobbly and warmer than the 840 soils. The (745) Laurelhurst soils are warmer and less acid than the 340 soils.

Soil Behavior: The 340 soils are timbered mostly with conifers. Dominant species are Douglas-fir, white fir and incense-cedar. Productivity for Douglas-fir is low because of cool temperatures and a short growing season.

Regeneration hazard by bare-root planting is moderate for pine species and severe for fir. Grass and rodent invasions occur after timber harvest. Susceptibility to frost heave is moderate to severe.

Compaction by heavy equipment is a severe hazard most of the year on all slope gradients. Effective water bars can be constructed on slopes less than 35 percent.

Cutbank slumping and raveling is common and small slumps can trigger larger slides that may remove sections of the road prism. The bedrock usually is stable. The erosion hazard is severe and exposed mineral surfaces are sources of high yields of colloidal sediments. Most drainage-ways carry water only during snowmelt.

Bedrock can be ripped but is not suitable for base material. Soil material is poor for fills and embankments. These soils provide good material for pond sites.

Recreation development is limited because of steep slopes and because the soil is easily compacted by foot traffic. Bare soils are dusty when dry and muddy when wet.

These soils support vegetation important for deer summer range.

Mapping Units:

840/X 680 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit mostly contains the deep, clayey 840 soils on steep hillslopes.



Figure 12. Concentration of snowmelt in a concave position within the unstable zone shown in Figure 11 has caused a rotational slump.

Inclusions consist of similar but moderately deep unclassified soils randomly mixed with the 840 soils: the moderately deep, clayey, very cobbly 842 soils on steeper positions or near ridge tops; the moderately well-drained, very clayey 850 soils on benches; and the deep, clayey (745) Laurelhurst soils near warmer regions.

840/Xn 4,130 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit mostly contains the deep, clayey 840 soils on steep hillslopes.

Inclusions consist of similar but moderately deep unclassified soils randomly mixed with the 840 soils; the moderately deep, clayey, very cobbly 842 soils on steeper positions or near ridge tops; the moderately well-drained, very clayey 850 soils on benches; and the deep, clayey (745) Laurelhurst soils near warmer regions.

840-842/X 1,560 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit consists of about 65 percent of the deep, clayey 840 soils and 35 percent of the moderately deep, clayey, very cobbly 842 soils. The 842 soils usually occupy the steepest positions.

Inclusions consist of moderately deep, clayey unclassified soils mixed at random: the moderately deep, very cobbly, loamy 809 soils on the steeper positions or near ridge tops; and the moderately well-drained, very clayey 850 soils on benches and in swales. The 705 and (745) Laurelhurst soils occur near warmer regions.

840-842/Xn 2,850 acres. Slopes dominantly are northerly and have gradients of 35 to 60 percent. This unit consists of about 65 percent of the deep, clayey 840 soils and 35 percent of the moderately deep, clayey, very cobbly 842 soils. The 842 soils usually occupy the steepest positions.

Inclusions consist of moderately deep, clayey unclassified soils mixed at random: the moderately deep, very cobbly, loamy 809 soils on the steeper positions or near ridge tops; and the moderately well-drained very clayey 850 soils on benches and in swales. The 705 and (745) Laurelhurst soils occur near warmer regions.

840-842/XY 2,670 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains about 55 percent of the deep, clayey 840 soils and 45 percent of the moderately deep, clayey, very cobbly 842 soils. The 842 soils usually occupy the steepest positions.

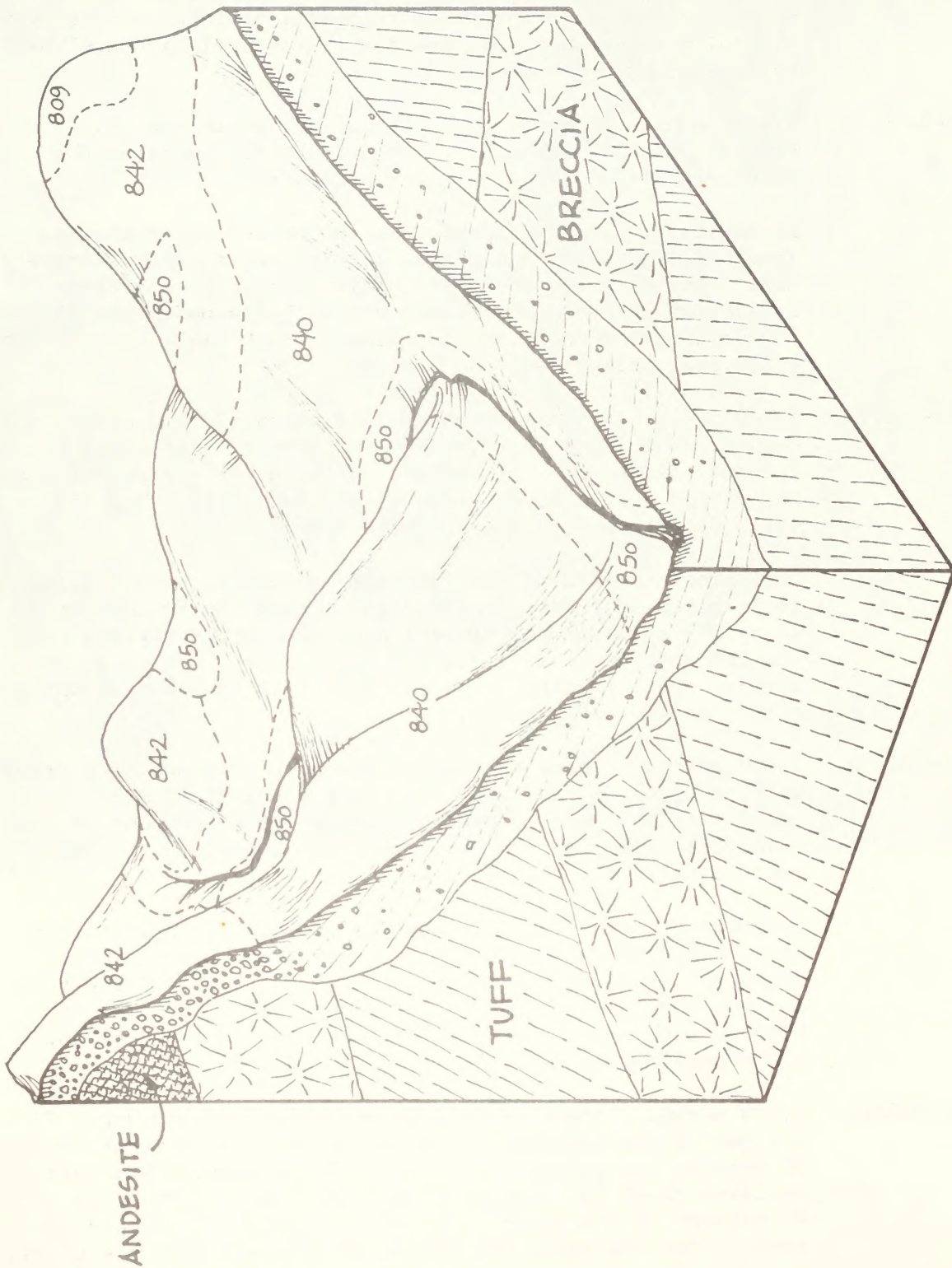


Figure 13. A block diagram showing the position where 840, 842, 809 and 850 soils may be expected to occur upon the landscape.

Inclusions consist of the moderately deep, clayey unclassified soils mixed with the 840 soils: the moderately deep, loamy 809 soils on upper slopes and ridges; the moderately well-drained, very clayey 850 soils on benches; the shallow 806 soils and (R) rock land on the steepest positions; and the 705 and (745) Laurelhurst soils near the warmer regions.

840-842/XYn 7,010 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains about 55 percent of the deep, clayey 840 soils and 45 percent of the moderately deep, clayey, very cobbly 842 soils. The 842 soils usually occupy the steepest positions.

Inclusions consist of the moderately deep, clayey unclassified soils mixed with the 840 soils; the moderately deep, very cobbly, loamy 809 soils on upper slopes and ridges; the moderately well-drained, very clayey 850 soils on benches; the shallow 806 soils and (R) rock land on the steepest positions; and the 705 and (745) Laurelhurst soils near the warmer regions.

38. 842 Series

The 842 series consists of moderately deep, brownish, very cobbly, clayey, well-drained soils from volcanic rocks at elevations above 3,500 feet in the Cascade Mountains. They occur on steep to very steep ridges and sideslopes.

Profile Description: 842 gravelly clay loam.

Surface Soil:	0-13"	Very dark brown, gravelly clay loam, friable, neutral. 6-14" thick.
Subsoil:	13-37"	Dark brown, very cobbly clay, friable, slightly acid. 12-30" thick.
Substratum:	37"+	Fractured and partially weathered volcanic bedrock.

Variations: Depth to bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 35 to 70 percent. Surface soil colors are very dark brown or very dark grayish brown. Subsoil colors are dark brown, brown, strong brown, or dark yellowish brown. Surface textures are loam, gravelly loam, clay loam, or gravelly clay loam. Subsoil textures are very cobbly clay or very cobbly clay loam.

Setting: The 842 soils occur on moderately steep to steep ridge tops and sideslopes at elevations of 3,500 to 6,000 feet. Areas below 4,000

feet generally are on north-facing slopes. Slope gradients range from 5 to 85+ percent. The soils formed in colluvium from basic volcanic rocks.

The winters are cold and moist and the summers are cool and dry. Mean annual precipitation ranges from 35 to 55 inches. The mean annual air temperature ranges from 43 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir, incense-cedar and associated shrubs and forbs.

The 842 soils are associated with the soils of the deep, clayey 840 series; the moderately well-drained, very clayey 850 series; and the very cobbly, loamy 809 and 810 series.

The 842 soils are distinguished from the similar 809 soils by having more clay in the subsoil. The 840 soils are deeper, more clayey and less gravelly. The 850 soils are very clayey in the subsoil and are moderately well drained. Soils of the 705 series are similar but are warmer than the 842 soils. The (745) Laurelhurst soils are warmer, less acid and have fewer cobbles than the 842 soils.

Soil Behavior: The 842 soils are timbered mostly with conifers. Dominant species are Douglas-fir, white fir, incense-cedar and ponderosa pine. Productivity for Douglas-fir is low because of cool temperatures and a short growing season.

The regeneration hazard is severe. Grass and rodent invasions occur after timber harvest. Susceptibility to frost heave is moderate to severe.

Compaction by heavy equipment is a moderate hazard late into spring and early summer. Water bars are difficult to construct.

Cutbank slumping and raveling are common and small slumps can trigger larger slides that may remove sections of the road prism. The bedrock usually is stable. The erosion hazard is severe and exposed mineral surfaces are sources of high yields of colloidal sediments. Most drainage-ways carry water only during snowmelt.

Bedrock can be ripped but is not suitable for base material. Soil material is fair for fills and embankments if coarse fragments do not exceed cobble size and 50 percent of the volume. These soils are not good pond sites because of moderate depth.

Recreation development is severely limited because of soil physical properties and steep slopes.

These soils support vegetation important for deer summer range.

Mapping Units: Soils of the 842 series are not dominant in any mapping unit and occur as secondary soils in mapping units where the 840 series is dominant.

39. 850 Series

The 850 series consists of moderately deep, very clayey, moderately well-drained soils from basic volcanic rocks in the Cascade Mountains. They occur on gently sloping to steep ridges and sideslopes.

Profile Description: 850 clay loam.

Surface Soil:	0-12"	Dark brown clay loam, friable, slightly acid. 10-15" thick.
Subsoil:	12-38"	Light yellowish brown clay, massive, extremely firm, very sticky and very plastic, medium acid. 10-30" thick.
Substratum:	38"+	Weathered tuff.

Variations: Depth to weathered tuff ranges from 20 to 40 inches. Coarse-fragment content ranges from 0 to 15 percent. Surface soil colors are dark brown to very dark brown. Subsoil colors are olive brown, light olive brown, or yellowish brown. Soil texture of the surface soil is loam or clay loam. The subsoil texture is a fine clay.

Setting: The 850 soils occur on nearly level ridge tops and on sloping to steep sideslopes at elevations of 3,500 to 5,000 feet. Areas below 4,000 feet are on north-facing slopes. Slope gradients range from 0 to 60 percent. The soils formed in colluvium from andesitic tuff and breccia.

The summers are relatively cool and dry and the winters are cold and moist. Mean annual precipitation ranges from 30 to 55 inches. The mean annual air temperature is about 45 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of white fir, Douglas-fir, incense-cedar, black oak and an understory of shrubs, forbs and grasses.

The 850 soils are associated with the deep, well-drained, clayey 840 soils and the moderately deep, well-drained, very cobbly, clayey 842 soils. The shallow, stoney 806 soils and (R) rock land occur on south-facing slopes adjacent to areas of the 850 soils.

The 850 soils differ from the moderately well-drained, very clayey (706) Medco soils, at elevations below 4,000 feet, by being colder and more olive or yellowish colored in the subsoil.

Soil Behavior: The 850 soils are timbered with conifers and some hardwoods. Dominant species are white fir, ponderosa pine, Douglas-fir, incense-cedar and black oak. Productivity is severely limited by a dense clay subsoil and seasonal high water table, and by cool temperatures and a short growing season. Potential for frost heave is high.

These soils remain wet in the surface foot late in spring or early summer. They are subject to compaction by livestock and equipment. The erosion hazard is severe and bare mineral surfaces are important sources of colloidal sediment.

Road cutbanks are unstable, especially during the wet season. Water seeps out of the soil profile above the clay layer causing the soil mantle to slough onto ditches and roadways. Side-cast material will support a protective grass cover against surface erosion.

Soft bedrock is easily ripped but is of poor quality for construction material. The soil material is poor for fills or embankments. Ponds are satisfactory if kept full, but embankments will crack if allowed to become dry.

Recreation development potential is seriously limited by physical properties of the 850 soils and by slope gradients.

Wildlife habitat is good. The soils support vegetation important for deer summer range.

Mapping Units:

850/V 670 acres. Slopes dominantly are southerly and have gradients of 0 to 10 percent. This unit contains predominantly moderately well-drained, very clayey 850 soils on gently sloping hillslopes and terraces.

Minor inclusions of somewhat poorly-drained, unclassified soils occur in low spots and on concave positions in meadows.

850/VW 10,290 acres. Slopes dominantly are southerly and about 70 percent have gradients of 0 to 10 percent and about 30 percent have gradients of 10 to 35 percent. This unit contains predominantly moderately well-drained, very clayey 850 soils on gently sloping to moderately steep hillslopes and terraces.

Inclusions consist of well-drained, clayey 840 soils mingled with loamy, cobbly 809 and 810 soils on the steeper positions, and of somewhat poorly-drained unclassified soils in low spots and in meadows. Some gradients are more sloping than 35 percent.

40. (861) Rogue Series

The (861) Rogue series consists of moderately deep, sandy, somewhat excessively-drained soils from granitoid rocks at elevations above 4,000 feet in the Siskiyou Mountains. They occur on steep to very steep slopes.

Profile Description: (861) Rogue sandy loam.

Surface Soil:	0-11"	Brown, sandy loam, very friable, neutral. 8-14" thick.
Subsoil:	11-34"	Yellowish brown, cobbly sandy loam, massive, friable, slightly acid. 6-30" thick.
Substratum:	34"+	Highly-weathered granitic bedrock.

Variations: Depth to weathered bedrock ranges from 20 to 40 inches. Coarse-fragment content ranges from 10 to 35 percent. Surface soil colors are brown or dark grayish brown. Subsoil colors are dark yellowish brown, yellowish brown, olive brown, or light olive brown. Textures of the surface and subsurface layers are sandy loam or cobbly sandy loam.

Setting: The (861) Rogue soils occur on ridge tops and sideslopes in the Siskiyou Mountains at elevations of 4,000 to 6,000 feet. Gradients range from 10 to 85 percent with gradients over 35 percent being most common. The soils formed in colluvium from granitoid rocks.

The winters are cold and moist and the summers are cool and dry. The mean annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 44 to 47 degrees F.; the mean January temperature is about 30 degrees F.; and the mean July temperature centers on 60 degrees F. The frost-free period ranges from 70 to 100 days. The native vegetation is white fir, incense-cedar, Douglas-fir and an associated understory of shrubs and forbs.

The (861) Rogue soils are associated with soils of the (721) Siskiyou series which occur below 4,000 feet. Adjacent high-elevation areas underlain by metamorphic rocks have soils of the 824 and 825 series.

The (861) Rogue soils are distinguished from the moderately deep 824 soils by being less gravelly and cobbly and higher in sand. They are also sandier than the moderately deep soils of the 809 series which are high-elevation soils in the Cascade Mountains and underlain by volcanic rocks.

Soil Behavior: The (861) Rogue soils are timbered with mixed stands of conifers and hardwoods. Dominant species are white fir, Douglas-fir, ponderosa pine, chinquapin and madrone. These soils have a low water-holding capacity. However, they have a good site class for fir species. On the north, upper slopes of Sugarloaf Peak, seepage from snowmelt favors tree growth and natural regeneration.

The sandy surface layer has a low water-holding capacity for plant roots. Regeneration hazard of bare-root planting is severe.

Cable yarding has the least impact of conventional harvest systems on soil structure and stability. Tractor yarding, particularly, causes

excessive disturbance and reduces soil mantle stability. Water bars made of these coarse materials have a high incidence of failure.

Saturated cutbanks and fill slopes are subject to slumping and massive failure. Soil particles are easily detached by moving water and unprotected surfaces are susceptible to severe erosion. Gullies often form in unsurfaced roadways and ditchlines. Coarse sediments of the (861) Rogue soils generally do not cause much turbidity but biological activity is adversely affected where sediments contribute to stream bedload. Grass cover is easily established on fill slopes but needs periodic fertilization for maintenance.

Bedrock can be ripped but is not suitable for construction material. Ponds and reservoirs fail. Manufactured material or suitable clayey soils must be used for pond embankments. The soil is poorly suited for fills.

Potential for recreation site development is limited because of soil physical properties and excessive slope gradients.

Wildlife habitat is good.

Mapping Units:

861/XY 760 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 90+ percent. The soils predominantly are of the moderately deep, sandy (861) Rogue series on steep to very steep slopes.

Inclusions of (R) rock land mostly occur on the ridges and steepest slopes. Some unclassified, very cobbly and stony soils occur in the West Fork Williams Creek watershed.

861/XYn 3,940 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 90+ percent. The soils predominantly are of the moderately deep, sandy (861) Rogue series on steep to very steep slopes.

Inclusions of (R) rock land mostly occur on the steepest slopes and ridge tops. Some unclassified, very cobbly and stony soils occur in the West Fork Williams Creek watershed.

861/Y 170 acres. Slopes dominantly are southerly with gradients of 60 to 90+ percent. The soils predominantly are the moderately deep, sandy (861) Rogue soils on very steep slopes.

Inclusions of (R) rock land mostly occur on the steepest slopes and ridges.

861/Yn 400 acres. Slopes dominantly are northerly with gradients of 60 to 90+ percent. The soils predominantly are the moderately deep, sandy (861) Rogue soils on very steep slopes.

Inclusions of (R) rock land mostly occur on the steepest slopes and ridge tops.

41. 880 Series

The 880 series consists of deep, loamy, well-drained soils from basic volcanic rocks at elevations above 3,500 feet in the Cascade Mountains and receiving less than 35 inches of precipitation. They occur on gently sloping ridge tops and lower hillslopes.

Profile Description: 880 loam.

Surface Soil:	0-8"	Dark reddish brown loam, very friable, neutral. 5-11" thick.
Subsoil:	8-50"	Dark brown, clay loam, firm, slightly acid. 32-52" thick.
Substratum:	50-60"+	Dark reddish brown clay loam, firm, medium acid.

Variations: Depth to large boulders or bedrock ranges from 40 to more than 60 inches. Coarse-fragment content ranges from about 5 to 25 percent. Surface soil colors are dark brown or dark reddish brown. Subsoil colors are dark brown or dark reddish brown. Surface textures are loam or cobbly loam. Subsoil textures are clay loam or cobbly clay loam.

Setting: The 880 soils are on gently sloping to moderately steep slopes of the Cascade Mountains at elevations of 3,500 feet to 4,800 feet. Slope gradients range from 2 to 35 percent. The soils formed in colluvium from basic volcanic rocks.

The winters are cold and moist and the summers are cool and dry. The mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature ranges from 41 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of ponderosa pine, Douglas-fir, incense-cedar, sugar pine and associated shrubs and forbs.

The 880 soils are associated with the deep, very cobbly 882 series; and the very cobbly 809 and 810 series. Warmer soils at lower elevations include those of the (36) Witzel, (706) Medco, (710) Coker and (745) Laurelhurst series.

The 880 soils are distinguished from the 882 soils by having less gravel and fewer cobbles. They are less acid than the 809 and 810 soils. The 840 soils have more clay.

Soil Behavior: The 880 soils are timbered dominantly with ponderosa pine and Douglas-fir. Productivity for Douglas-fir is limited by cool temperatures and low rainfall.

Natural regeneration and bare-root plantings of pine species usually are successful.

The compaction hazard is moderate. Tractor yarding during wet soil conditions will lower productivity and cause erosion on steeper gradients. Soils on concave slopes and benches below steeper terrain remain wet for longer periods of time than on uniform slopes.

These soils exhibit high mantle stability when excavated. Most cuts for roads are shallow and are not into hard bedrock. However, large boulders are occasionally encountered during road construction. The erosion hazard is slight to moderate, but silt-size sediments from bare surfaces can adversely affect aquatic habitat. Runoff occurs during spring snowmelt and heavy summer thundershowers. Wet, unsurfaced roads are hazardous for vehicle traffic.

Bedrock is suitable for construction material when crushed. The soil material is fair to poor for fills and has moderate to severe limitations for embankments. Coarse fragments in these structures should not exceed cobble size and about 50 percent of the volume. There are good sites for ponds and reservoirs on less sloping ground.

Potential for recreation site development is good but there are some limitations. The soils are dusty when dry and muddy when wet. Water supply is limited to a few perennial creeks.

Wildlife habitat is excellent. The area south of Highway 66 is critical deer winter range. Some tree plantations near these ranges have been failures because of heavy pressure from deer.

Mapping Units:

880/V 24,530 acres. Slopes dominantly have gradients of 0 to 10 percent. This unit contains predominantly the deep, loamy 880 soils. This unit mostly occurs on the gentle topography south of the Greensprings Highway in southwestern Klamath County.

Inclusions consist of the very cobbly 882 soils on low knobs and steeper slopes; and deep, loamy unclassified soils in basins near drier regions. (R) Rock land, unclassified very cobbly, loamy soils and clayey 790 soils occur at random.

42. 882 Series

The 882 series consists of deep, loamy, very cobbly, well-drained soils from basic volcanic rock at elevations above 4,000 feet in the Cascade

Mountains. They receive less than 35 inches of precipitation and occur on gently sloping knolls and moderately steep to very steep mountain slopes.

Profile Description: 882 cobbly loam.

Surface Soil:	0-10"	Dark brown, cobbly loam, very friable, neutral. 2-16" thick.
Subsoil:	10-49"	Dark brown, very cobbly clay loam, friable, slightly acid. 29-50" thick.
Substratum:	49"+	Fractured and partially weathered andesite bedrock.

Variations: Depth to large boulders or bedrock ranges from 40 to 60 inches. Coarse-fragment content ranges from 35 to about 70 percent. Surface soil colors are dark brown or dark reddish brown. Subsoil colors are dark brown or dark reddish brown. Surface textures are cobbly loam or stony loam. Subsoil textures are cobbly loam, cobbly clay loam, or stony loam.

Setting: The 882 soils are on moderately steep to very steep slopes of the Cascade Mountains at elevations from 4,000 feet to 6,200 feet. Slopes range from 5 to 80 percent. The soils formed in stony colluvium mostly derived from andesite rock.

The winters are cold and moist and the summers are cool and dry. The mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature ranges from 41 to 47 degrees F.; the mean January temperature centers on 30 degrees F.; and the mean July temperature centers on 58 degrees F. The frost-free period ranges from 70 to 100 days. Native vegetation consists of ponderosa pine, Douglas-fir, incense-cedar, sugar pine, true fir and associated shrubs and forbs.

The 882 soils are associated with the deep loamy 880 series on gently sloping to moderately steep slopes; the very cobbly 809 and 810 series at high elevations. Warmer soils at lower elevations include those of the (36) Witzel, (706) Medco, (710) Coker and (745) Laurelhurst series.

The 882 soils are distinguished from the 880 soils by having more stones and cobbles. They are less acid than the 809 and 810 soils. The 842 soils are moderately deep.

Soil Behavior: The 882 soils are timbered dominantly with ponderosa pine and Douglas-fir. Productivity for Douglas-fir is limited by cool temperatures and low rainfall.

Regeneration hazard is moderate for bare-root plantings of pine species.

The compaction hazard on these soils is slight but erosion occurs in skid trails on steeper slopes. Water bars are difficult to build in these cobbly and stony soils on steep slopes.

These soils exhibit high mantle stability when excavated. Large boulders are occasionally encountered during road construction. The erosion hazard is moderate and silt-size sediments from bare surfaces can adversely affect aquatic habitat. Runoff occurs during spring snowmelt and heavy summer thundershowers. Wet, unsurfaced roads are hazardous for vehicle traffic.

Bedrock is suitable for construction material when crushed. The soil material is fair to poor for fills and has severe limitations for pond embankments.

Potential for recreation site development is limited because of soil physical properties and excessive slope gradients.

Wildlife habitat is excellent. The area south of Highway 66 is critical deer winter range. Some tree plantations near these ranges have been failures because of heavy pressure from deer.

Mapping Units:

882/WX 6,050 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit is made up predominantly of the deep, very cobbly 882 soils.

Inclusions consist of the loamy 880 soils mixed with the 882 soils; the more moist 809 and 810 soils at higher elevations; and the brown colored, loamy unclassified soils near drier regions.

882/WXn 3,820 acres. Slopes dominantly are northerly and about 70 percent of the area has gradients of 10 to 35 percent and 30 percent has gradients of 35 to 60 percent. This unit is made up predominantly of the deep, very cobbly 882 soils.

Inclusions consist of the loamy 880 soils mixed with the 882 soils: the more moist 809 and 810 soils at higher elevations; and the brown colored, loamy unclassified soils in basins near drier regions.

882/X 4,490 acres. Slopes dominantly are southerly and have gradients of 35 to 60 percent. This unit consists mostly of the very cobbly 882 soils.

Inclusions consist of the more moist 809 and 810 soils at higher elevations; and of (R) rock land mixed at random. Some slope gradients exceed 60 percent.

882/XY 950 acres. Slopes dominantly are southerly and about 70 percent of the area has gradients of 35 to 60 percent and 30 percent has gradients of 60 to 85+ percent. This unit contains

predominantly the very gravelly 882 soils. This unit mostly occurs on canyon walls adjacent to Jenny Creek in southwestern Jackson County.

Inclusions consist of the shallow 806 soils and (R) rock land.

882-880/W 28,960 acres. Slopes dominantly are southerly and 70 percent of the area has gradients of 0 to 10 percent and 30 percent has gradients of 10 to 35 percent. This unit contains about 65 percent of the very cobbly 882 soils and about 35 percent of the loamy 880 soils.

Inclusions consist of the very cobbly, clayey 790 soils and deep, loamy unclassified soils mixed with the redder 880 soils on nearly level slopes and in basins near drier regions.

882-380/W 6,310 acres. Slopes dominantly are southerly and have gradients of 10 to 35 percent. This unit contains about 75 percent of the very cobbly 882 soils and 25 percent of the loamy 880 soils. The 880 soils usually occur on lower slopes and benches.

Inclusions consist of the more moist 809 and 810 soils at higher elevations.

C. Soil Formation

This section discusses the factors of soil formation and their effects on the soils in the inventory area. A genetic key is included that relates each soil series to its factors of formation and to major characteristics resulting from the integrated effects of these factors which are significant to classification and the easy identification of the soils.

1. Factors of Soil Formation

The nature of a soil depends upon the combination and interaction of five factors: (1) climate, (2) living organisms, (3) parent material, (4) topography and (5) time (age). Each kind of soil reflects a certain combination and amount of influence of these factors.

Climate - The effects of climate on soil formation are both direct and indirect. It expresses itself through moisture (precipitation) and heat energy (temperature) that causes weathering of rocks and alteration of parent materials. The indirect affect on soils is expressed through living organisms for which the climate supplies energy and a suitable environment.

The major climatic variable in the Medford District is moisture. It ranges from over 80 inches in the northwestern part of the District to less than 18 inches in the southeastern part near Klamath Falls. Evapotranspiration losses exceed precipitation during the growing season; however, downward movement of water through the soil profile removes bases to make soils more acid and translocates clay particles to the subsoils to form argillic horizons. Soils that are strongly leached of bases and more acid are the 371 and 372 soils. The (718) Beekman and (781) Colestine soils occur on the same parent material but are in a lower precipitation zone, are less leached of bases and have higher pH values. The (380) Pollard and (719) Manzanita soils have argillic horizons but the (380) Pollard soils have fewer bases and, therefore, are more acid.

Soils forming at higher elevations, where temperatures are cooler, generally have more organic matter in the surface horizons. Here, the climatic conditions cause slower decomposition of plant residue that results in an accumulation of organic matter. Surface horizons that are relatively thick, dark colored, high in organic matter and high in exchangeable bases are called mollic horizons. Soils of the 809, 810, 880 and 882 series all have mollic horizons. Surface horizons that are dark colored but low in exchangeable bases are called umbric. Surface horizons too thin, too light colored or too low in organic matter to be called mollic or umbric are called ochric horizons. Most soils occurring in warmer portions of the District have ochric horizons.

Within the climate of the Medford District are many partial or microclimates that differ from the general climate. Variations in the thickness of the forest canopy, slope gradient and exposure to sunlight are among the factors that modify the general climate and provide local differences

in soil development. The ground cover of vegetation, more abundant in part of the District than in others, contributes to the interception of rainfall, modification of soil temperatures, and control of accelerated erosion. The influence of vegetation on the microclimate is discussed in greater detail under Living Organisms in this section.

Soils having a mean annual soil temperature cooler than 47° F. (8° C.) are classified as frigid and those having mean annual soil temperatures between 47° F. and 59° F. (8° to 15° C.) are classified as mesic. There is a close relationship between air temperatures and mean soil temperatures. Usually, the mean soil temperature is a few degrees warmer than the mean air temperature. The frigid zone within the inventory area generally is above 4,000 feet and the mesic zone is below that elevation.

Direct influences of differences in moisture and soil temperature on soil characteristics are not conspicuous. These separations are of more significance in affecting the length of growing season and productivity, the species composition and density, and other growth events that are important in planning land management practices.

Alternate wetting and drying of the soil profile are required for the formation of kinds of soils called Vertisols. They developed in parent materials high in montmorillonite clay that shrinks and swells a great deal with changes in moisture content. Soils of the (704) Carney series are of this kind.

Living Organisms - Processes of soil development are greatly modified by vegetation growing on the soil and by animal and plant life living in it. The kind and amount of vegetation that grows on a soil over a long period of time strongly influences the kind, amount and position of the organic matter in the soil. Rodents, worms and insects are natural cultivators of the soil and affect its structure, aeration and drainage.

Vegetation affects soil development in two ways: (1) by modifying the soil climate and (2) by the addition of humus. Forest cover influences the soil climate by intercepting rainfall and by modifying temperature and humidity at the ground level. The tree canopy also absorbs much of the light and heat during the day and radiates heat during the night. Thus, the tree canopy serves to moderate the climate beneath it at ground level and contributes to a soil climate that is less variable than the general climate.

A dense cover of vegetation reduces erosion losses even on sloping topography. The miscellaneous land type, (R) rock land, is very sparsely covered and may always have been essentially bare. Consequently, geologic erosion is keeping pace with weathering and the soil profile never develops or, if so, only very slowly. Shallow soils in the District, such as the (36) Witzel series, may also be eroding nearly as fast as new material weathers, even on gentle slopes. This is because the shallow, effective rooting zone can only support a sparse cover that offers little protection from erosion. Also, the shallow soils have a low water-holding

capacity so that they quickly become saturated and thereby are more subject to runoff than deeper soils.

Vegetation also helps to recycle plant nutrients and, in effect, reduce leaching losses. Nutrients are absorbed by the roots, translocated to the leaves and incorporated into organic matter by metabolic processes. They are returned to the soil through leaf fall and death of entire plants.

Microorganisms, together with insects, fungi and other plant and animal life, aid in decomposing organic matter and in weathering rock material. The mineral forms of nutrients can then be absorbed and the cycle is repeated.

Some plants, such as madrone and snowbrush, act as effective "nurse crops" for certain conifer species. They provide shade and protection from deer browse for Douglas-fir seedlings.

Man is a living organism and can cause considerable change to soils. For example, he brings about drastic changes in the vegetation, mixes or removes the upper horizons by harvest and tillage practices, rips dense subsoils to increase permeability, produces an artificial climate through irrigation and physically moves parts of soil by leveling, ditching and road construction.

Parent Material - Parent material is the unconsolidated mass from which a soil develops. It contributes minerals and other materials and affects surface infiltration, permeability and drainage and, thereby, the water and air supply.

Parent material as a soil-forming factor is discussed in considerable detail in Section IV, General Characteristics of the Area, under Geology. Table 10 in that section shows the relation between the soil series and the parent material.

Topography - The topography of the area is discussed in Section IV, General Characteristics of the Area, under Land Form.

Differences in elevation or inequalities of the land surface are closely related to differences in (1) drainage and, consequently, color, (2) coarse-fragment content, (3) thickness of the developed soil over parent material, (4) horizon differentiation and (5) erosion.

Internal drainage characteristics usually are reflected in the color of the soil, especially the degree and kind of mottling or gleying in the soil profile.

Most of the soils in the inventory area are well drained and occupy the more strongly-sloping hill slopes with smooth or convex surface form. They are mostly reddish or brownish and are free of low chroma mottles in their profiles.

Among the moderately well-drained soils are the (706) Medco, (712) Jump-off and 850 series that occupy mostly middle and lower slope positions on benched and uneven terrain. These soils usually are brownish or yellowish and may have low chroma mottles below about 35 inches, indicating a seasonal water table.

Among the somewhat poorly-drained soils is the (710) Coker series that occupies valley bottoms, rotational slumps and gently sloping positions, usually in or marginal to active drainageways. These soils are grayish brown and, infrequently, reddish and may have low chroma mottles at 15 to 30 inches below the surface, indicating a fluctuating water table.

Poorly-drained soils occur on slumps, basins and in valley bottoms adjacent to drainageways on level to nearly-level terrain. A water table occurs at or near the surface most of the time. These soils occur in small bodies and occupy very few acres in the inventory area and have not been classified.

The amount and thickness of coarse fragments in the surface layer is related to topographic position. Gravel and other size fragments in the surface layer are most abundant and thickest on hill crests and upper slopes of hills and land rises. The (36) Witzel and 705 soils are typical examples of soils that contain large amounts of coarse fragments.

In the (745) Laurelhurst soils on side slopes, for example, the amount of gravel and cobble is much less in quantity and is not so thick as in the higher-lying (36) Witzel and 705 soils. Generally, coarse fragments are progressively more abundant on the steeper slopes. Soils on lower slopes may contain coarse fragments in appreciable amounts but, frequently, they are buried beneath a variable thickness of gravel-free colluvium.

Topography also affects the thickness of the developed soil and the degree of horizon differentiation. Soils on very steep slopes characteristically are shallow and lack strong horizon development. These characteristics result mostly from geologic erosion that keeps pace with soil development. On less-sloping gradients, the profile of the soils are progressively thicker, usually have more clay, and horizons are more pronounced. The 371 and (380) Pollard series of the 371-372-370 Soil Association provide an example of this relationship. The soils of both series have formed in the same kind of parent material but the 371 soils are on steeper slopes and have a thinner profile. They lack the strong grade of structure that is characteristic of (380) Pollard soils. Runoff is slower on gentle slopes than on strong slopes. As a result, gently-sloping soils have more moisture available to plants and less hazard of surface erosion. The content of organic matter, more often than not, is greater on the less-sloping soils.

Time (Age) - The length of time required for a soil to develop depends mostly upon the other factors of soil formation. Less time generally is required for a soil to develop in warm, humid areas where the vegetation is rank than in cold, dry areas where the vegetation is sparse. Also,

less time is required if the parent material is high in basic weatherable minerals and fine grained than if it is high in siliceous minerals and coarse grained.

The length of time that soils have been developing is commonly reflected in the distinctness of horizons in the profile. Generally, older soils show a greater degree of horizon differentiation than younger soils. For example, on rounded ridges and benched lower slopes, the soils have developed to maturity ((380) Pollard, 382 and (750) Dumont soils) but, on stronger slopes, geologic erosion has removed the soil material as fast as it formed ((R) rock land). On floodplains, periodic deposits of new material have prevented the development of distinct horizons (certain soils of (1) alluvial land).

Young soils commonly have weak structure in their subsoils and they lack significant enrichment in clay by movement from upper to lower horizons. Such horizons are called cambic horizons. Soils of the (715) Brader, (731) Colestine, (721) Siskiyou and 809 series have cambic horizons.

Soils with mature profiles have an argillic horizon. In addition to having moderate or strong grades of structure, these horizons are noticeably higher in clay content than the overlying horizon. There is clear evidence, in the form of clay film on ped surfaces, that the clay has been translocated to the argillic horizon by water moving downward through the profile. Commonly, mature soils are redder or have stronger chroma color than the younger soils because of a greater degree of oxidation of iron and aluminum in the soil. Mature soils usually are more acid than the younger soils.

2. Genetic Key for the Soils

Table 2 is a key to the soils of the area that relates each soil series to the major soil-forming factors and soil properties significant to the classification and use of the soils. Information in Table 2 will be helpful in keying out soils during field studies and in obtaining a quick understanding of the major soil differences in the District.

TABLE 2

A GENETIC KEY FOR THE SOIL SERIES

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SOIL SERIES	DIAGNOSTIC HORIZONS		FAMILY PARTICLE SIZE CLASS	COARSE FRAGMENTS IN SUBSOIL (percent)		DRY SUBSOIL COLOR	PROFILE DEPTH (inches)	DRAINAGE CLASS	PPT. (inches)	TEMP. ZONE
	SURFACE SOIL	SUBSOIL		FRAGMENTS IN SUBSOIL (percent)	FRAGMENTS IN SUBSOIL (percent)					
I A. Siskiyou Mountains - Soils from Sedimentary and Metamorphic Rocks										
370	ochric	cambic	loamy-skeletal	35-75	light brown	40+	good	35-70+	mesic	
371	ochric	cambic	loamy-skeletal	35-75	light brown	20-40	good	35-70+	mesic	
372	ochric	cambic	loamy-skeletal	35-70	light brown	12-20	good	35-70+	mesic	
(380) Pollard	ochric	argillic	fine	5-35	yellowish red	40+	good	35-70+	mesic	
381	ochric	argillic	clayey-skeletal	35-75	yellowish red	20-40	good	35-70+	mesic	
382	ochric	argillic	clayey-skeletal	35-75	yellowish red	40+	good	35-70+	mesic	
701	ochric	cambic	loamy-skeletal	35-70	light brown	12-20	good	20-35	mesic	
(712) Jumpoff	ochric	argillic	fine	10-35	yellowish brown	40+	moderately good	30-50	mesic	
(715) Brader	ochric	cambic	fine-loamy	0-25	brown	12-20	good	18-30	mesic	
(716) Debenger	ochric	cambic	fine-loamy	0-25	reddish brown	20-40	good	18-30	mesic	
(718) Beekman	ochric	cambic	loamy-skeletal	35-75	light brown	20-40	good	20-35	mesic	
(719) Manzanita	ochric	argillic	fine	5-35	yellowish red	40+	good	20-35	mesic	
(781) Colestine	ochric	cambic	fine-loamy	10-35	reddish brown	20-40	good	20-35	mesic	
824	ochric	cambic	loamy-skeletal	35-75	light brown	20-40	good	40-80	frigid	
825	ochric	cambic	loamy-skeletal	35-75	light brown	12-20	good	40-80	frigid	
I B. Siskiyou Mountains - Soils from Serpentinitic Rocks										
(770) Pearsoli	ochric	cambic	fine	35-75	reddish brown	12-20	good	25-60	mesic	
I C. Siskiyou Mountains - Soils from Acid, Granitoid Rocks										
(721) Siskiyou	ochric	cambic	coarse-loamy	5-35	light gray	20-40	somewhat excessive	30-50	mesic	
(722) Holland	ochric	argillic	fine-loamy	5-25	reddish brown	40+	good	30-50	mesic	
(861) Rogue	ochric	cambic	coarse-loamy	10-35	very pale brown	40+	somewhat excessive	35-60	frigid	
II A. Cascade Mountains - Soils from Basic Volcanic Rocks (Tuffs, Breccias, Andesite and Basalt)										
(36) Witzel	mollc	cambic	loamy-skeletal	35-70	reddish brown	12-20	good	20-35	mesic	
(704) Carney	mollc	vertic	very fine	0-15	dark grayish brown	20-40	good	18-30	mesic	
705	mollc	argillic	clayey-skeletal	35-75	reddish brown	20-40	good	20-35	mesic	
(706) Medco	mollc	cambic	very fine	5-35	brown	20-40	moderately good	20-35	mesic	
(710) Coker	mollc	vertic	very fine	0-5	dark gray	40+	somewhat poor	18-25	mesic	
(731) Straight	ochric	cambic	loamy-skeletal	35-75	light reddish brown	20-40	good	35-60	mesic	
732	ochric	cambic	loamy-skeletal	35-70	light reddish brown	12-20	good	35-55	mesic	
(740) Geppert	pachic	cambic	loamy-skeletal	35-75	dark reddish gray	20-40	good	35-60	mesic	
(741) Freezner	ochric	argillic	fine	0-35	yellowish red	40+	good	35-60	mesic	
(745) Laurelhurst	pachic	cambic	fine	0-35	dark brown	40+	good	20-35	mesic	
(750) Dumont	ochric	argillic	clayey	0-20	red	40+	good	35-60	mesic	
790	pachic	argillic	clayey-skeletal	45-65	dark brown	20-40	good	12-16	mesic	
806	ochric	cambic	loamy-skeletal	35-75	brown	12-20	good	35-60	frigid	
809	mollc	cambic	loamy-skeletal	35-75	dark brown	20-40	good	35-60	frigid	
810	pachic	cambic	loamy-skeletal	35-75	dark brown	40+	good	35-60	frigid	
840	mollc	argillic	fine	5-35	brown	40+	good	35-55	frigid	
842	mollc	argillic	clayey-skeletal	35-70	brown	20-40	good	35-55	frigid	
850	ochric	cambic	very fine	0-15	light yellowish brown	20-40	moderately good	30-55	frigid	
880	pachic	argillic	fine-loamy	5-25	reddish brown	40+	good	20-35	frigid	
882	pachic	argillic	loamy-skeletal	35-70	reddish brown	40+	good	20-35	frigid	

VI. SOIL USE AND MANAGEMENT

A. Engineering Uses of the Soils

This section contains information about the soils of the inventory area significant to engineering uses. The information can be used to (1) make soil and land use studies that will aid in selecting and developing recreational, residential and commercial sites; (2) make preliminary estimates of soil properties that are important in planning ponds, irrigation systems, dikes and waterways; (3) make preliminary evaluations of soil and ground conditions that will aid in selecting locations for roads, pipelines, power transmission lines, and cables, and in planning detailed investigations at the selected sites; (4) locate probable sources of road construction material; (5) correlate performance of engineering structures with soil mapping units to develop information for overall planning that will be useful in planning certain engineering practices; (6) determine the suitability of soils for cross-country movement of vehicles and construction equipment; (7) develop other preliminary estimates for construction purposes pertinent to the particular area.

THIS INFORMATION WILL NOT ELIMINATE THE NEED FOR ON-SITE SAMPLING AND TESTING OF SOILS WHEN THE DESIGN AND CONSTRUCTION OF SPECIFIC ENGINEERING WORKS ARE BEING CONSIDERED. IT SHOULD BE USED PRIMARILY FOR PLANNING DETAILED FIELD INVESTIGATIONS TO DETERMINE THE CONDITION OF THE SOIL MATERIAL AT THE PROPOSED SITE. THE INFORMATION WILL ENABLE SOIL ENGINEERS TO CONCENTRATE ON THE MOST SUITABLE SOILS, TO TAKE FEWER SAMPLES AND TO MAKE AN ADEQUATE INVESTIGATION AT A MINIMUM COST.

Suitability of soils for roadfill is discussed in the section on Interpretive Ratings for Soil Uses, Table 4.

1. Hydrologic Soil Groups

Hydrologic soil groups are used in watershed planning to estimate runoff from rainfall (Ref. 3). Soil properties are considered that influence the minimum rate of infiltration obtained for a bare soil after prolonged wetting. These properties are depth of seasonally high water table, intake rate and permeability after prolonged wetting, and depth to a very slowly permeable layer. The influence of ground cover on runoff and infiltration is not considered in hydrologic soil groups. Soils are classified into four groups: A, B, C and D.

Group A soils have a low runoff potential. They include soils having high infiltration rates even when thoroughly wetted and consist chiefly of deep, well- to excessively-drained sands and gravels. There are no group A soils in the inventory area.

Group B soils have a moderately low runoff potential. These are soils having moderate infiltration rates when thoroughly wetted and consisting chiefly of moderately deep, moderately well- and well-drained soils with moderately fine to moderately coarse textures. These soils have a moderate rate of water transmission.

Group C soils have a moderately high runoff potential. These are soils having slow infiltration rates when thoroughly wetted and consisting chiefly of well-drained and moderately well-drained soils with slowly and very slowly permeable layers at moderate depths (20 to 40 inches) and soils with moderately fine to fine textures.

Group D soils have a high runoff potential. These are soils having very slow infiltration rates when thoroughly wetted and consisting chiefly of clay soils with a high swelling potential, soils with a permanent high water table, and soils with a nearly impervious layer at depths of less than 20 inches.

2. Shrink/Swell Potential

Shrink/swell behavior is that quality of the soil that determines its volume change with change in moisture content. The volume change behavior of soils is influenced by the amount of moisture change, and the amount and kind of clay in the soils. Three degrees of limitation are recognized: slight, moderate and severe (Ref. 3). Soils rated with a slight degree of limitation have less than 18 percent clay of the mixed or montmorillonitic type, or less than 30 percent clay of the kaolinitic type. Soils classified as having a moderate degree of shrink/swell limitation have 18 to 30 percent clay of the mixed or montmorillonitic type or more than 30 percent clay of the kaolinitic type. Soils having more than 30 percent montmorillonitic or mixed clay are rated as having a severe limitation for shrink/swell.

3. Corrosivity

Corrosivity pertains to potential soil-induced chemical action that dissolves or weakens uncoated steel or concrete. Rate of corrosion of uncoated steel is related to soil properties such as drainage, texture, total acidity, electrical resistivity, and electrical conductivity of the soil material. Corrosivity for concrete is influenced mainly by the content of sodium or magnesium sulfate but also by soil texture and acidity. Installations of uncoated steel that intersect soil boundaries or soil horizons are more susceptible to corrosion than installations entirely in one kind of soil or in one soil horizon. A corrosivity rating of low means that there is a low probability of soil-induced corrosion damage. A rating of high means that there is a high probability of damage, so that protective measures for steel and a more resistant concrete should be used to avoid or minimize damage.

4. Engineering Classification Systems

In addition to the U.S. Department of Agriculture soil textural classification in Table 3, are the unified soils classification system established by the Waterways Experiment Station, Corps of Engineers (Ref. 8); and the American Association of State Highway Officials (AASHTO) system (Ref. 2). The classifications in Table 2 are estimates based on laboratory analysis and field study and comparison with similar soils in other areas.

a. The Unified Soil Classification System

The unified soil classification system is used mainly by the Corps of Engineers and the U.S. Bureau of Reclamation to evaluate soils for roads, airfields, embankments and foundations ((Refs. 1 & 8). The system classifies soils according to their textural and plasticity qualities and their performance as engineering construction materials. The following properties form the basis of soil identification: (1) percentage of gravel, sand and fines (fraction passing the #200 sieve); (2) the shape of the grain size distribution curve; (3) plasticity and compressibility characteristics. The soil is given a letter symbol indicating its principal characteristics, such as ML for loamy or silty soils with low plasticity.

On the basis of texture, the soils are divided into (1) coarse-grained, (2) fine-grained and (3) highly organic soils in the unified system. The coarse-grained soils contain 50 percent or less material smaller than the #200 sieve. Highly organic soils are generally identified visually.

Coarse-grained soils are subdivided into gravels (G) and sand (S). The gravels have more than 50 percent of the coarse fraction retained on the #4 sieve and the sands have the greater portion passing the #4 sieve. The four secondary divisions of each group - GS, GP, GM and GC or SW, SP, SM and SC - depend on the amount and type of fines and the shape of the grain size distribution curve. The letter W is for well graded; the P is for poorly graded; the M means silty or medium sized; the C means clayey. The grain size curves of well-graded (W) materials are smooth and concave with no sizes lacking and no excess of materials in any size range.

Fine-grained soils are subdivided into silts (M) and clays (C) depending on their liquid limit and plasticity index. Soils for which the plasticity index is less than three-fourths of the liquid limit, minus the constant 15, are M soils. Those for which the plasticity index is greater than three-fourths of the liquid limit, minus 15, are C soils. If the liquid limit is less than 50 percent, the fine-grained soils are ML or CL. If the liquid limit is greater than 50 percent, they are classified MH or CH. Peat and other highly organic soils are identified as Pt. Organic silts and silty clays of low plasticity are identified as OL and organic clays of medium to high plasticity are identified as OH.

The significance of properties of the various classes of the Unified Soil Classification System to specific engineering uses is summarized in Federal Housing Administration Bulletin No. 373, "Engineering Soil Classification for Residential Developments" (Ref. 8). In general, the coarse-grained soils, especially when well graded (GS and SW), are most desirable for roadways and foundations and least desirable for reservoirs. They have high bulk densities, are easy to compact, have low compressibility and expansion potential, have low potential frost action, and have a high permeability. The fine-grained soils with high liquid limits (MH and CH) are least desirable for nearly all engineering uses of soils because of their low shearing strengths, high expansion potential, high potential

frost action, high corrosion potential, low permeability, and low bulk densities. The most desirable soils for earth embankments to retain water are classified as GS and SC or clayey gravels and clayey sands. Such soils can be compacted relatively easily and, once compacted, have very low permeabilities and are not subject to potential expansion and frost action.

b. The American Association of State Highway Officials System

The American Association of State Highway Officials (AASHO) soil classification system is based on the field performance of soils (Ref. 2). In this system, classification is based on gradation (particle size distribution), liquid limit and plasticity index of the soil. Grouping soils about the same general load-carrying capacity and service results in seven basic groups that are designated A-1 through A-7. The best soils for road subgrades are classified as A-1, the next best A-2, etc., with the poorest soils classified as A-7.

Soils groups A-1, A-2 and A-3 are called granular materials and include soils having less than 35 percent of the soil material including gravels and cobbles passing through a #200 sieve. Groups A-4, A-5, A-6 and A-7 are called silt-clay materials and include soils for which more than 35 percent of the material passes through a #200 sieve.

A-1 soils are well-graded mixtures from coarse to fine with a nonplastic or feebly plastic soil binder. A-1-a soils include those materials consisting predominantly of stone fragments or gravel (more than 50 percent is retained on a #10 sieve). A-1-b soils include those materials consisting predominantly of coarse sand (more than 50 percent passes a #10 sieve and more than 50 percent is retained on a #40 sieve). A-1 soils generally are highly stable under wheel loads regardless of moisture conditions. They function satisfactorily as bases for thin bituminous wearing surfaces.

A-2 soils are composed of a wide range of granular materials that are subdivided into subclasses based on differences in liquid limit and plasticity index of the material passing through a #40 sieve. A-2-4 and A-2-5 soils include those granular materials that have soil binder characteristics of the A-4 and A-5 soil groups. The binder material in the A-2-4 soils is predominantly silts that have a relatively low liquid limit (less than 40). The binder material in the A-2-5 soils is very poorly graded and consists mostly of diatoms and mica which are productive of elastic properties and very low stability. A-2-6 and A-2-7 soils include those granular materials that have binder characteristics of the A-6 and A-7 soil groups. The binder material in A-2-6 soils is composed predominantly of clay with a relatively low liquid limit (less than 40) whereas it has a liquid limit of more than 40 in A-2-7 soils. A-2-4 and A-2-5 soils are satisfactory as a road base when properly drained and compacted. As a base coarse, A-2-6 and A-2-7 soils may lose stability because of capillary saturation or lack of drainage. Generally, A-2 soils are suitable as a blanketing material for very plastic subgrades over which concrete pavement is to be placed.

A-3 soils are composed of sands deficient in soil binder or coarse material. Typical of this group are fine beach sand, fine dune sand and poorly-graded fine sandy alluvium. A-3 soils lack stability under wheel loads except when they are moist. They have no volume change with variations in moisture content and make suitable subgrades for all pavement types when confined. They cannot be compacted with a sheepfoot roller but may be compacted by vibration or by pneumatic tire or steel wheel rollers.

A-4 soils are very common in occurrence and are composed predominantly of silt. They provide a firm riding surface when dry with little rebounding after loading. When water is absorbed rapidly, these soils expand detrimentally or lose stability and they are subject to frost heave. Bituminous surfaces require substantial base courses when placed on subgrades of this soil group.

A-5 soils are similar to A-4 soils except that they include very poorly-graded soils containing such materials as diatoms and mica which are productive of elastic properties and very low stability. They are likely to rebound when load is removed when they are dry. A-5 soils are not suitable as subgrades for thin, stabilized, flexible base courses of bituminous surfaces. They are subject to frost heave.

A-6 soils, of very common occurrence, are composed predominantly of clay with moderate to negligible amounts of coarse material. In the soft or stiff plastic state, they absorb additional water only when manipulated. They have good bearing capacity when compacted to maximum practical density but lose this bearing strength when moisture is absorbed. These soils are compressible, rebound very little when load is removed and are very expansive when compacted at a moisture condition below optimum. These soils possess little internal friction and have low stability at the higher moisture contents. A-6 soils are characterized by shrinkage cracks during dry weather. Gravitational water flow is negligible which makes ordinary drainage installation of little value. These soils are not suitable for use as subgrades under thin flexible base courses or bituminous surfaces because of the large volume changes that are caused by moisture changes and the loss of bearing strength after the entrance of moisture.

A-7 soils are also composed predominantly of clay but, because of the presence of single-size silt particles, organic matter or lime carbonate, they are elastic. At certain moisture contents they deform quickly under load and rebound appreciably when load is removed. They make particularly undesirable subgrades for flexible pavements. A-7-5 soils represent those A-7 soils with moderate plasticity indexes in relation to liquid limit and may be highly elastic as well as subject to considerable volume change. A-7-6 soils have high plasticity indexes in relation to liquid limit and are subject to extremely high volume change.

5. Coarse Fragments Greater Than Three Inches

"Coarse fragments over three inches in diameter" refers to percent by weight of rock fragments. In the Unified and AASHTO systems, these

fragments are not considered in the classification. However, it is necessary to know how much fragments are present in evaluating the class.

6. Liquid Limit and Plasticity Index

"Liquid limit" and "plasticity index" indicate the effect of water on the strength and consistence of soil material. As the moisture content of a clayey soil is increased from a dry state, the material changes from a plastic to a liquid state. The plastic limit is the moisture content at which the soil material changes from a semisolid to a plastic state and the liquid limit, from a plastic to a liquid state. The plasticity index is the numerical difference between the liquid limit and the plastic limit. It indicates the range of moisture content within which a soil material is plastic.

The Liquid limit and plasticity index are obtained either by engineering tests or by estimates of USDA texture and consistence. Assuming 15-bar water is known, liquid limit can be estimated as follows: two times 15-bar water percentage equals liquid limit.

TABLE 3

ENGINEERING PROPERTIES OF SOILS - MEASUREMENTS AND INTERPRETATIONS

Soil Series Symbol	Soil Name	Depth From Surface (inches)	Depth to Bedrock (inches)	Hydro-logic Group	Shrink/Swell Potential	---CORROSION---		Concrete	USDA Texture	CLASSIFICATION	AASHTO	Coarse Fragments >3" (percent)	Liquid Limit (percent)	Plasticity Index
						Uncoated Steel	Steel							
36	Witzel	0-19	12-20	D	Low	Moderate	Moderate	Moderate	Very cobbly silty clay loam	GC or CL	A-6	30-60	35-40	15-20
370	Unnamed	0-60	40+	B	Moderate	Moderate	Moderate	Moderate	Gravelly clay loam	CL	A-6	0-40	25-35	15-20
371	Unnamed	0-9	20-40	B	Low	Moderate	Moderate	Moderate	Loam	ML or CL-ML	A-4 or A-6	0	25-35	5-10
		9-34			Low	High	Moderate	Moderate	Very gravelly loam	GM	A-2	0-20	25-35	5-10
372	Unnamed	0-18	12-20	D	Low	Moderate	Moderate	Moderate	Very gravelly loam	GM	A-4 or A-2	0-20	20-30	5-10
380	Pollard	0-9	40+	C	Low	Moderate	Low	Low	Loam or clay loam	ML or CL	A-6	0-15	35-40	10-15
		9-50			Moderate	High	Moderate	Moderate	Clay	ML or MH	A-7-5	0	45-55	15-20
381	Unnamed	0-14	20-40	C	Low	Moderate	Low	Low	Gravelly loam or gravelly clay loam	ML or GM	A-4 or A-6	0	25-40	5-15
		14-34			Moderate	High	Moderate	Moderate	Gravelly clay or gravelly clay loam	CL or ML	A-6, A-7-5	0-20	35-50	15-25
382	Unnamed	0-11	40+	C	Low	Moderate	Low	Low	Gravelly clay loam	GM	A-4 or A-6	0-10	25-40	5-15
		11-74			Moderate	High	Moderate	Moderate	Very gravelly clay or very gravelly silty clay	GC or CL	A-7-5	0-20	45-55	15-20
701	Unnamed	0-8	12-20	D	Low	Low	Low	Low	Gravelly loam	SM	A-4, A-2	0-20	20-30	NP-5
		8-13			Low	Low	Low	Low	Very gravelly loam	GM or CL	A-4 or A-6	0-20	20-30	5-10
704	Carney	0-30	20-40	D	High	High	Low	Low	Clay	CH	A-7-6	0-30	60-75	35-45
705	Unnamed	0-7	20-40	C	Low	Low	Low	Low	Cobbly clay loam	ML or CL	A-4	0-35	30-35	5-10
		7-31			Moderate	Moderate	Low	Low	Very cobbly clay	CG	A-6, A-7-5	30-60	35-50	15-25
706	Medco	0-13	20-40	D	Moderate	Moderate	Low	Low	Loam or clay loam	ML, SM or GM	A-6 or A-4	0-40	30-40	5-15
		13-27			High	High	Low	Low	Clay	CH	A-7	0-20	60-80	35-50
710	Coker	0-70	40+	D	High	High	Low	Low	Clay	CH	A-7	0-5	60-75	35-45
712	Jumpoff	0-5	40+	C	Moderate	Low	Low	Low	Gravelly clay loam	CL-ML, ML	A-4	0	25-35	5-10
		5-52			High	Low	Moderate	Moderate	Clay	CL or CH	A-7-6	0	45-60	30-40

TABLE 3 (Cont'd)

ENGINEERING PROPERTIES OF SOILS - MEASUREMENTS AND INTERPRETATIONS

Soil Series Symbol	Soil Name	Depth		Hydro-logic Group	Shrink/Swell Potential	---CORROSION---		-----CLASSIFICATION-----		Coarse Fragments >3" (percent)	Liquid Limit (percent)	Plasticity Index	
		From Surface (inches)	Depth to Bedrock (inches)			Uncoated Steel	Concrete	USDA Texture	Unified				AAASHO
715	Brader	0-13	12-20	D	Moderate	Moderate	Low	Clay loam and loam	ML	A-4	0	30-40	5-10
716	Debenger	0-9	20-40	C	Low	Low	Low	Loam	ML or SM	A-4	0	25-35	0-5
718	Beekman	9-27	20-40	B	Low	Moderate	Moderate	Clay loam	CL-ML or CL	A-4	0	25-30	5-10
		0-14	20-40	B	Low	Low	Low	Gravelly loam	ML or GM	A-4 or A-2-4	0	25-35	5-10
		14-28			Low	Low	Low	Very gravelly loam	GM, GM-GC	A-2-4, A-1 or A-4	0	25-35	5-10
719	Manzanita	0-8	40+	C	Low	Moderate	Low	Loam	ML-CL, CL or ML	A-4	0	25-35	5-10
721	Siskiyou	8-58	20-40	B	Moderate	High	Moderate	Clay loam or clay	CL	A-7	0	40-45	20-25
722	Holland	0-36	20-40	B	Low	Low	Moderate	Gravelly coarse sandy loam	SM	A-2-4	0-5	Nonplastic	
731	Straight	0-14	40+	B	Low	Moderate	Moderate	Loam	SM	A-4	0	Nonplastic	145
		14-49	20-40	B	Low	Moderate	Moderate	Clay loam	SC	A-4	0	30-35	5-10
740	Gepfert	0-6	20-40	B	Low	Low	Moderate	Gravelly loam	ML	A-2-4 or A-2-6	0-20	Nonplastic	
741	Freezner	6-36	40+	C	Low	Low	Moderate	Very gravelly loam	GM, GC or GM-GC	A-4 or A-6	0-30	25-35	5-15
		0-13	40+	B	Moderate	Low	Low	Cobbly loam	ML or GM	A-4	15-50	25-35	5-10
		13-30			Moderate	Moderate	Moderate	Very cobbly clay loam	GC	A-6 or A-2-6	45-65	25-40	10-15
745	Laurelhurst	0-15	40+	C	Moderate	Moderate	Moderate	Gravelly loam and clay loam	ML	A-5	0	40-50	5-10
		15-42			Moderate	High	Moderate	Clay	MH	A-7-5	0	55-65	15-25
		42-60			Moderate	Moderate	Moderate	Clay loam	MH	A-7-5	0	50-60	10-20
		0-8	40+	C	Moderate	High	Low	Clay loam or silty clay loam	CL	A-7	0-15	35-50	15-25
		8-44			High	High	Low	Clay	CH	A-7	0-15	50-60	25-35

TABLE 3 (Cont'd)

ENGINEERING PROPERTIES OF SOILS - MEASUREMENTS AND INTERPRETATIONS

Soil Series Symbol	Soil Name	Depth From Surface (inches)	Depth to Bedrock (inches)	Hydrologic Group	Shrink/Swell Potential	---CORROSION---		CLASSIFICATION		Coarse Fragments >3" (percent)	Liquid Limit (percent)	Plasticity Index	
						Uncoated Steel	Concrete	USDA Texture	Unified				AASHTO
750	Dumont	0-8	40+	C	Low	Moderate	Moderate	Loam	ML	A-4	0	30-40	5-10
		8-19			Low	High	Moderate	Clay loam	ML	A-7-5	0	40-50	10-15
		19-60			Low	High	Moderate	Clay	ML or MH	A-5 or A-7-5	0	45-60	10-20
770	Pearsoll	0-14	12-20	D	High	High	Low	Very gravelly clay loam and very cobbly clay	GC or CH	A-7-6 or A-2-7	35-75	45-65	25-30
781	Colestine	0-8	20-40	B	Low	Low	Low	Gravelly silt loam	ML or GM	A-4	0	25-30	5-10
		8-31			Low	Low	Low	Gravelly loam	CL or GC	A-6	0-30	25-35	10-15
790	Unnamed	0-8	20-40	C	Low	Low	Low	Gravelly loam or loam	SM, GM, MI	A-2-4, A-4	0-30	Nonplastic	
		8-16			Low	Moderate	Low	Very cobbly clay loam	GC, CL	A-6	0-30	35-40	15-20
		16-25			Moderate	High	Low	Very cobbly clay	GC, SC, CL	A-2-6, A-6, A-7	15-30	35-50	15-25
806	Unnamed	0-19	12-20	D	Low	Low	Moderate	Very gravelly loam	ML	A-4	10-30	Nonplastic	
809	Unnamed	0-17	20-40	B	Low	Low	Moderate	Gravelly loam	ML or GM	A-4, A-2-4 or A-1	0	Nonplastic	
		17-36			Low	Low	Moderate	Very gravelly clay loam and very gravelly loam	GM or ML	A-4	0-10	20-30	5-10
810	Unnamed	0-22	40+	B	Low	Low	Moderate	Gravelly loam and very gravelly loam	ML or GM	A-4, A-2-4, or A-1	20-50	Nonplastic	
		22-50			Low	Low	Moderate	Very gravelly clay loam and cobbly clay loam	GM or ML	A-4	30-55	25-30	5-10
824	Unnamed	0-12	20-40	B	Low	Low	Low	Gravelly loam	SM or ML	A-2-4 or A-4	0-20	20-30	0-5
		12-32			Moderate	Low	Low	Gravelly clay loam	CL-ML	A-6 or A-4	0-10	25-30	5-10
825	Unnamed	0-15	12-20	D	Low	Low	Moderate	Very gravelly loam and very cobbly loam	GM	A-4	0-30	20-30	0-5
840	Unnamed	0-18	40+	C	Moderate	Low	Low	Gravelly loam, clay loam	ML or CL-ML	A-4 or A-6	0	25-35	5-10
		18-60			High	Moderate	Moderate	Clay	CL or CH	A-7-5	0	45-55	25-35

TABLE 3 (Cont'd)

ENGINEERING PROPERTIES OF SOILS - MEASUREMENTS AND INTERPRETATIONS

Soil Series Symbol	Soil Name	Depth From Surface (inches)	Depth to Bedrock (inches)	Hydro-logic Group	Shrink/Swell Potential	---CORROSION---		USDA Texture	---CLASSIFICATION---		Coarse Fragments >3" (percent)	Liquid Limit (percent)	Plasticity Index
						Uncoated Steel	Concrete		Unified	AASHO			
842	Unnamed	0-13	20-40	C	Moderate	Low	Low	Gravelly loam and gravelly clay loam	ML	A-4	0-20	20-30	0-5
		13-26			Moderate	Moderate	Moderate	Cobbly clay loam	CL-ML or ML	A-4	20-60	25-35	5-10
		26-37			High	Moderate	Moderate	Very cobbly clay	GC	A-7-5	30-70	45-55	25-35
850	Unnamed	0-9	40+	D	Moderate	Moderate	Moderate	Loam and clay loam	CL or ML	A-6	5-20	25-40	10-15
		9-60			High	High	High	Clay	CH	A-7-6	0-20	65-80	35-50
861	Rogue	0-34	20-40	B	Low	Moderate	Moderate	Cobbly coarse sandy loam	SM	A-2-4	15-30	Nonplastic	
		34-54			Low	Moderate	Moderate	Coarse sandy loam	SM	A-2-4	0	Nonplastic	
880	Unnamed	0-8	40+	B	Low	Low	Low	Loam	ML	A-2-4 or A-4	0	Nonplastic	
		8-44			Low	Moderate	Low	Clay loam	ML or CL	A-4, A-6 or A-7-5	0-25	35-45	5-15
882	Unnamed	0-35	40+	B	Low	Low	Low	Cobbly loam	ML or GM	A-4 or A-2-4	25-45	Nonplastic	
		35-49			Low	Moderate	Moderate	Very cobbly clay loam and very cobbly loam	GM or GP-GM	A-4	45-70	25-30	5-10

B. Interpretive Ratings for Soil Uses

In this section, suitability of soils for road fill and limitations of soils for water management, community development and recreational uses are discussed. Some recreational uses include camp areas, picnic areas and play areas for organized games like baseball, and footpaths and bridle trails. Soil limitations for landscaping are also discussed because intensely-used recreational areas commonly are landscaped. Also, soil limitation ratings are given for septic tank absorption fields and other sanitary facilities because of their common association with recreational facilities.

Rating terms used for soil suitability are good, fair and poor. Rating terms used for soil limitations are slight, moderate and severe.

1. Road Fill

Road fill is soil material used for making embankments for roads. Low embankments or upper parts of high embankments serve as subgrade (foundation) for the road. Thus, soil material good for road fill is also good for subgrade.

Ratings, good, fair and poor, reflect how well a soil performs after it is removed from its original location and placed in a road embankment. They also reflect evaluation of soil characteristics, such as slope, that determine ease in getting soil out. Generally, the rating is given for the whole soil, from the surface to a depth of 5 to 6 feet, based on the assumption that soil horizons will be mixed in loading, dumping and spreading.

2. Pond Locations and Embankments

Pond reservoir areas hold water behind a dam or embankment. Features affecting this use are permeability, depth to bedrock, and slope gradient.

Embankments are earthfills designed to hold back water. Features affecting these uses are shear strength, compressibility, permeability of the compacted soil, susceptibility to piping, compaction characteristics, shrink/swell potential, and stoniness. Ratings given apply only to small, homogeneous embankments.

3. Shallow Excavations

Shallow excavations are those that require digging or trenching to a depth of less than 6 feet. Important features affecting excavations are a seasonally high water table, flooding, slope, soil texture, depth to bedrock or other cemented layer, stoniness, and rockiness.

4. Camp Areas

A camp area is an area that is used intensively for tents, campers and small camp trailers and for outdoor living. Camping areas require little site preparation other than minor shaping and leveling of areas used for tents and parking. The soils must be able to support heavy foot traffic and limited vehicular traffic.

Soil suitability for growing and maintaining vegetation is not a part of this guide but is an item to consider in final evaluation of a site. Not considered in the ratings were the problems of water supply, sewage disposal or access roads.

A soil has slight limitations for campsites if all of the following features apply: Slopes are less than 8 percent; drainage is excessive, somewhat excessive or well; depth to the seasonal water table is more than 30 inches; there is no flooding; permeability is rapid to moderately rapid, inclusive; surface soil texture is sandy loam, silt loam or loam; soil depth is 20 inches or more; gravel covers less than 20 percent of the surface area; stones cover less than 0.1 percent of the area; rock outcrops cover less than 2 percent of the area.

A soil that has a moderate limitation for campsites has one or more of the following features: Slopes are 8 to 15 percent; drainage is somewhat poor; depth to the seasonal water table is 20 to 30 inches; flooding does not occur during season of use; permeability is moderately slow or slow; the surface soil texture is clay loam, sandy clay loam, silty clay loam or loamy sand; soil depth to rock is between 10 and 20 inches; gravel covers between 20 and 50 percent of the surface area; stones cover between 0.1 and 3 percent of the surface area; rock outcrops cover from 2 to 25 percent of the area.

A soil has severe limitations for campsites if one or more of the following features apply: Slopes are more than 15 percent; depth to seasonal water table is less than 20 inches; flooding occurs during season of use; permeability is very slow; the surface texture is silty clay, sandy clay, clay or loose sand; depth to rock is less than 10 inches; gravel covers over 50 percent of the surface area; stones cover more than 3.0 percent of the surface area; rock outcrops cover more than 25 percent of the surface area.

5. Picnic Areas

A picnic area is a place that is intensively used for daytime outdoor food preparation and eating. Picnic areas require little site preparation other than minor shaping and leveling of areas for picnic tables. The soils must be able to support heavy traffic by people.

Soil suitability for growing vegetation is not a part of this guide but is an item to consider in final evaluation of a site. Problems of water

supply and sewage disposal are not considered in the ratings. Most vehicular traffic will be confined to access roads.

A soil has slight limitations for picnic areas if all of the following features apply: Slopes are less than 8 percent; the drainage class is moderately well, well or somewhat excessive; seasonal water tables are deeper than 20 inches; flooding does not occur during season of use; surface soil texture is sandy loam, fine sandy loam, silt loam or loam; gravel covers less than 20 percent of the surface area; stones and rocks cover less than 3 percent of the surface area.

A soil that has moderate limitations for use as a picnic area has one or more of the following features; Slopes are 8 to 15 percent; the drainage class is somewhat poor and the depth to a seasonal water table may be less than 20 inches for short periods during the season of use; flooding occurs 1 or 2 times for short periods during the season of use; surface soil textures are sandy clay loam, clay loam, sandy clay, silty clay loam, or loamy sand; gravel covers from 20 to 50 percent of the area; stones and rocks cover from 3 to 15 percent of the surface area.

A soil has severe limitations for picnic areas if one or more of the following features apply: Slopes are more than 15 percent; the drainage class is poorly drained and the water table is above 20 inches for a month or more during the season of use; flooding occurs more than twice during the season of use; the surface soil texture is sandy clay, silty clay, clay, or loose sand; gravel covers more than 50 percent of the surface area; stones and rocks cover 15 percent of the surface area.

6. Play Areas

A playground is an area intensively used for organized games such as baseball, football, badminton, volleyball and the like. They are commonly associated with day-use parks and schools. The soils must be able to support heavy traffic by people. A nearly-level surface, good drainage, and a soil texture and consistence that gives a firm surface are generally needed. Rock outcrops and coarse fragments are undesirable. Soil suitability for growing vegetation is not a part of this guide, but it is an important item to consider in final evaluation of a site.

A soil has slight limitations for playgrounds if all of the following features apply: Slopes are less than 2 percent; drainage is somewhat excessive, well, or moderately well and the depth to a seasonal water table is greater than 30 inches during the season of use; there is no flooding; permeability is rapid or moderate; surface soil texture is sandy loam, fine sandy loam, silt loam or loam; the soil is nongravelly; stones cover less than 0.01 percent of the surface area; rock outcrops cover less than 2 percent of the surface area; depth to bedrock is more than 40 inches.

A soil that has moderate limitations for playgrounds has one or more of the following features: Slopes range from 2 to 6 percent; drainage is

somewhat poor and the depth to a seasonal water table during the season of use is between 20 and 30 inches; floods occur once in 2 or more years during the season of use; surface soil texture is sandy clay loam, clay loam, silty clay loam, or loamy sand; depth to bedrock is 20 to 40 inches; gravel covers less than 20 percent of the surface area; stones cover between 0.01 and 3.0 percent of the surface area; rock outcrops cover from 2 to 10 percent of the area; permeability is moderately slow or slow.

A soil has severe limitations for playgrounds if one or more of the following features apply: Slopes are more than 6 percent; drainage is poor and the depth to a seasonal water table during the season of use is less than 20 inches; flooding occurs more frequently than once in 2 years; permeability is very slow; surface soil texture is sandy clay, clay, silty clay, or sand; depth to bedrock is less than 20 inches; gravel covers more than 20 percent of the surface area; stones cover more than 3 percent of the surface area; rock outcrops cover more than 10 percent of the surface area.

7. Paths and Trails

Paths and trails are areas that are used for local and cross-country hiking and/or horseback riding. The chief requirement for such areas is good trafficability. The areas are assumed to be for use as they occur in nature and little soil will be moved.

The path and trail ratings are based on soil properties and qualities only. They do not take into account other features, such as esthetic value, that would make the path site desirable but would require more preparation and maintenance. An example is a mountain lookout where a guardrail would be needed.

A soil has slight limitations for paths and trails if all of the following features apply: Slopes are 0 to 15 percent; drainage is somewhat excessive, well, or moderately well, and the depth to a seasonal water table is more than 20 inches; floods occur no more than once a year during the season of use; surface textures are sandy loam, fine sandy loam, loam, or silt loam; gravel covers less than 20 percent of the surface area; stones cover less than 0.01 percent of the area; rock outcrops cover less than 10 percent of the area.

A soil that has moderate limitations for paths and trails has one or more of the following features: Slopes range from 15 to 25 percent; drainage is somewhat poor; floods occur 2 or 3 times during each season of use; surface soil texture is silty clay loam, sandy clay loam, clay loam, or loamy sand; gravel covers from 20 to 50 percent of the surface area; stones cover from 0.01 to 3.0 percent of the area; rock outcrops cover from 10 to 25 percent of the area.

A soil has severe limitations for paths and trails if one or more of the following features apply: Slopes are more than 25 percent, drainage is poor or very poor; floods occur more than 3 times during each season of

use; surface soil textures are sandy clay, silty clay, clay, or sand; gravel covers more than 50 percent of the surface area; stones cover more than 3.0 percent of the surface area; rock outcrops cover more than 25 percent of the area.

8. Septic Tank Absorption Fields

The term "septic tank absorption fields" refers to a sewage disposal system in which waste is distributed to a central tank and the effluent from the tank is dispersed over a fairly large area of filter field lines buried in the soil. Sites developed for camping, picnicking and playgrounds ordinarily require some form of an independent sewage disposal system. These ratings also apply to any disposal fields, such as waste water, in addition to sewage disposal systems.

The soil limitation ratings for this use are based on soil properties and qualities only. Coarse-textured soils, for example, may permit contamination of water supplies. Water, required for the system, may not be readily available at the site.

A soil has slight limitations for absorption fields if all of the following feature apply: Permeability is more than 1.0 inch per hour, or the percolation rate is faster than 45 minutes per inch of drop in water level; depth to seasonal water table is more than 6 feet; drainage is somewhat excessive or well; depth to impervious bedrock or permanent water is more than 6 feet; slope is between 0 and 7 percent; flooding never occurs.

A soil that has a moderate limitation for septic tank absorption fields has one or more of the following features: Permeability is between 1.0 and 0.63 inches per hour, or the percolation rate is between 45 and 75 minutes per inch; depth to a seasonal water table is between 4 and 6 feet; drainage class is moderately well or somewhat poor; depth to impervious bedrock or permanent water table is between 4 and 6 feet; slopes range from 7 to 12 percent; floods occur less than once in 10 years; the duration of overflow during flooding is 48 hours or less.

A soil has severe limitations for this use if one or more of the following apply: Permeability is less than 0.63 inches per hour, or the percolation rate is lower than 75 minutes per inch of drop in water level; depth to seasonal water table is less than 4 feet; drainage is less than somewhat poor; depth to impervious bedrock or permanent water table is less than 4 feet; slope is more than 15 percent; floods occur one or more times in a 10-year period; the duration of any overflow is more than 48 hours.

Installation of subsurface sewage disposal systems must meet county ordinances and are subject to approval by the County Health Officer.

9. Sewage Lagoons

A sewage lagoon (aerobic) is a shallow lake used to hold sewage for the time required for bacterial decomposition. The requirements for

this embankment are the same as for other embankments designed to impound water (see embankments, Table 4). Soil requirements for basin floors of lagoons are slow rate of seepage, even surface of low gradient and low relief, and little or no organic matter.

10. Sanitary Landfill

Because trenches as deep as 15 feet or more are used for many landfills, geologic investigation is needed to determine the potential for pollution of ground water by leachates as well as to ascertain the design needed. Soil survey borings commonly are limited to depths of 5 or 6 feet; however, for some soils, properties can be predicted with reasonable confidence below such depths. Predictions relative to probable depth to a seasonal high water table or to bedrock can be useful in planning for detailed investigation.

A trench-type landfill is a dug trench in which refuse is buried daily and the refuse is covered with a layer of soil material at least 6 inches thick. The material used for covering is the soil excavated in digging the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill.

Important features affecting trench-type sanitary landfills are depth to a seasonal high water table, flooding, permeability, slope, texture, depth to bedrock or hardpan, stoniness and rockiness.

State and local regulations must be followed.

11. Landscape Plantings

Plant materials commonly are used to alter the color, texture, contrast, line and form of disturbed or unnatural conditions of the landscape. Ratings are used to identify areas that have limitations for commonly-grown and climatically-adapted shrubs and trees. Important soil properties evaluated are pH, salinity, water-holding capacity, depth, permeability and drainage class.

A soil with slight limitations has properties that will permit use of practically all desired climatically-adapted plant species.

A soil with moderate limitations must be modified or the choice of a desired climatically-adapted species is limited.

A soil with severe limitations has properties that are difficult and costly to modify to allow use of desired climatically-adapted species.

INTERPRETIVE RATINGS FOR SOIL USES

Map Symbol	Soil Name	Suitability Load/Fill	--DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING--										Sanitary Landfill	Landscape Plantings	
			Pond Location	Pond Embankment	Shallow Excavations	Camp Area	Picnic Areas	Play Areas	Paths and Trails	Septic Tank Absorption	Sewage Lagoons	Sanitary Landfill			
36/V	Hitzel, 0-10% slopes	Poor excessive gravel; limited supply of suitable material	Severe <20" to bedrock	Severe excessive coarse fragments	Severe 20" to bedrock	Moderate rock outcrop	Moderate rock outcrop	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe Available water capacity <3"
36/W	Hitzel, 10-35% slopes	Poor excessive gravel; limited supply of suitable material	Severe <20" to bedrock	Severe excessive coarse fragments	Severe 20" to bedrock	Severe excessive alope gradient	Severe excessive alope gradient	Severe bedrock at 20"	Moderate-Severe rock outcrop; excessive alope gradient	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe Available water capacity <3"	
36/X	Hitzel, 35-60% slopes	Poor excessive gravel; limited supply of suitable material	Severe <20" to bedrock	Severe excessive coarse fragments	Severe 20" to bedrock	Severe excessive alope gradient	Severe excessive alope gradient	Severe bedrock at 20"	Moderate-Severe rock outcrop; excessive alope gradient	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe Available water capacity <3"	
36/Y	Hitzel, 60-85% slopes	Poor excessive gravel; limited supply of suitable material	Severe <20" to bedrock	Severe excessive coarse fragments	Severe 20" to bedrock	Severe excessive alope gradient	Severe excessive alope gradient	Severe bedrock at 20"	Moderate-Severe rock outcrop; excessive alope gradient	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe bedrock at 20"	Severe Available water capacity <3"	
370/N	Unnamed, 10-35% slopes	Fair-Poor slopes exceed 15%	Moderate-Severe slopes exceed 15%	Moderate M or Mt material	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Severe excessive alope gradient	Moderate-Severe slopes exceed 25%	Severe slopes exceed 72"	Severe slopes exceed 72"	Severe slopes exceed 72"	Severe slopes exceed 72"	Moderate available water capacity 3-6"	
370/X	Unnamed, 35-60% slopes	Poor excessive alope gradient	Severe excessive alope gradient	Moderate M or Mt material	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Moderate available water capacity 3-6"	
370/Y	Unnamed, 60-85% slopes	Poor excessive alope gradient	Severe excessive alope gradient	Moderate M or Mt material	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Moderate available water capacity 3-6"	
371/N	Unnamed, 10-35% slopes	Poor excessive gravel; excessive alope gradient	Severe <40" to bedrock; excessive alope gradient	Severe 55% fragments exceeding 6" diameter	Severe <40" to bedrock; excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Moderate available water capacity 3-6"	
371/X	Unnamed, 35-60% slopes	Poor excessive gravel; excessive alope gradient	Severe <40" to bedrock; excessive alope gradient	Severe 55% fragments exceeding 6" diameter	Severe <40" to bedrock; excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Moderate available water capacity 3-6"	
371/Y	Unnamed, 60-85% slopes	Poor excessive gravel; excessive alope gradient	Severe <40" to bedrock; excessive alope gradient	Severe 55% fragments exceeding 6" diameter	Severe <40" to bedrock; excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Severe excessive alope gradient	Moderate available water capacity 3-6"	

*Nortriety aspects are not shown but have the same ratings as southerly aspects.

TABLE 4 (Cont'd)

*Map Symbol	Soil Name	--DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING--											Landscape Plantings		
		Suitability Road Fill	Portic Location	Fond Embayment	Shallow Excavations	Camp Areas	Play Areas	Paths and Trails	Static Tank Absorption	Swamp/Lagoons	Sandary Landfill				
372/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe bedrock; excessive slope gradient	Severe >5% fragments exceeding 6" diameter	Severe <40" to bedrock; excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe available water capacity <3" >20" deep
372/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe <20" to bedrock; excessive slope gradient	Severe >5% fragments exceeding 6" diameter	Severe <40" to bedrock; excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe available water capacity <20" deep
380/H	Pollard, 10-35% slopes	Fair-Poor excessive slope gradient	Moderate ML or MH site material	Moderate moderate shrink- swell; slopes >25%	Moderate- Severe slopes exceed 15% moderately slow permeability	Moderate- Severe slopes exceed 15%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Slight
380/X	Pollard, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Moderate moderate shrink- swell	Severe MH material	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Slight
380/Y	Pollard, 60-85% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Moderate moderate shrink- swell	Severe MH material	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Slight
381/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient; <40" deep	Moderate moderate shrink- swell	Severe excessive slope gradient; <40" deep	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6" 20-40" deep
381/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe excessive slope gradient; <40" deep	Moderate moderate shrink- swell	Severe excessive slope gradient; <40" deep	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6" 20-40" deep
382/H	Unnamed, 10-35% slopes	Fair-Poor moderate shrink- swell; slopes >25%	Moderate OH material	Moderate moderate shrink- swell	Moderate- Severe OH material slopes exceed 15%	Moderate- Severe slopes exceed 15%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate- Severe slopes exceed 25%	Moderate available water capacity 3-6" 20-40" deep
382/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Moderate moderate shrink- swell	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6" 20-40" deep
382/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Moderate moderate shrink- swell	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6" 20-40" deep

*Northernly aspects are not shown but have the same ratings as southerly aspects.

TABLE 4 (Cont'd) INTERPRETIVE RATINGS FOR SOIL USES

NPS Symbol	Soil Name	DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING													Landscape Plantings
		Suitability Road Fill	Pond Location	Pond Embankment	Shallow Excavations	Areas Severe excessive slope gradient	Areas Severe excessive slope gradient	Areas Severe excessive slope gradient	Areas Severe excessive slope gradient	Areas Severe excessive slope gradient	Path and Trails	Septic Tank Absorption	Sewage Lagoons	Suitability Landfill	
701/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe <20" to bedrock	>5% fragments exceeding 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity 3%; <20" deep
701/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe <20" to bedrock	Severe >5% fragments exceeding 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity 3%; <20" deep
704/W	Camey, 10-35% slopes	Poor high shrink-swell	Severe <40" to bedrock	Severe high shrink-swell	Severe clay texture; very slow permeability; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity 3%; moderate permeability
704/X	Camey, 35-60% slopes	Poor high shrink-swell	Severe <40" to bedrock	Severe high shrink-swell	Severe clay texture; very slow permeability; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity 3%; <05%/hr. per- meability
704/Y	Camey, 60-70% slopes	Poor high shrink-swell	Severe <40" to bedrock	Severe high shrink-swell	Severe clay texture; very slow permeability; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity 3%; moderate permeability
705/V	Unnamed, 0-10% slopes	Fair Moderate shrink- swell	Severe <40" deep	Severe >5% fragments exceeding 6" diameter	Moderate moderately slow permeability	Moderate clay loam sur- face texture; fragments on surface	Moderate-Severe slope exceeds 6%; fragments on surface	Severe clay texture; excessive slope gradient	Severe clay texture; excessive slope gradient	Moderate course fragments on surface	Severe <48" deep	Severe exceeds 7%	Severe clay texture <40" deep	Severe clay texture <40" deep	Moderate available water capacity 3-6"
705/W	Unnamed, 10-35% slopes	Fair-Poor Moderate shrink- swell exceed 35%	Severe <40" deep	Severe >5% fragments exceeding 6" diameter	Moderate-Severe moderately slow permeability; slopes <15%	Moderate-Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate-Severe slopes exceed 35%	Severe <48" deep	Severe exceeds 7%	Severe clay texture <40" deep	Severe clay texture <40" deep	Moderate available water capacity 3-6"
705/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe <40" deep	Severe >5% fragments exceeding 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate-Severe slopes exceed 35%	Severe <48" deep	Severe exceeds 7%	Severe clay texture <40" deep	Severe clay texture <40" deep	Moderate available water capacity 3-6"
705/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe <40" deep	Severe >5% fragments exceeding 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate-Severe slopes exceed 35%	Severe <48" deep	Severe exceeds 7%	Severe clay texture <40" deep	Severe clay texture <40" deep	Moderate available water capacity 3-6"

northerly aspects are not shown but have the same ratings as southerly aspects.

TABLE 4 (Cont.'d)

Map Symbol	Soil Name	DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING--												
		Suitability Road Fill	Pond Location	Pond Embayment	Shallow Excavations	Areas Play	Panic Areas	Paths and Trifles	Septic Tank Absorption	Sewage Lagoons	Sanitary Landfill	Landscape Plantings		
706/W	Medco, 0-10% slopes	Poor high shrink-swell; low strength	Severe 440" deep	Severe high shrink-swell	Severe too clayey; <40" deep	Severe very slow permeability	Moderate surface cobble and gravel	Severe very slow permeability; slopes exceed 6%	Moderate coarse fragments on surface	Severe very low permeability; high water table	Severe <40" deep; slope exceeds 7%	Severe <60" deep	Severe <0.05"/hr. permeability	
706/W	Medco, 10-35% slopes	Poor high shrink-swell; low strength	Severe 440" deep	Severe high shrink-swell	Severe too clayey; <40" deep	Severe very slow permeability	Moderate-Severe slopes exceed 15%	Severe very slow permeability; slopes exceed 6%	Moderate-Severe slopes exceed 23%	Severe very slow permeability	Severe <40" deep; slope exceeds 7%	Severe <60" deep	Severe <0.05"/hr. permeability	
706/X	Medco, 35-60% slopes	Poor high shrink-swell; low strength	Severe 440" deep	Severe high shrink-swell	Severe too clayey; <40" deep	Severe very slow permeability	Severe excessive slopes	Severe very slow permeability; slopes exceed 6%	Severe excessive slopes	Severe very slow permeability	Severe <40" deep; slope exceeds 7%	Severe <60" deep	Severe <0.05"/hr. permeability	
710/W	Coker, 0-10% slopes	Poor high shrink-swell; low strength	Slight	Severe high shrink-swell	Severe too clayey; wet	Severe very slow permeability	Severe too clayey	Severe wet; slopes exceed 6%	Severe too clayey	Severe very low permeability; high water table	Severe wet; slopes exceed 7%	Severe too clayey; hard to pack	Severe <0.05"/hr. permeability	
710/W	Coker, 10-35% slopes	Poor high shrink-swell; low strength	Slight	Severe high shrink-swell	Severe too clayey; wet	Severe very slow permeability	Severe too clayey	Severe wet; slopes exceed 6%	Severe too clayey	Severe very low permeability; high water table	Severe wet; slopes exceed 7%	Severe too clayey; hard to pack	Severe <0.05"/hr. permeability	
712/W	Jumpoff, 10-35% slopes	Poor high shrink-swell; low strength	Moderate 40-60" deep	Severe high shrink-swell	Severe <40" deep	Severe very low permeability	Moderate-Severe slopes exceed 15%	Severe slopes exceed 6%	Moderate-Severe slopes exceed 23%	Severe very low permeability; high water table	Severe <40" deep	Severe <60" deep	Moderate available water capacity, 3-6"	
712/X	Jumpoff, 35-60% slopes	Poor high shrink-swell; low strength	Severe steep slopes	Severe high shrink-swell	Severe <40" deep	Severe very slow permeability	Severe excessive slopes	Severe slopes exceed 6%	Severe excessive slopes	Severe very low permeability; high water table	Severe <40" deep	Severe <60" deep	Moderate available water capacity, 3-6"	
715/V	Brader, 0-10% slopes	Poor thin layer of material	Severe 420" deep	Moderate M. material	Severe 420" deep	Slight-Moderate slopes exceed 8%	Slight-Moderate slopes exceed 8%	Severe 420" to bedrock	Slight	Severe 420" to bedrock	Severe <40" deep	Severe <60" deep	Severe <20" deep	
715/W	Brader, 10-35% slopes	Poor thin layer of material; excessive slopes	Severe 420" deep	Moderate M. material	Severe 420" deep	Moderate-Severe slopes exceed 23%	Moderate-Severe slopes exceed 25%	Severe 420" to bedrock	Moderate-Severe slopes exceed 23%	Severe 420" to bedrock	Severe <40" deep	Severe <60" deep	Severe <20" deep	
715/X	Brader, 35-60% slopes	Severe excessive slope gradient	Severe shallow depth; excessive slope gradient	Moderate M. material	Severe 420" deep	Severe excessive slope gradient	Severe excessive slope gradient	Severe 420" to bedrock	Severe excessive slope gradient	Severe 420" to bedrock	Severe excessive slope gradient	Severe <20" deep	Severe <20" deep	

*Northernly aspects are not shown but have the same ratings as southerly aspects.

INTERPRETIVE RATINGS FOR SOIL USES

*Map Symbol	Soil Name	Suitability Road Fill	Pond Location	Pond Embankment	Shallow Excavation	Camp Area	Pitotic Areas	Play Areas	Paths and Trails	Septic Tank Absorption	Swamp Lagoons	Sanitary Landfill	Landscape Plantings
715/Y	Braider, 60-85% alopes	Severe excessive alopes gradient	Severe shallow depth; excessive alopes gradient	Moderate M. material	Severe <20" deep	Severe excessive alopes gradient	Severe excessive alopes gradient	Severe <20" to bedrock	Severe excessive alopes gradient	Severe <20" to bedrock	Severe excessive alopes gradient	Severe <20" deep	Severe <20" deep
716/Y	Debanger, 0-10% alopes	Fair M. material	Severe <40" to bedrock	Moderate M. material	Severe <40" to bedrock	Slight-Moderate alopes exceed 8%	Slight-Moderate alopes exceed 8%	Moderate-Severe alopes exceed 6%	Slight	Severe <48" deep	Severe <40" deep	Severe <60" to soft bedrock	Moderate available water capacity 3-6"
716/H	Debesget, 10-35% alopes	Fair-Poor M. material; excessive alopes gradient	Severe <40" to bedrock	Moderate M. material	Severe <40" to bedrock	Moderate-Severe alopes exceed 15%	Moderate-Severe alopes exceed 15%	Severe excessive alopes gradient	Moderate-Severe alopes exceed 25%	Severe <48" deep	Severe <40" deep	Severe <60" to soft bedrock	Moderate available water capacity 3-6"
716/X	Debanger, 35-60% alopes	Poor steep alopes	Severe <40" to bedrock	Moderate M. material	Severe <40" to bedrock	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe steep alopes	Severe <48" deep	Severe <40" deep	Severe <60" to soft bedrock	Moderate available water capacity 3-6"
716/H	Beekman, 10-35% alopes	Fair-Poor alopes exceed 25%	Severe <40" to bedrock	Moderate GM material	Severe <40" to bedrock	Moderate-Severe alopes exceed 15%	Moderate-Severe alopes exceed 15%	Severe excessive alopes gradient	Moderate-Severe alopes exceed 25%	Severe <48" deep	Severe <40" deep	Severe <60" to soft bedrock	Moderate available water capacity 3-6"
716/X	Beekman, 35-60% alopes	Poor steep alopes	Severe <40" to bedrock	Moderate GM material	Severe <40" to bedrock	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe steep alopes	Severe <48" deep	Severe <40" deep	Severe <60" to soft bedrock	Moderate available water capacity 3-6"
716/Y	Beekman, 60-85% alopes	Poor steep alopes	Severe <40" to bedrock	Moderate GM material	Severe <40" to bedrock	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe steep alopes	Severe <48" deep	Severe <40" deep	Severe <60" to soft bedrock	Moderate available water capacity 3-6"
719/Y	Manzanita, 0-10% alopes	Fair-Poor excessive alopes gradient	Slight	Moderate moderate shrink-swell	Slight-Moderate alopes exceed 8%	Moderate-Severe alopes exceed 15%	Slight-Moderate alopes exceed 8%	Moderate-Severe alopes exceed 6%	Slight	Severe moderately allow permeability	Moderate-Severe alopes exceed 7%	Severe clay texture	Slight
719/H	Manzanita, 10-35% alopes	Fair-Poor alopes exceed 25%	Moderate-Severe alopes exceed 30%	Moderate moderate shrink-swell	Moderate-Severe alopes exceed 15%	Moderate-Severe alopes exceed 15%	Moderate-Severe alopes exceed 15%	Severe excessive alopes gradient	Moderate-Severe alopes exceed 25%	Severe moderately allow permeability	Severe excessive alopes gradient	Severe clay texture	Slight
719/X	Manzanita, 35-60% alopes	Poor steep alopes	Severe steep alopes	Moderate moderate shrink-swell	Severe steep alopes	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe clay texture	Slight
719/Y	Manzanita, 60-85% alopes	Poor steep alopes	Severe steep alopes	Moderate moderate shrink-swell	Severe steep alopes	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe clay texture	Slight
721/X	Skakiyou, 35-60% alopes	Poor excessive alopes gradient	Severe >2"/hr. permeability	Moderate SM material	Moderate-Severe steep alopes	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe steep alopes	Severe steep alopes	Severe excessive alopes gradient	Severe <60" to bedrock	Severe available water capacity 3-6"

*Worthier aspects are not shown but have the same ratings on southerly aspects.

INTERPRETIVE RATINGS FOR SOIL USES

WVap Symbol	Soil Name	Sufficiency Road Fill	Pond Location	Pond Embankment	Shallow Excavations	Gap Areas	Picnic Areas	Play Areas	Paths and Trails	Septic Tank Absorption	Sewage Lagoons	Safety Landfill	Landscaping Plantings
721/Y	Staklyou, 60-85% slopes	Poor excessive slope gradient	Severe permeability	Moderate SW material	Moderate-Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slope gradient	Severe steep slopes	Severe steep slopes	Severe steep slope gradient	Severe to <60" to bedrock	Severe available water capacity <3"
722/V	Holland, 0-10% slopes	Fair excessive fines	Slight	Slight-Moderate slopes exceed 8%	Slight-Moderate slopes exceed 8%	Moderate-Severe slopes exceed 6%	Moderate-Severe slopes exceed 6%	Moderate-Severe slopes exceed 6%	Slight	Moderate-Severe slopes exceed 8%	Moderate-Severe slopes exceed 7%	Slight	Slight
722/W	Holland, 10-35% slopes	Fair-Poor slopes exceed 25%	Moderate-Severe slopes exceed 30%	Slight	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 2%	Moderate-Severe slopes exceed 15%	Severe excessive slope gradient	Moderate-Severe slopes exceed 2%	Slight
731/X	Straight, 35-60% slopes	Poor excessive gravel; excessive slope gradient	Severe excessive slope gradient	Moderate >5% coarse fragments	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6"
731/Y	Straight, 60-85% slopes	Poor excessive gravel; excessive slope gradient	Severe excessive slope gradient	Moderate >5% coarse fragments	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6"
732/X	Unnamed, 35-60% slopes	Poor excessive gravel; excessive slope gradient	Severe to <20" to bedrock	Moderate >5% coarse fragments	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe available water capacity <3"
732/Y	Unnamed, 60-85% slopes	Poor excessive gravel; excessive slope gradient	Severe to bedrock	Moderate >5% coarse fragments	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe available water capacity <3"
740/N	Gepfert, 10-35% slopes	Fair-Poor slopes exceed 25%	Moderate-Severe slopes exceed 30%; 40-60" deep	Severe >5% coarse fragments	Moderate-Severe slopes exceed 15%	Severe slopes exceed 15%; dust	Severe slopes exceed 15%; dust	Severe excessive slope gradient; dust	Moderate-Severe slopes exceed 25%; fragments on surface	Moderate-Severe slopes exceed 15%	Severe excessive slope gradient	Moderate-Severe slopes exceed 2%	Moderate available water capacity 3-6"
740/X	Gepfert, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe >5% coarse fragments	Severe excessive slope gradient	Severe slopes exceed 15%; dust	Severe slopes exceed 15%; dust	Severe excessive slope gradient; dust	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6"
741/W	Freesner, 10-35% slopes	Fair-Poor moderate shrink-swell; HI material exceed 25%	Moderate-Severe slopes exceed 30%; moderate shrink-swell; HI material	Moderate moderate shrink-swell; HI material	Severe HI material	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Severe slope gradient	Moderate-Severe slopes exceed 25%	Moderate-Severe slopes exceed 15%	Severe excessive slope gradient	Moderate-Severe slopes exceed 25%	Slight
741/X	Freesner, 35-60% slopes	Poor steep slopes	Severe steep slopes	Moderate moderate shrink-swell; HI material	Severe HI material	Severe steep slopes	Severe steep slopes	Severe slope gradient	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe steep slopes	Slight

*Northernly aspects are not shown but have the same ratings as southerly aspects.

INTERPRETIVE RATINGS FOR SOIL USES

TABLE 4 (Cont'd)

Shop Symbol	Soil Name	Sufability	Road Fill	Pond Location	Pond Embankment	Shallow Excavations	Camp Area	Picnic Area	Play Area	Paths and Trails	Septic Tank Absorption	Sewage Lagoons	Sanitary Landfill	Landscaping Plantings
745/W	Laurelhurst, 0-10% slopes	Poor high shrink-swell	Poor high shrink-swell	Slight	Severe high shrink-swell	Severe CH material	Moderate slope gradient; low permeability	Moderate-Severe steep slopes	Moderate-Severe steep slopes	Moderate-Severe clay loam and clay textures	Severe slow permeability	Moderate-Severe slopes exceed 7%	Severe clay texture	Moderate slow permeability
745/W	Laurelhurst, 10-35% slopes	Poor high shrink-swell	Severe high shrink-swell	Moderate-Severe slopes exceed 30%	Severe high shrink-swell	Severe CH material	Moderate-Severe slopes exceed 15%	Moderate-Severe steep slopes	Severe excessive slope gradient	Moderate-Severe clay loam and clay textures	Severe excessive slope permeability	Severe excessive slope gradient	Severe clay texture	Moderate slow permeability
745/X	Laurelhurst, 35-60% slopes	Poor high shrink-swell	Severe high shrink-swell	Severe steep slopes	Severe high shrink-swell	Severe excessive slope gradient; CH material	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Moderate-Severe clay loam and clay textures	Severe excessive slope gradient; low permeability	Severe excessive slope gradient	Severe clay texture	Moderate slow permeability
750/V	Oumont, 0-10% slopes	Fair ML or MH material with low PI	Moderate ML or MH material	Moderate ML or MH material	Moderate ML or MH material	Moderate kaolinic clay	Moderate moderately slow permeability	Moderate clay loam surface texture	Moderate-Severe slopes exceed 6%; clay loam surface texture	Moderate clay loam surface texture	Severe moderately slow permeability	Moderate-Severe slopes exceed 7%	Severe clay texture	Slight
750/W	Dumont, 10-35% slopes	Fair-Poor ML or MH material; slopes exceed 25%	Moderate ML or MH material	Moderate-Severe ML or MH material; slopes exceed 30%	Moderate ML or MH material	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Moderate-Severe steep slopes	Severe excessive slope gradient	Moderate-Severe slopes exceed 2%	Severe moderately slow permeability	Severe excessive slope gradient	Severe clay texture	Slight
750/X	Dumont, 35-60% slopes	Poor steep slopes	Moderate ML or MH material	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe steep slopes	Severe moderately slow permeability	Severe excessive slope gradient	Severe clay texture	Slight
770/X	Pearroll, 35-60% slopes	Poor high shrink-swell; excessive slope gradient	Severe high shrink-swell; >5% coarse fragments	Severe <20" to bedrock; excessive slope gradient	Severe high shrink-swell	Severe CH material; steep slopes	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe steep slopes	Severe to bedrock; excessive slope gradient	Severe excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity <3"
770/Y	Pearroll, 60-85% slopes	Poor high shrink-swell; excessive slope gradient	Severe high shrink-swell; >5% coarse fragments	Severe <20" to bedrock; excessive slope gradient	Severe high shrink-swell	Severe CH material; steep slopes	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe steep slopes	Severe to bedrock; excessive slope gradient	Severe excessive slope gradient	Severe clay texture; excessive slope gradient	Severe available water capacity <3"
781/W	Colistine, 10-35% slopes	Fair-Poor slopes exceed 25%	Moderate >5% coarse fragments	Severe <40" to bedrock	Moderate high shrink-swell	Severe <40" to bedrock; excessive slope gradient	Moderate-Severe slopes exceed 15%	Moderate-Severe steep slopes	Severe excessive slope gradient	Moderate-Severe slopes exceed 2%	Severe <44" to bedrock; excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"
781/X	Colistine, 35-60% slopes	Poor steep slopes	Moderate >5% coarse fragments	Severe steep slopes	Moderate high shrink-swell	Severe <40" to bedrock; excessive slope gradient	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe steep slopes	Severe <44" to bedrock; excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"

northerly aspects are not shown but have the same ratings as southerly aspects.

TABLE 4 (Cont'd)

Map Symbol	Soil Name	DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING INTERPRETIVE RATINGS FOR SOIL USES											
		Suitability Road Fill	Pond Location	Pond Embankment	Shallow Excavation	Camp Area	Picnic Area	Play Area	Paths and Trails	Specific Task Absorption	Severe Lagoons	Sanitary Landfill	Landscape Plantings
781/Y	Colentine, 60-85% slopes	Poor steep slopes	Severe steep slopes	Moderate >5% coarse fragments	Severe <40" to bedrock; excessive slope gradient	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe steep slopes	Severe excessive slope gradient	Severe <48" to bedrock; excessive slope gradient	Severe excessive slope gradient	Moderate available water capacity 3-6"
790/N	Unnamed, 10-35% slopes	Fair-Poor moderate shrink-swell; slopes exceed 25%	Severe <40" to bedrock; excessive slope gradient	Severe >5% fragments exceeding 6" diameter	Severe <40" to bedrock	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <40" to bedrock	Severe excessive slope gradient	Severe available water capacity <3"
790/X	Unnamed, 35-60% slopes	Poor steep slopes	Severe <40" to bedrock; excessive slope gradient	Severe >5% fragments exceeding 6" diameter	Severe <40" to bedrock	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <40" to bedrock	Severe excessive slope gradient	Severe available water capacity <3"
806/V	Unnamed, 0-10% slopes	Fair moderate frost action	Severe <20" to bedrock	Severe >5% coarse fragments over 6" diameter	Severe <40" to bedrock	Slight-Moderate slopes exceed 8%	Slight-Moderate slopes exceed 8%	Severe <20" to bedrock	Slight	Severe <20" to bedrock	Severe <40" to bedrock	Severe <20" to bedrock	Severe available water capacity <3"
806/W	Unnamed, 10-35% slopes	Fair-Poor moderate frost action; excessive slope gradient	Severe <20" to bedrock	Severe >5% coarse fragments over 6" diameter	Severe <40" to bedrock	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%	Severe <20" to bedrock	Moderate-Severe slopes exceed 25%	Severe <20" to bedrock	Severe <40" to bedrock	Severe <20" to bedrock	Severe available water capacity <3"
806/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe <20" to bedrock; steep slopes	Severe >5% coarse fragments over 6" diameter	Severe <20" to bedrock	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient; shallow depth	Severe excessive slope gradient	Severe excessive slope gradient	Severe <20" to bedrock	Severe <20" to bedrock	Severe available water capacity <3"
809/V	Unnamed, 0-10% slopes	Fair moderate frost action; hard to pack	Severe <40" to bedrock	Severe >5% coarse fragments over 6" diameter	Severe <40" to bedrock	Moderate dust	Moderate dust	Moderate dust	Slight	Severe <48" to bedrock	Severe <40" to bedrock	Severe <40" to bedrock	Moderate available water capacity 3-6"
809/W	Unnamed, 10-35% slopes	Fair-Poor moderate frost action; excessive slope gradient	Severe <40" to bedrock	Severe >5% coarse fragments over 6" diameter	Severe <40" to bedrock	Moderate-Severe slopes exceed 15%; dust	Moderate-Severe slopes exceed 15%; dust	Severe excessive slope gradient; dust	Moderate-Severe slopes exceed 25%	Severe <48" to bedrock	Severe <60" to bedrock	Severe <60" to bedrock	Moderate available water capacity 3-6"
809/X	Unnamed, 35-60% slopes	Severe steep slopes	Severe <40" to bedrock	Severe >5% coarse fragments over 6" diameter	Severe <40" to bedrock	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe <48" to bedrock	Severe <60" to bedrock	Severe <60" to bedrock	Moderate available water capacity 3-6"
809/Y	Unnamed, 60-80% slopes	Severe steep slopes	Severe <40" to bedrock	Severe >5% coarse fragments over 6" diameter	Severe <40" to bedrock	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe <48" to bedrock	Severe <60" to bedrock	Severe <60" to bedrock	Moderate available water capacity 3-6"

*Weatherly aspects are not shown but have the same ratings as southerly aspects.

TABLE 4 (Cont'd)

DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING

Soil Symbol	Soil Name	Suitability Road Fill	Pond Location	Embankment	Shallow Excavations	Area	Public Areas	Paths and Trails	Septic Tank Absorption	Sewage Lagoons	Sanitary Landfill	Landscape Plantings
810/Y	Unnamed, 0-10% slopes	Fair moderate frost action	Moderate 40-60" to bedrock	Severe >5% coarse fragments over 6" diameter	Moderate 40-60" to bedrock	Moderate dust	Moderate slope exceeds 6% dust	Slight	Moderate 40-60" to bedrock	Moderate-Severe slopes exceed 7%	Severe <60" to bedrock	Moderate available water capacity 3-6"
810/W	Unnamed, 10-35% slopes	Fair-Poor moderate frost action; excessive slope gradient	Moderate-Severe slopes exceed 30%	Severe 5% coarse fragments over 6" diameter	Moderate-Severe slopes exceed 15%	Moderate-Severe slopes exceed 15%; slopes exceed 15%; dust	Severe excessive slope gradient; dust	Moderate-Severe slopes exceed 23%	Moderate-Severe slopes exceed 15%	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"
810/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe >5% coarse fragments over 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"
810/Y	Unnamed, 60-80% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe coarse fragments over 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"
824/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe >5% coarse fragments over 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"
824/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe >5% coarse fragments over 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Moderate available water capacity 3-6"
825/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe >5% coarse fragments over 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Severe available water capacity <3"
825/Y	Unnamed, 60-85% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe >5% coarse fragments over 6" diameter	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe <60" to bedrock	Severe available water capacity <3"
840/X	Unnamed, 35-60% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe high shrink-swell	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe steep slopes; permeability	Severe excessive slope gradient	Severe <60" to bedrock	Slight
840/Y	Unnamed, 60-80% slopes	Poor excessive slope gradient	Severe excessive slope gradient	Severe high shrink-swell	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe steep slopes; permeability	Severe excessive slope gradient	Severe <60" to bedrock	Slight

INTERPRETIVE RATINGS FOR SOIL USES

Map Symbol	Soil Name	DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING												Sanitary Landfill	Landscaping	
		Suitability Flood Fill	Pond Location	Pond Embankment	Shallow Excavations	Camp Areas	Picnic Areas	Play Areas	Paths and Trails	Septic Tank Absorption	Sewage Lagoons	Sewage Lagoons	Sewage Lagoons			
842/X	Unnamed, 35-60% slopes	Poor excessive slope gradient; 40" to bedrock	Severe excessive slope gradient; 40" to bedrock	Severe >5% coarse frags exceed 6" diameter	Severe excessive slope gradient; 40" to bedrock	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe 40" to bedrock	Severe available water capacity <3"	
842/Y	Unnamed, 60-80% slopes	Poor excessive slope gradient	Severe excessive slope gradient; 40" to bedrock	Severe >5% coarse frags; ments exceed 6"	Severe excessive slope gradient; 40" to bedrock	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe 40" to bedrock	Severe available water capacity <3"	
850/Y	Unnamed, 0-10% slopes	Poor high shrink-swell; CH material	Slight	Severe high shrink-swell	Severe OH material	Moderate very slow permeability; dust	Moderate- Severe very slow permeability; dust	Moderate- Severe very slow permeability; dust	Moderate- Severe very slow permeability; dust	Moderate- Severe very slow permeability; dust	Moderate- Severe very slow permeability; dust	Moderate- Severe very slow permeability; dust	Moderate- Severe very slow permeability; dust	Severe clay texture	Severe very slow permeability	
850/W	Unnamed, 10-35% slopes	Poor high shrink-swell; CH material	Moderate- Severe slopes exceed 30% permeability	Severe high shrink-swell	Severe OH material	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Severe clay texture	Severe low permeability	
861/X	Rogue, 35-60% slopes	Poor excessive slope gradient	Severe >2"/hr. permeability	Moderate SN material	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe 40" to bedrock	Severe available water capacity <3"	
861/Y	Rogue, 60-85% slopes	Poor excessive slope gradient	Severe >2"/hr. permeability	Moderate SN material	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe excessive slope gradient	Severe 40" to bedrock	Severe available water capacity <3"	
880/V	Unnamed, 0-10% slopes	Fair moderate frost action	Moderate Mg material; 40-60" deep	Severe >5% cobble	Moderate 40-60" to bedrock	Moderate dust	Moderate dust	Moderate dust	Moderate dust	Moderate dust	Moderate dust	Moderate dust	Moderate dust	Moderate clay loam texture	Slight	
880/W	Unnamed, 10-35% slopes	Fair-Poor slopes exceed 15%; front action	Moderate- Severe slopes exceed 15%; >30% slope	Severe >5% cobble	Moderate- Severe slopes exceed 15%	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe clay loam and clay texture; slopes exceed 25%	Slight	
882/V	Unnamed, 0-10% slopes	Fair moderate frost action	Moderate- Severe CP-CH material	Severe >5% cobble	Moderate- Severe CP-CH material	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate 20-50% surface; dust	Moderate clay loam texture	Moderate available water capacity 3-6"
882/W	Unnamed, 10-35% slopes	Fair-Poor slopes exceed 15%; front action	Moderate- Severe CP-CH material	Severe >5% cobble	Moderate- Severe CP-CH material	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe slopes exceed 15%; dust	Moderate- Severe clay loam and clay texture; slopes exceed 25%	Moderate available water capacity 3-6"	
882/X	Unnamed, 35-60% slopes	Poor steep slopes	Severe steep slopes	Severe >5% cobble	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe steep slopes	Moderate- Severe clay loam and clay texture; slopes exceed 25%	Moderate available water capacity 3-6"	

*Southern aspects are not shown but have the same ratings as southerly aspects.

INTERPRETIVE RATINGS FOR SOIL USES

		DEGREE OF LIMITATIONS AND SOIL FEATURES AFFECTING--											
Map Symbol	Soil Name	Suitability Road Fill	Pond Location	Pond Embankment	Shallow Excavations	Camp Areas	Picnic Areas	Play Areas	Faths and Trails	Septic Tank Absorption	Sewage Lagoons	Sanitary Landfill	Landscape Planting
892/Y	Unnamed, 60-80% slopes	Poor steep slopes	Severe steep slopes	Severe >5% cobble	Severe steep slopes	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient; dust	Severe steep slopes	Severe steep slopes	Severe excessive slope gradient	Severe 4.72" to bedrock	Moderate available water capacity 3-6
R	Rock Land, 0-90% slopes	Poor too shallow	Severe too shallow	Variable	Variable	Variable	Variable	Variable	Variable	Severe too shallow	Severe too shallow	Severe too shallow	Severe available water capacity low
1	Alluvial Land, 0-3% slopes	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable	Variable

*Weatherly aspects are not shown but have the same ratings as southerly aspects.

C. Interpretive Ratings for Selected Soil Properties and Qualities

This section provides information about the soils that are significant to such things as soil moisture retention, internal soil moisture movement, erosion, soil productivity and frost action.

1. Permeability

Permeability is that quality of a soil that enables it to transmit water or air. Accepted as a measure of this quality is the rate at which soil transmits water while saturated. Permeability is estimated on the basis of these soil characteristics observed in the field, particularly structure and texture. The estimates do not take into account lateral seepage or such transient soil features as plowpans and surface crusts.

The following classes and rates are used:

<u>Permeability Class</u>	<u>Numerical Range (inches per hour)</u>
Very slow	Less than 0.06
Slow	0.06 - 0.2
Moderately slow	0.2 - 0.6
Moderate	0.6 - 2.0
Moderately rapid	2.0 - 6.0
Rapid	6.0 - 20.0
Very rapid	More than 20.0

2. Drainage

Soil drainage, as a quality of the soil, refers to the frequency and duration of periods when the soil is free of saturation or partial saturation. Soil drainage classes are determined by observations and inferences used to obtain classes of permeability. These classes are based on those morphological characteristics that are affected by aeration within the soil profile.

Very Poorly Drained - Water table remains at or near the surface a greater part of the time. Field evidences of very poor drainage are level or depressed areas, presence of water table above 18 inches, a peaty or mucky surface horizon, or colors as follows:

Immediately below any dark surface horizon at least 7 inches thick (dry values of 5.5 or less and moist values of 3.5 or less) as follows: (1) if hues are 10YR in the Munsell Soil Color Chart or redder and are accompanied by mottling, chromas are /2 or less on ped faces or in the matrix and if hues of 10YR or redder are not mottled, chromas are less than /1; (2) if hues are between 10YR and 10Y and are accompanied by distinct or prominent mottles, chromas are /3 or less on ped faces or in the matrix and if hues between 10YR are not mottled, chromas are /3 or less on ped faces in the matrix and if hues between 10YR and 10Y are not mottled, chromas are /1 or less; (3) hues bluer than 10Y; (4) any color, if due to uncoated grains of sand; OR

If surface 7-inches are not dark, then mottles, iron-manganese concretions or chromas of /2 or less must occur within 7 inches of soil surface; and if a textural B horizon is present, it has: (1) dominant chromas of /1 or /2 in hues of 10YR or redder on ped faces or in the matrix if peds are lacking, accompanied by mottles of stronger chroma; (2) dominant chromas of /1 to /3 in hues of 2.5Y or yellower on the ped faces or in the matrix if peds are lacking, accompanied by mottles of stronger chroma and redder hue; (3) dominant chromas of /1 or less on ped faces or in the matrix if no peds are present with or without mottles of stronger chroma.

Soils that are very poorly drained due to a moving water table may have oxidized rather than reduced colors because of dissolved oxygen in water. Drainage is a minimum prerequisite for the growth of important crops. Usually, grazing is possible, at least seasonally, and hay may be harvested in drier years. Commercial timber production of conifer species is not possible.

Poorly Drained - Soil remains wet much of the time with the water table near the surface for prolonged intervals. Field evidences are the presence of a high water table (at depths of 18 to 36 inches), colors as above, but near the surface (above 20 inches), and pronounced accumulations of water-soluble salts at or near surface in saline areas. Soils usually lack peaty or mucky surface horizons. Drainage is necessary for growth of important plants. Grazing is possible most of the time and hay can usually be harvested. Commercial timber production of conifer species is poor to fair.

Somewhat Poorly Drained - Soil is wet for significant periods, usually because of a slowly permeable layer or a high water table. Field evidences are the presence of a water table (at depths of 36 to 60 inches), colors as above but within 20 to 36 inches of the surface, unusually thick and dark A horizons (related to abundant growth of coarser grasses and slower decomposition rates because of wetness), pronounced accumulations of water-soluble salts within 36 inches, or a combination of these. Artificial drainage is needed for growth of most deep-rooted plants and many others that are sensitive to poor aeration. Drainage may also be necessary to maintain a favorable salt balance. Commercial timber production of conifer species is fair to good where climatically adapted.

Moderately Well Drained - Profile is wet for a small but significant part of the time, usually because of a slowly permeable layer within or immediately beneath the solum, a relatively high or intermittently high water table (usually below 5 feet), surface additions of water by runoff from areas higher up the slopes or a combination of these conditions. Moderately well drained is particularly difficult to assess in drier climates and where winter rainfall occurs when temperatures are low enough to almost inhibit growth. Evidence includes somewhat thicker and darker A horizons as contrasted to those of well-drained soils, indistinct mottling in the lower B horizons or within 36 inches of the surface or both. Artificial drainage may be needed for some deep-rooted plants and some others

that are particularly sensitive to short periods of poor aeration. Commercial timber production is very good for climatically-adapted species.

Well Drained - Water is removed readily but not rapidly. Soils are commonly intermediate in texture but in dry climates may even be fine textured. Chromas are generally more than 1/2 below the surface horizon unless the parent materials have an inherently low chroma. Soils are free of mottling, at least within the usual depth of plant roots. Under natural conditions of drainage, soil aeration is not a problem associated with well-drained soils. Commercial timber production is good for climatically-adapted species.

Somewhat Excessively Drained - Water is removed from these soils rapidly. Soils may be very shallow or shallow, many have little horizon differentiation and are sandy and very porous. Soils are similar in color to well-drained soils. Soils are droughty and produce a narrow range of plants, except in humid climates, with a uniform distribution of rainfall or unless irrigated.

Excessively Drained - Water is removed from these soils very rapidly. Soils are commonly composed of sands and gravels and are very porous. Soils are similar in color to well-drained soils. Dark A horizons are occasionally present. Most of these soils are unsuitable for ordinary plant production.

3. Available Water Capacity

"Available water capacity" refers to the total quantity of water available for plant growth that is stored in the effective root zone, or for very deep soils in the upper 60 inches of the soil profile at field capacity (Refs. 7 & 14). It includes the potential water capacity in the root zone between the limits of permanent wilting point and field capacity. It is largely dependent upon effective soil depth, texture and coarse-fragment content. Soil structure and organic-matter content have a minor influence on the available water capacity. In general, profiles that contain 50 percent coarse fragments (by volume), will only have one-half the moisture capacity of a comparable soil that is free of coarse fragments. Average available water capacities for nongravelly textural classes expressed as inches of water per inch of soil are: 0.06 for sand; 0.08 for loamy sand; 0.10 for sandy loam; 0.16 for loam; 0.18 for clay loam; 0.20 for silt loam and silty clay loam; and 0.18 for silty clay and clay. The classes of available water capacity for the entire effective root zone are:

<u>Descriptive Term</u>	<u>Available Water (in inches)</u>
Very high	More than 12
High	9 to 12
Moderate	6 to 9
Low	3 to 6
Very low	0 to 3

4. Annual Precipitation

Precipitation and the adapted vegetation that it supports, influences soil physical and chemical properties. Soils of the area have been classified according to the precipitation zone in which they occur. These zones generally are identified as: (1) areas receiving less than 20 inches, (2) areas receiving 20 to 35 inches and (3) areas receiving more than 35 inches.

5. Water-Supplying Capacity

"Water-supplying capacity" pertains to the moisture, not exceeding evapotranspiration, which falls during the growing season, in inches, plus the inches of moisture available in the soil profile at the beginning of plant growth. The growing season begins when the dominant plants show evidence of growth. Plant growth may begin in the spring, or in the fall for cool-season plants, depending on available moisture. Water-supplying capacity is also referred to as effective precipitation.

6. Compaction Hazard

Compaction results from pressing soil particles together into a close state of contact. The amount of compaction which can be obtained principally is influenced by the soil's physical properties, moisture content, type and amount of compaction effort. Soils are rated as having a slight, moderate, or severe susceptibility to a compactive force that reduces its productivity by restricting root development and internal air and water movement. Slight means soil properties generally are favorable for use under most conditions. Moderate means soil properties are unfavorable and, under some conditions, use should be restricted. Severe means soil properties are so unfavorable that use at any time could create soil conditions very difficult to correct.

7. Reaction Range

Reaction is the degree of acidity or alkalinity of a soil expressed in pH values. Reaction range shows highest and lowest pH in the total soil profile without reference to any particular layer or depth.

<u>Reaction Description</u>	<u>pH Range</u>
Extremely acid	Below 4.5
Very strongly acid	4.5 - 5.0
Strongly acid	5.1 - 5.5
Medium acid	5.6 - 6.0
Slightly acid	6.1 - 6.5
Neutral	6.6 - 7.3
Mildly alkaline	7.4 - 7.8
Moderately alkaline	7.9 - 8.4
Strongly alkaline	8.5 - 9.0
Very strongly alkaline	Above 9.0

8. Frost Susceptibility

"Potential frost action" refers to the probable effects on structures resulting from the freezing of soil material and its subsequent thawing. These are important factors mainly in selecting sites for highways and runways but also are important in planning any structure that is to be supported or abutted by soil that freezes. The action not only pertains to heaving of soil as freezing progresses but also to excessive wetting and loss of soil strength during thaw. The three degrees of limitation used in Table 5 are slight, moderate and severe. The ratings are based on the assumptions that there is a source of water during the freezing period and there is a suitable temperature gradient which exists long enough for freezing temperatures to penetrate the soil. Soils having a slight frost-action limitation rating are classified as GS, GP, SW and SP in the Unified Soil Classification System. Those having a moderate limitation are classified as GM, GC, SC, CH and OH in that system. The soils with a severe limitation are classified as SM, ML, CL, OL or MH in the Unified Soil Classification System.

TABLE 5

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

Soil Series Symbol	Soil Name	Depth (Inches)	Permeability	Drainage	Available Water Capacity (Inches)	Annual Precipitation (Inches)	Water Supplying Capacity (Inches)	Compaction Hazard	Reaction Range	Frost Susceptibility
36	Witzel	12-20	Moderately Slow	Well Drained	<3	20-35	4-10	Slight	5.6-6.0	Moderate
370	Unnamed	40+	Moderate	Well Drained	3-6	35-70+	7-14	Moderate	5.8-6.3	Severe
371	Unnamed	20-40	Moderate	Well Drained	3-6	35-70+	6-12	Slight	5.6-5.7	Moderate
372	Unnamed	12-20	Moderate	Well Drained	<3	35-70+	5-10	Slight	5.8-6.0	Moderate
380	Pollard	40+	Moderately Slow	Well Drained	6-9	35-70+	15-20	Severe	5.4-5.5	Severe
381	Unnamed	20-40	Moderately Slow	Well Drained	3-6	35-70+	12-16	Moderate-Severe	5.8-6.4	Moderate
382	Unnamed	40+	Moderately Slow	Well Drained	3-6	35-70+	13-18	Moderate-Severe	5.8-6.5	Moderate
701	Unnamed	12-20	Moderate-Moderately Rapid	Well Drained-Somewhat Excessively Drained	<3	20-35	4-10	Slight	5.6-6.5	Moderate
704	Carney	20-40	Very Slow	Well Drained	<3	18-30	4-8	Severe	6.1-7.3	Severe
705	Unnamed	20-40	Moderately Slow	Well Drained	3-6	20-35	8-12	Moderate	6.1-7.3	Moderate
706	Medco	20-40	Very Slow	Moderately Well Drained	3-6	20-35	12-18	Severe	6.1-6.0	Severe
710	Coker	40+	Very Slow	Somewhat Poorly Drained	6-9	18-25	10-17	Severe	6.6-8.4	Severe
712	Jumpoff	40+	Slow-Very Slow	Moderately Well Drained	3-6	30-50	13-16	Severe	6.2-6.4	Severe
715	Brader	12-20	Moderate	Well Drained	<3	18-30	8-10	Slight	6.0-6.5	Severe
716	Debenger	20-40	Moderate	Well Drained	3-6	18-30	10-14	Slight	6.0-6.5	Severe
718	Beekman	20-40	Moderate	Well Drained	3-6	20-35	6-12	Slight	6.1-6.6	Moderate
719	Manzanita	40+	Moderately Slow	Well Drained	6-9	20-35	12-20	Severe	5.6-6.5	Severe
721	Siskiyou	20-40	Moderately Rapid	Somewhat Excessively Drained	<3	30-50	9-13	Slight	5.1-6.0	Severe
722	Holland	40+	Moderately Slow	Well Drained	6-9	30-50	10-20	Slight-Moderate	5.6-6.5	Moderate

INTERPRETIVE RATINGS FOR SELECTED SOIL PROPERTIES AND QUALITIES

TABLE 5 (Cont'd)

Soil Series Symbol	Soil Name	Depth (Inches)	Permeability	Drainage	Available Water Capacity (Inches)	Annual Precipitation (Inches)	Water Supplying Capacity (Inches)	Compaction Hazard	Reaction Range	Frost Susceptibility
731	Straight	20-40	Moderate	Well Drained	3-6	35-60	6-12	Slight	5.6-6.0	Moderate
732	Unnamed	12-20	Moderate	Well Drained	<3	35-55	5-10	Slight	5.6-6.0	Moderate
740	Geppert	20-40	Moderate	Well Drained	3-6	35-60	5-13	Slight	5.6-7.3	Moderate
741	Freezner	40+	Moderately Slow	Well Drained	6-9	35-60	12-18	Severe	5.1-6.0	Severe
745	Laurelhurst	40+	Slow	Well Drained	6-9	20-35	15-20	Severe	6.1-7.3	Moderate
750	Dumont	40+	Moderately Slow	Well Drained	6-9	35-60	12-16	Severe	4.5-6.5	Severe
770	Pearsoll	12-20	Slow	Well Drained	<3	25-60	2-6	Moderate-Severe	6.1-7.3	Moderate
781	Colestine	20-40	Moderate	Well Drained	3-6	20-35	8-14	Slight-Moderate	6.2-6.8	Moderate
790	Unnamed	20-40	Slow	Well Drained	<3	12-16	7-10	Moderate-Severe	6.6-7.3	Moderate
806	Unnamed	12-20	Moderate	Well Drained	<3	35-60	7-9	Slight	5.6-6.0	Moderate
809	Unnamed	20-40	Moderate	Well Drained	3-6	35-60	9-12	Slight	5.6-6.2	Moderate
810	Unnamed	40+	Moderate	Well Drained	3-6	35-60	8-16	Slight	5.6-6.2	Severe
824	Unnamed	20-40	Moderate	Well Drained	3-6	40-80+	10-13	Slight	5.8-6.2	Severe
825	Unnamed	12-20	Moderate-Moderately Rapid	Well Drained	<3	40-80+	8-10	Slight	5.6-5.8	Moderate
840	Unnamed	40+	Moderately Slow	Well Drained	6-9	35-55	10-15	Severe	6.0-6.6	Severe
842	Unnamed	20-40	Moderately Slow	Well Drained	<3	35-55	8-11	Moderate-Severe	6.1-6.4	Moderate
850	Unnamed	20-40	Very Slow	Moderately Well Drained	3-6	30-55	7-13	Severe	4.5-5.5	Severe
861	Rogue	20-40	Moderately Rapid	Somewhat Excessively Drained	<3	35-60	6-12	Slight	6.1-7.3	Severe
880	Unnamed	40+	Moderately Slow	Well Drained	6-9	20-35	10-17	Moderate	6.2-6.6	Severe
882	Unnamed	40+	Moderate	Well Drained	3-6	20-35	9-12	Slight	6.0-6.6	Moderate

D. Forest Management

Table 6 lists items that will assist managers of forest lands in planning timber harvest and reforestation programs.

Soil productivity is measured by site index and site class of the major managed species. Site indexes are measured for various conifer species and identified with the soil in which they are growing. Available moisture is critical during the growing season. In many cases, the productivity of a soil differs according to aspect and variations in soil depth and coarse-fragment content.

Regeneration hazard is given for bare-root stock with no distinction made for age or species. Regeneration hazard is defined as the probable success of establishing new plantings as influenced by soil or topographic conditions. Three classes are recognized. The ratings are based on the percent of plantations that are expected to regenerate on the first attempt. A slight hazard means success on more than 80 percent of the plantations. A moderate hazard means success on 30 to 80 percent of the plantations. A severe hazard means success on less than 30 percent of the plantations.

Reduction of soil productivity, siltation to streams and high road-maintenance costs are hazards involved with harvesting timber. These hazards can be minimized and other resource values protected by applying the logging method best suited to the soils and terrain.

The following list is a guide to reduce the impact from surface disturbance during timber harvest on forested watersheds:

<u>Logging Method</u>	<u>Equipment Restrictions</u>	<u>Soil Texture and Conditions</u>
Tractor	<35% slope gradient anytime	sandy and loamy subsoil
Tractor	<35% slope gradient when surface foot is dry	clayey subsoil
Cable	>35% slope gradient anytime; wet spots on <35% slope gradient	all soils

Erosion hazard and slope stability are discussed in Section V Soils under Descriptions of Soil Series and Mapping Units. Compaction hazard is listed in Table 5, Interpretive Ratings for Selected Soil Properties and Qualities.



Figure 14. Skid trail intersects main road landing where the cut bank is lowest. This prevents excessive disturbance to slopes and ditch-lines. Effective water bars can easily be constructed on this kind of topography.

TABLE 6

FOREST MANAGEMENT INTERPRETATIONS

Soil Series Symbol	Soil Name	Species	Productivity Site Index and Class ^{2/}	Regeneration Hazard (Bare Root)	Remarks
36	Witzel	--	--	--	Nonforest soils.
1/ 370/n	Unnamed, northerly aspect	Douglas-fir	150-III (4)	Slight	Soils with higher site index receive seepage water. Windthrow is a hazard in the Low Divide area.
1/ 370	Unnamed, southerly aspect	Douglas-fir	130-III (1)	Moderate	Soils with higher site index receive seepage water. Windthrow is a hazard in the Low Divide area.
1/ 371/n	Unnamed, northerly aspect	Douglas-fir	115-IV (3)	Moderate	
1/ 371	Unnamed, southerly aspect	Douglas-fir	115-IV (3)	Severe	
1/ 372/n	Unnamed, northerly aspect	Douglas-fir	100-V (3)	Severe	
1/ 372	Unnamed, southerly aspect	Douglas-fir	80-V (1)	Severe	
1/ 380/n	Pollard, northerly aspect	Douglas-fir	III	Slight	
1/ 380	Pollard, southerly aspect	Douglas-fir	145-III (3)	Moderate	Site class is lower near zones of low precipitation.
1/ 381/n	Unnamed, northerly aspect	Douglas-fir	130-III (1)	Moderate	
1/ 381	Unnamed, southerly aspect	Douglas-fir	125-IV (2)	Severe	
382/n	Unnamed, northerly aspect	Douglas-fir	120-IV	Moderate	Site class data are from forest inventory records.
1/ 382	Unnamed, southerly aspect	Douglas-fir	115-IV (5)	Moderate	
701/n	Unnamed, northerly aspect	Douglas-fir	80-V	Severe	Site class data are from SCS records.
701	Unnamed, southerly aspect	Ponderosa pine	80-V	Severe	Site class data are from SCS records.
704	Carney	--	--	--	Nonforest soils.
705/n	Unnamed, northerly aspect	Douglas-fir	85-V	Severe	Site class data are from SCS records.
705	Unnamed, southerly aspect	Douglas-fir	--	--	Nonforest soils.
706/n	Medco, northerly aspect	Douglas-fir	90-V (1)	--	Site class data are from SCS records.
706	Medco, southerly aspect	--	--	--	Nonforest soils.
710	Coker	--	--	--	Nonforest soils.
712/n	Jumpoff, northerly aspect	Douglas-fir	105-IV	Severe	Site class data are from forest inventory records.
712	Jumpoff, southerly aspect	Douglas-fir	90-V	Severe	Site class data are from forest inventory records.
715	Brader	--	--	--	Nonforest soils.
716	Debenger	--	--	--	Nonforest soils.
718/n	Beekman, northerly aspect	Douglas-fir	110 to 90-IV to V	Severe	Site class data are from SCS records. Productivity is higher at elevations above 3000 feet.
718	Beekman, southerly aspect	Douglas-fir	95-V	Severe	Site class data are from forest inventory records.

1/ Soils with measured data.

2/ From tables in Field Instructions for Integrated Forest Survey and Timber Management Inventories in Western Oregon, 1968. BLM, Portland, Oregon. The number in parentheses show number of plots examined with 3 to 5 trees per plot.

TABLE 6 (Cont'd)

FOREST MANAGEMENT INTERPRETATIONS

Soil Series Symbol	Soil Name	Species	Productivity Site Index and Class ^{2/}	Regeneration Hazard (Bare Root)	Remarks
719/n 719	Manzanita, northerly aspect Manzanita, southerly aspect	Douglas-fir Douglas-fir	115-IV (2) 110-IV (1)	Severe Severe	Sampled where annual precipitation is near 35 inches. Sampled where annual precipitation is near 35 inches.
721/n	Siskiyou, northerly aspect	Douglas-fir	120-IV (2)	Moderate	Site class V in Silver Creek watershed where gravel content is higher. Site class III in Glade Fork area where seepage water occurs.
721	Siskiyou, southerly aspect	Douglas-fir Ponderosa pine Sugar pine	110-IV (2) 110-III (1) 110-III (1)	Severe Severe Severe	
722/n	Holland, northerly aspect	Douglas-fir	135-III (2)	Moderate	Site class is lower where annual precipitation is 30 inches near Grants Pass.
722	Holland, southerly aspect	Ponderosa pine Sugar pine	120-III (1) 130-II (1)	Moderate Moderate	
731/n 731	Straight, northerly aspect Straight, southerly aspect	Douglas-fir Douglas-fir	IV III IV	Severe Moderate Severe	Site class data are from South Umpqua Survey. Site class data are from South Umpqua Survey.
732/n 732	Unnamed, northerly aspect Unnamed, southerly aspect	Douglas-fir Douglas-fir	95-V 75-V	Severe Severe	Site class data are from forest inventory records. Site class data are from forest inventory records.
740/n 740	Geppert, northerly aspect Geppert, southerly aspect	Douglas-fir Douglas-fir	115-IV 105-V	Moderate Severe	Site class data are from SCS records. Site class data are from SCS records.
741/n 741	Freezner, northerly aspect Freezner, southerly aspect	Douglas-fir Douglas-fir	135-III 130-III	Moderate Severe	Site class data are from SCS records. Site class data are from SCS records.
745/n 745	Laurelhurst, northerly aspect Laurelhurst, southerly aspect	Douglas-fir Douglas-fir	100-V 90-V	Severe Severe	Site class data are from forest inventory records. Site class data are from SCS records.
750/n 750	Dumont, northerly aspect Dumont, southerly aspect	Douglas-fir Douglas-fir	III 140-III	Slight Moderate	Site class data are from forest inventory records. Site class data are from SCS records.
770	Pearsoll	Jeffrey pine	--	Severe	Noncommercial sites.
781/n 781	Colectine, northerly aspect Colectine, southerly aspect	Douglas-fir Douglas-fir	115-IV 100-V	Severe Severe	Site class data are from forest inventory records. Higher productivity is on soils above 3000 feet near high-rainfall zones.
790	Unnamed	--	--	--	Nonforest soils.
809/n	Unnamed, northerly aspect	Douglas-fir	120-IV	Moderate	Site class data are from forest inventory records. Rodents and grass are limitations to regeneration. Slight to moderate ripping limitation on slope 0-15%.
		True fir	II	Moderate	

TABLE 6 (Cont'd)

FOREST MANAGEMENT INTERPRETATIONS

Soil Series Symbol	Soil Name	Species	Productivity Site Index and Class ² / ₁	Regeneration Hazard (Bare Root)	Remarks
809	Unnamed, southerly aspect	Douglas-fir True fir	115-IV II	Severe Severe	Site class data are from forest inventory records. Rodents and grass are limitations to regeneration. Slight to moderate ripping limitation on slopes 0-15%.
810/n	Unnamed, northerly aspect	Douglas-fir	125-IV	Moderate	Site class data are from forest inventory records. Rodents and grass are limitations to regeneration. Slight to moderate ripping limitation on slopes 0-15%.
810	Unnamed, southerly aspect	True fir Douglas-fir	II 120-IV	Moderate Severe	Site class data are from forest inventory records. Rodents and grass are limitations to regeneration. Slight to moderate ripping limitation on slopes 0-15%.
824/n 824	Unnamed, northerly aspect Unnamed, southerly aspect	Douglas-fir Douglas-fir	115-IV 100-V	Moderate Severe	Site class data are from forest inventory records. Site class data are from forest inventory records.
825/n 825	Unnamed, northerly aspect Unnamed, southerly aspect	Douglas-fir --	85-V --	Severe --	Site class data are from forest inventory records. Nonforest soils.
840/n	Unnamed, northerly aspect	Douglas-fir	110-IV	Severe	Site class data are from SCS records. Grass competition and rodent hazard.
840	Unnamed, southerly aspect	True fir Douglas-fir	II 100-V	Severe Severe	Site class data are from SCS records. Grass competition and rodent hazard.
842/n 842	Unnamed, northerly aspect Unnamed, southerly aspect	Douglas-fir Douglas-fir	100-V 85-V	Severe Severe	Site class data are from forest inventory records. Site class data are from forest inventory records.
850/n	Unnamed, northerly aspect	Douglas-fir True fir	100-V III	Severe Severe	Site class data are from forest inventory records.
850	Unnamed, southerly aspect	Douglas-fir True fir	90-V III	Severe Severe	Site class data are from forest inventory records.
1/ 861	Rogue, northerly aspect	Douglas-fir	155-III (1)	Severe	Productivity is enhanced by seepage water in the Sugarloaf Peak area. Site class is lower near Ashland.
880/n	Unnamed, northerly aspect	True fir Ponderosa pine	II 100-IV	Severe Moderate	Site class data are from forest inventory records. Deer damage to seedlings near winter range.
880	Unnamed, southerly aspect	True fir Ponderosa pine	II 90-IV	Moderate Moderate	Site class data are from forest inventory records. Deer damage to seedlings near winter range.
882/n	Unnamed, northerly aspect	Ponderosa pine True fir	70-V III	Moderate Moderate	Site class data are from SCS records. Site class data are from forest inventory records.
882	Unnamed, southerly aspect	Douglas-fir True fir	75-V III	Severe Severe	Site class data are from SCS records. Site class data are from forest inventory records.

E. Range Management

Lands used for grazing livestock mostly occur in the eastern and southern parts of the District. Management of these lands are varied to meet the demands of the multiple resources. Livestock grazing is often a secondary use of the land and must conform to the needs of timber production or wildlife habitat in critical deer winter-range areas. Intermixed private lands also have an important impact on the management needs and decisions in the area.

In forested areas, livestock forage is transient. Grass and other forage species increase as the timber is harvested. Then, as the stand becomes reestablished, the forage production decreases.

In some areas, cattle use and deer winter range are in conflict. Use by cattle must be limited to the spring season and a period of rest provided for restoration of plant vigor. On these areas, cattle are used mostly to form the plants for deer use and not for cattle production.

Other areas of conflicting use include small, wet meadows that dot the timberlands of the high Cascade Mountains.

Table 7 shows the range site, or vegetative association, that is supported by each soil used for livestock grazing. For each site, two or more of the key species in the climax plant community of the site, together with the approximate percent of cover of each species, is shown. This information will have significance in management techniques and studies used to meet and evaluate the objectives of range management. "Potential acres per AUM" refers to the usable acres per animal unit month. It is shown to indicate the potential forage production of a site in excellent ecological condition. These figures are based primarily on actual stocking records and generally are conservative in a planned grazing system. The normal growing season dates represent the normal beginning of growth of key species for each site and when these species have reached the seed-mature stage. The normal grazing season dates represent the time during the year when the soil is suitable for grazing without damage to the resource or to the animals. The season of grazing for harvest of AUMs is very important on many sites because of the abundance of annual plants. Some of this information is lacking and should be determined before management decisions are made.



Figure 15. Vegetative communities and plant density sometimes indicates soil differences and patterns. This is a portion of mapping unit 706-36/WX. Here, abundance of poison oak in the foreground reveals the location of the very clayey members of the soil association. Wedgeleaf ceanothus in the background locates some of the loamy members. The soil mantle is thinner where ceanothus is less dense.

RANGE MANAGEMENT INTERPRETATIONS

Soil Symbol	Soil Name	Range Site Name	Key Species and Percent Cover	Potential Acres per AUM	Normal Growing Season	Normal Grazing Season
* 36/n	Witzel, northerly aspect	--	--	--	--	--
* 36	Witzel, southerly aspect	--	--	--	--	--
*370	Unnamed	--	--	--	--	--
*371	Unnamed	--	--	--	--	--
*372	Unnamed	--	--	--	--	--
*380	Pollard	--	--	--	--	--
*381	Unnamed	--	--	--	--	--
*382	Unnamed	--	--	--	--	--
*701/n	Unnamed, northerly aspect	--	--	--	--	--
*701	Unnamed, southerly aspect	--	--	--	--	--
704	Carney, southerly aspect	Oak - Pine - Oatgrass	White oak 35-50 Ponderosa pine 5-15 California oatgrass 50-65 Idaho fescue 1-5	2-3	2/15- 7/1	--
705	Unnamed, southerly aspect	Douglas-fir - Mixed Pine Forest	Douglas-fir 40-60 Ponderosa pine 5-10 Sugar pine 5-10 Western fescue 5-10 Mountain brome Trace- 2	--	2/15- 7/15	--
706/n	Medco, northerly aspect	Douglas-fir Forest	Douglas-fir 65-80 Madrone 1-5 Black oak 1-5 Western fescue 2-3 Mountain brome 2-3	--	3/15- 8/ 1	--
706	Medco, southerly aspect	Oak - Pine - Fescue	White oak 50-70 Ponderosa pine Trace- 3 Idaho fescue 35-45	2-5	2/15- 6/15	--
710	Coker, southerly aspect	Oak - Pine - Oatgrass	White oak 35-50 Black oak 1-10 Pacific serviceberry 1-3 Poison oak 1-3 California oatgrass 50-65 Idaho fescue 1-5	2-3	3/ 1- 7/15	5/ 1-11/ 1
*712	Jumpoff	--	--	--	--	--

*These soils are not now used for grazing, or information is not available.

TABLE 7 (Cont'd)

RANGE MANAGEMENT INTERPRETATIONS

Soil Symbol	Soil Name	Range Site Name	Key Species and Percent Cover	Potential Acres per AUM	Normal Growing Season	Normal Grazing Season
715	Brader, southerly aspect	Oak - Pine - Fescue	White oak Ponderosa pine Idaho fescue Bluebunch wheatgrass Pine bluegrass 1-2	2-3	2/15- 6/15	--
716	Debenger, southerly aspect	Pine - Oak - Fescue	Ponderosa pine White oak Idaho fescue Junegrass Blue wildrye Trace- 2	--	2/ 1- 6/15	--
718/n	Beekman, northerly aspect	Douglas-fir Forest	Western fescue Mountain brome Douglas-fir Oceanspray Tall Oregon grape Cascade Oregon grape 5-25	--	3/15- 8/ 1	--
718	Beekman; southerly aspect	Pine - Douglas-fir - Fescue	Idaho fescue California fescue Ponderosa pine Douglas-fir	--	2/15- 7/15	--
719/vw	Manzanita, 0-35% southerly aspect	Pine - Oak - Fescue	Ponderosa pine White oak Idaho fescue	--	2/ 1- 6/15	--
719/x	Manzanita, 35-60% southerly aspect	Mahogany - Oak - Fescue	Mountain mahogany White oak Idaho fescue	--	3/ 1- 7/ 1	--
721/n	Siskiyou, northerly aspect	Douglas-fir forest	Douglas-fir	--	3/15- 8/ 1	--
721	Siskiyou, southerly aspect	Mixed Pine - Douglas-fir - Fescue	Ponderosa pine Sugar pine Douglas-fir Idaho fescue Western fescue 2- 5	--	2/15- 7/15	--
722	Holland, southerly aspect	Mixed Pine - Douglas-fir - Fescue	Ponderosa pine Sugar pine Douglas-fir Idaho fescue Western fescue 2- 5	--	2/15- 7/15	--
*731	Straight	--	--	--	--	--
*732	Unnamed	--	--	--	--	--

TABLE 7 (Cont'd)

RANGE MANAGEMENT INTERPRETATIONS

Soil Symbol	Soil Name	Range Site Name	Key Species and Percent Cover	Potential Acres per AUM	Normal Growing Season	Normal Grazing Season
740/n	Geppert, northerly aspect	Douglas-fir - Chinquapin Forest	Douglas-fir Madrone Chinquapin Western fescue Trace- 2	--	3/15- 8/15	--
740	Geppert, southerly aspect	Mixed Fir - Mixed Pine Forest	Douglas-fir White fir Ponderosa pine Sugar pine Western fescue California fescue	--	3/ 1- 8/ 1	--
*741	Freezner	--	--	--	--	--
745	Laurelhurst, southerly aspect	Pine - Douglas-fir - Fescue	Ponderosa pine Douglas-fir California fescue Idaho fescue	3-8	2/15- 7/15	--
750	Dumont, southerly aspect	Mixed Fir - Mixed Pine	Douglas-fir Sugar pine Ponderosa pine White fir Western fescue California fescue Mountain brome	--	3/ 1- 8/ 1	--
*770	Pearsoll	--	--	--	--	--
790	Unnamed, southerly aspect	Juniper Rolling Hills	Bluebunch wheatgrass Idaho fescue Sandberg bluegrass	2.2-3	4/ 1- 6/15	4/20-12/ 1
*806	Unnamed	--	--	--	--	--
809/n	Unnamed, northerly aspect	Mixed Fir - Yew Forest	White fir Douglas-fir Pacific yew Cascade Oregon grape Western fescue Mountain brome	--	5/ 1-11/15	--
809	Unnamed, southerly aspect	Mixed Fir - Serviceberry Forest	Douglas-fir White fir Western fescue Mountain brome	--	4/ 1-11/15	--
810/n	Unnamed, northerly aspect	Mixed Fir - Yew Forest	White fir Douglas-fir Pacific yew Cascade Oregon grape Western fescue Mountain brome	--	5/ 1-11/15	--

TABLE 7 (Cont'd)

RANGE MANAGEMENT INTERPRETATIONS

Soil Symbol	Soil Name	Range Site Name	Key Species and Percent Cover	Potential Acres per AUM	Normal Growing Season	Normal Grazing Season
810	Unnamed, southerly aspect	Mixed Fir - Serviceberry Forest	Douglas-fir White fir Western fescue Mountain brome	--	4/ 1-11/15	--
*824	Unnamed	--	--	--	--	--
*825	Unnamed	--	--	--	--	--
840/n	Unnamed, northerly aspect	Mixed Fir - Oceanspray Forest	Douglas-fir White fir Oceanspray Western fescue Mountain brome	--	4/15- 8/ 1	--
840	Unnamed, southerly aspect	Mixed Fir - Serviceberry Forest	Douglas-fir White fir Western fescue Mountain brome	--	4/ 1- 8/ 1	--
*842	Unnamed	--	--	--	--	--
850/n	Unnamed, northerly aspect	Pine - Douglas-fir - Fescue	Ponderosa pine Douglas-fir White fir California fescue	--	3/15- 7/15	--
850	Unnamed, southerly aspect	Mixed Fir - Serviceberry Forest	Douglas-fir White fir Western fescue Mountain brome	--	--	--
861/n	Rogue, northerly aspect	--	Douglas-fir White fir Snowberry	--	5/ 1-11/ 1	--
861	Rogue, southerly aspect	--	Ponderosa pine Sugar pine Douglas-fir White fir Chinquapin	--	4/15-11/15	--
*880	Unnamed	--	--	--	--	--
*882	Unnamed	--	--	--	--	--

F. Wildlife Management

Game and nongame wildlife species in the District are important for the recreational opportunities they provide or for the beneficial control of rodent and insect pests. Wildlife require an adequate supply of food, water and cover. The change or destruction of food and cover plants can cause a reduction in numbers of big-game animals, birds and fish. Forest roads, necessary for timber removal, must be properly located and timber-harvest methods carefully employed to protect wildlife habitat.

The kinds of wildlife that live in a particular area depend upon the kinds of habitat available. Under natural conditions, certain kinds of vegetation grow in various combinations in an area depending upon the kinds of soils that occur. The vegetation provides food for herbivorous and omnivorous animals and shelter for all kinds of animals. Wildlife generally is more abundant and the rate of reproduction is higher on more productive soils than on soils of poor quality.

Suitability of the soils for different kinds of wildlife varies according to soil fertility, climatic conditions and soil properties that affect water-holding capacity. Aspect and position on the landscape also are important because they are related to effective soil moisture and to the proximity of water, feeding areas and cover areas.

Table 8 identifies watersheds and areas within the District where certain wildlife species habitat requirements conflict with forest practices. A general description of each area is given by naming the watershed or a prominent geographic feature. The dominant soils listed are those that have the dominant influence in providing the different plant communities for wildlife habitat.* The "key species" refers to the wildlife species to be managed and their major browse and cover plants that are supported by the soils of the area. A dash indicates that a great variety of conditions occur or that the information is unknown. The "forest practices/wildlife habitat conflict" column indicates the problems of the interaction between these two resources. The "wildlife management units" refer to those areas established by the Oregon Wildlife Commission.

1. Kinds of Wildlife and Their Habitat Requirements

There are important big-game animals, game birds and predatory mammals on the District, as well as a great variety of nongame birds and animals. The habitat requirements for some wildlife species have a great impact and conflict with the goals of forest management. Aquatic life also plays an important role in affecting land management practices.

a. Black-tailed Deer

Soils on the northerly aspects in deer winter ranges are low timber productivity sites but support stands of commercial timber. Deer use these areas for cover from severe weather conditions and for hiding places. Timber harvest along ridge lines destroys these important wildlife cover

*Timber productivity ratings for these soils is given in the Forest Management section, p. 183.



Figure 16. Critical deer winter range. Abundant browse species occur on southerly aspects. Cover is in drainageways and on northerly aspects.

areas. Opening the forest canopy increases the snow depth and makes these areas less desirable for deer during the critical winter months. Roads constructed on these winter ranges encourage harassment and illegal harvest of wildlife during the period when they are under extreme stress from winter weather conditions.

Southerly aspects on the winter range produce forage plants for wildlife use during the winter months. Large herds of deer concentrate where these slopes usually are free of snow. Plantations adjacent to these areas receive heavy browse and usually are failures. Roads traversing the south slopes on critical ranges destroy the wildlife habitat. Elk occupy some of the deer winter ranges and feed on the same plants.

b. Other Animals and Birds

Soils and associated vegetation affect the distribution of many species of rodents. Management of these species includes control or reduction of their numbers rather than protection. Gopher concentration areas, such as meadows, natural forest openings and grasslands of the Cascade Plateau, affect the understory vegetation in adjacent mature timber stands. Populations increase when timber is removed.

Porcupines are the second most destructive rodent inhabiting the forest. Porcupine damage usually is associated with pine forests and especially pine plantations.

Jackrabbits, deer mice, chipmunks and other destructive small rodents are associated with the grassland/forested plant communities of the area.

Many important birds of prey feed and nest in the mature forest canopy. They are dependent on the trees for nest-building platforms and for resting places. Several endangered and threatened birds play an important role in the forest environment by feeding on rodents that cause tree damage. Management of these species includes their protection.

c. Fisheries

Forest practices involve surface disturbance that contributes to stream bedload and to the detrimental effect of aquatic habitat. Soils of the inventory area respond differently to management techniques and erosion-control measures. However, soil texture does not have as great an impact on water quality and aquatic life as the degree of disturbance, the place of disturbance, or the time of disturbance.

The Rogue River and its tributaries, the principle drainage system of the area, support major runs of anadromous fish, such as coho and chinook salmon, steelhead, sea-run cutthroat trout, green sturgeon and shad. Native cutthroat and rainbow trout inhabit the many minor drainageways. Howard Prairie and Hyatt Reservoirs contain both cold- and warm-water game fish. The Klamath and South Umpqua River systems drain a minor portion of the inventory area but contain important game-fish species.



Figure 17. Rock land meadows adjacent to timber are important for wild-life habitat. Rock outcrop occurs in left foreground. Scrubby incense-cedar trees are growing on soil less than 12 inches thick.

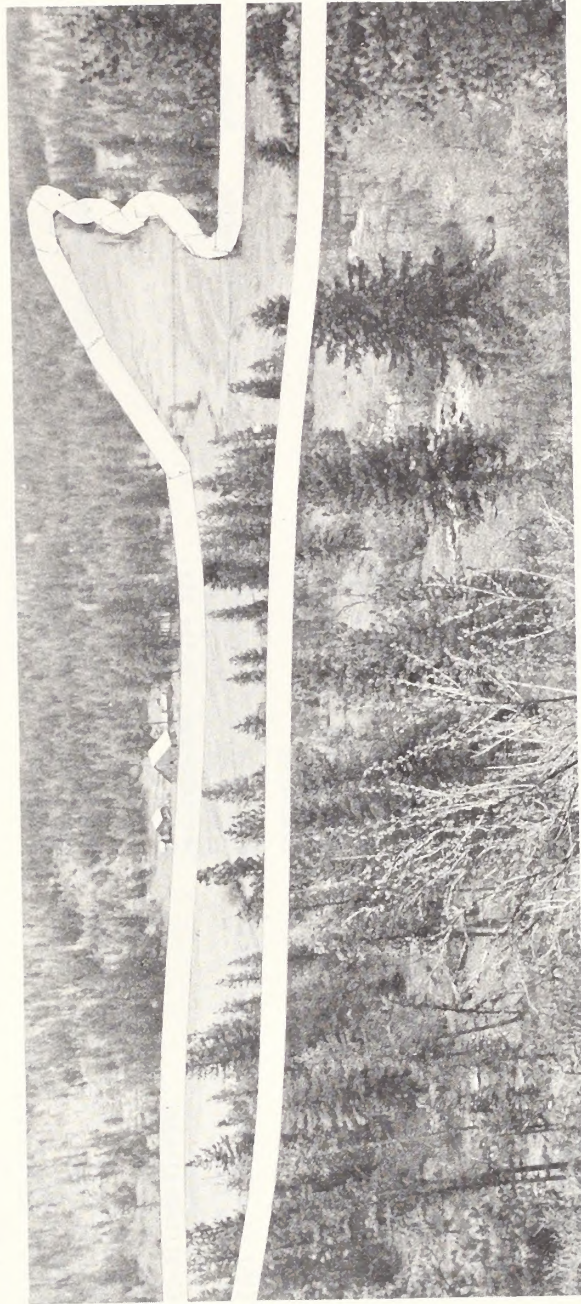


Figure 18. Wetland meadows produce abundant forage for wildlife and livestock. Undisturbed buffer zones for cover adjacent to these meadows will enhance wildlife habitat.

TABLE 8

WILDLIFE MANAGEMENT INTERPRETATIONS

Watershed or Area	Dominant Soils	-----KEY SPECIES-----			*Forest Practices/ Wildlife Habitat Conflict		Wildlife Management Unit	Remarks
		Wildlife	Browse	Cover	Wildlife	Wildlife		
Little Applegate	701, (718) Beekman, (719) Manzanita, (781) Colestine	Black-tailed Deer	Wedgeloaf ceanothus, Mountain mahogany, Black oak, White oak	Ponderosa pine, Douglas-fir, Madrone, Manzanita	Critical Winter Range	Applegate (east)	Deer feed mostly on southerly aspects; cover is on northerly aspects.	
Deer Creek	(770) Pearsoll, (R) Rock Land, 371, 372	Black-tailed Deer	Wedgeloaf ceanothus	Douglas-fir, Jeffrey pine, Incense-cedar, Ponderosa pine	Critical Winter Range	Applegate (west)	Deer feed in open brushfields supported by serpentine soils; cover is on adjacent forested soils.	
Klamath River, Ward Road	880, 882, 790, (R) Rock Land	Black-tailed Deer	Wedgeloaf ceanothus, Fremont silktassel, Snowbrush ceanothus	Douglas-fir, Ponderosa pine, White fir, Juniper	Critical Winter Range	Keno	Deer concentrate in open areas adjacent to plantations.	
Agate Flat	(36) Witzel, 705, (R) Rock Land, (706) Medco, (745) Laurelhurst, 840, 842, 850	Black-tailed Deer	Wedgeloaf ceanothus, Serviceberry, White oak	Ponderosa pine, Douglas-fir, White fir, White oak	Critical Winter Range	Rogue	Deer feed on open southerly aspects; cover is in drainage- ways and on northerly aspects.	
Emigrant Creek, Sampson Creek, Lake Creek, Salt Creek	(36) Witzel, 705, (R) Rock Land, (706) Medco, (745) Laurelhurst, 840, 842, 850	Black-tailed Deer	Wedgeloaf ceanothus, White oak	Ponderosa pine, Douglas-fir, White fir, Incense-cedar, White oak	Critical Winter Range	Rogue	Deer feed on open southerly aspects; cover is in drainage- ways and on forested soils with low site class for Douglas-fir	
Buckhorn Mountain	(770) Pearsoll, (R) Rock Land, (718) Beekman, (781) Colestine, 371, 372	Black-tailed Deer	Wedgeloaf ceanothus, Canyon live oak, Fremont silktassel, White oak	Douglas-fir, Ponderosa pine, Incense-cedar	Critical Winter Range	Powers, Chetco	Deer feed in open brushfields supported by serpentine soils; cover is on adjacent forested soils.	
Elk Creek	705, (36) Witzel, (706) Medco, (745) Laurelhurst	Black-tailed Deer	Deerbrush ceanothus	Ponderosa pine, Douglas-fir, Madrone	Critical Winter Range	Dixon	Cover is on forested soils with a low site class for Douglas-fir	

*See District URA Wildlife Overlays, page 21, for wildlife management units and deer winter ranges.

WILDLIFE MANAGEMENT INTERPRETATIONS

TABLE 8 (Cont'd)

<u>Watershed or Area</u>	<u>Dominant Soils</u>	<u>Wildlife</u>	<u>KEY SPECIES</u>	<u>Cover</u>	<u>*Forest Practices/ Wildlife Habitat Conflict</u>	<u>Wildlife Management Unit</u>	<u>Remarks</u>
Rocky Flat	705, (36) Witzel, (706) Medco, (745) Laurelhurst	Black-tailed Deer	Wedgelaaf ceanothus, White oak	Ponderosa pine, Douglas-fir Madrone	Critical Winter Range	Rogue	Cover is on forested soils with a low site class for Douglas-fir
Medco Pond	(740) Geppert, (750) Dumont	Roosevelt Elk	Redstem ceanothus	Douglas-fir, White fir	Critical Winter Range	Rogue	--
Cascade Plateau	809, 810	Pocket Gopher	Pine species, Elderberry, Mullen		Rodent Infestation	Rogue	Populations increase when timber is removed.
Cascade Plateau	809, 810, 840	Porcupine	Ponderosa pine		Pine Plantation Damage	Rogue, Keno	--

TABLE 9
ACREAGE AND PROPORTIONATE EXTENT OF SOILS MAPPED

Map Symbol	Total	AREAS											
		Glendale		Galice		Grants Pass		Rogue		Butte Falls		Klamath	
		BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other
36-R/XY	12,730							130		4,260	2,110	5,950	280
36-R/XYn	1,770								120			1,560	90
36-R/Y	3,770						40		1,250	870		1,240	370
36-705/XY	8,140								1,510	600		2,810	3,220
36-705/XYn	550								430	120			
370-382-371/XW	11,850	4,210	780	880		840	940	1,610	1,570	470	550		
370-382-371/XWn	8,740	5,960	930	490		400	150	480	330				
370-382-371/XY	28,990	3,030	340	2,080	860	10,160	7,320	2,310	2,210	680			
370-382-371/XYn	47,950	9,770	3,820	9,290	1,430	9,970	6,530	3,000	1,580	1,000	1,560		
371-372-370/XY	101,410	28,080	14,990	12,230	2,520	15,240	12,030	5,770	5,070	2,190	3,290		
371-372-370/XYn	86,940	20,750	11,250	18,590	7,440	10,180	7,120	6,610	5,000				
372-371/Y	23,150	9,160	2,890	8,380	1,490	320	250		70	350	240		
372-371/Yn	43,570	13,600	4,170	16,080	2,600	2,190	1,480	2,700	520	80	150		
372-R/Y	23,690	12,230	1,690	5,100	1,530	2,080	680	360	20				
372-R/Yn	2,650			290	250	1,170	940						
380/W	10,870	2,210	800	220	180	2,720	4,300	120	320				
380/Wn	3,710	560	130	1,010	1,750	190	70						
380-382/WX	22,610	6,310	7,350	3,050	960	810	1,950	1,060	1,120				
380-382/WXn	18,670	3,060	2,920	5,960	2,740	1,700	2,100	90	100				
381-380/X	21,680	7,760	5,870	3,830	1,480	750	840	660	380	40	70		
381-380/Xn	7,040	2,860	2,420	1,380	380								
381-380/XY	16,470	6,380	3,710	3,010	1,800	440	1,130						
381-380/XYn	9,360	2,670	2,150	2,100	2,440								
701-R/Y	8,650			1,330	230	1,240	910	4,660	280				
704/W	1,490									80		390	1,020
704-36/XY	5,750									850		1,930	2,970
705-36/X	2,140							40		1,290	680	100	30
705-36/Xn	4,440									280	370	2,450	1,340
705-36/XY	21,380					40				5,290	4,390	7,540	4,120
705-36/XYn	12,760									1,250	1,840	6,280	3,390
705-36/Y	1,840									220		1,110	510

TABLE 9 (Cont'd)

ACREAGE AND PROPORTIONATE EXTENT OF SOILS MAPPED

Map Symbol	Total	AREAS											
		Glendale		Galice		Grants Pass		Rogue		Butte Falls		Klamath	
		BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other
719/WX	10,680		400	490	1,810	3,830	2,010	1,850	60	230			
719/WXn	3,600			2,140		730	730						
719-781/WX	7,750		730	100	2,280	580	1,600	2,460					
719-781/WXn	3,910		260	40	240	360	2,300	710					
721/X	10,680	110	1,210	2,580	1,360	1,290	2,650	1,480					
721/Xn	3,220	1,130	390	280	390	370	290	190					
721/XY	18,300			1,250	1,410	640	8,860	6,040	30	70			
721/XYn	11,050			780	3,120	3,350	2,780	1,020					
721/Y	860			640		70	150						
721/Yn	1,940			1,940									
722/V	4,150		1,870	650	160		790	680					
722/VW	7,390	320	550	600	1,930	130	1,580	1,920	190				
722/W	4,930		240	330	170	290	2,360	1,540					
722/Wn	920				10	130	430	350					
731-732/XY	5,640								3,210	2,430			
731-732/XYn	11,360								4,660	4,330	1,460	910	
732-R/Y	1,310								880	430			
740-750/X	6,360								2,280	4,080			
740-750/Xn	6,240								2,780	3,460			
741/W	480								30	70	330	50	
741/WX	2,020								1,180	840			
741-731/X	4,500								1,990	2,510			
741-731/Xn	2,850								1,360	1,490			
745/V	990								60	890	40		
745/WV	930								210	720			
745/Wn	3,350								440	1,040	780	1,090	
745/WX	1,990								670	1,320			
745-36/X	1,860								480	110	930	340	
745-705/WV	2,050								660	870	200	320	
745-705/WX	9,200								2,640	5,580	440	540	

TABLE 9 (Cont'd) ACREAGE AND PROPORTIONATE EXTENT OF SOILS MAPPED

Map Symbol	Total	AREAS											
		Glendale		Galice		Grants Pass		Rogue		Butte Falls		Klamath	
		BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other
745-705/X	5,040									2,810	1,860	360	10
745-706/WX	1,830									1,820			10
745-706/X	3,740									1,010	1,860	240	630
745-706/Xn	10,450									1,370	390	5,000	3,690
750/V	3,530									2,220	1,310		
750/VW	15,010									6,670	8,340		
750/W	5,960									1,510	4,450		
750/Wn	870									450	420		
750/WX	2,850									520	2,330		
750-740/WX	4,800									4,690	110		
750-740/WXn	7,940									7,940			
770-R/XY	39,900	1,320	830	7,280	1,900	17,510	8,030	1,690	1,340				
781-719/WX	9,750			470	570	580	70	4,570	3,060	330	100		
781-719/WXn	3,450					420	110	1,910	1,010				
781-719/XY	15,680			2,330	2,860	660	160	6,660	3,010				
781-719/XYn	8,520			1,110	1,720	1,770	2,140	1,150	630				
790/WX	920									920			
806-R/VW	1,840											1,530	310
806-R/X	1,730											810	920
809-806/VW	8,210											2,200	6,010
809-810/V	4,560											3,230	1,330
809-810/VW	12,760											10,850	1,910
809-810/W	3,360											3,360	
809-810/Wn	9,490											5,650	30
809-810/X	800											720	80
809-810/Xn	4,620											2,400	
810-809/V	16,750											10,710	6,040
810-809/WV	8,100											2,800	850
810-809/WX	15,000											5,340	1,260
810-809/WXn	6,180											2,930	1,130

TABLE 9 (Cont'd) ACREAGE AND PROPORTIONATE EXTENT OF SOILS MAPPED

Map Symbols	Total	AREAS											
		Glendale		Galice		Grants Pass		Rogue		Butte Falls		Klamath	
		BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other	BLM	Other
824-825/XY	3,520	660	110	540	60	1,180	290	470	130	80	330	350	
824-825/XYn	13,210	810	230	3,070	1,490	5,580	280	1,500			2,300	1,830	
840/X	680										940	620	
840/Xn	4,130										2,290	560	
840-842/X	1,560										2,210	460	
840-842/Xn	2,850										3,730	3,280	
840-842/XY	2,670										80	590	
840-842/XYn	7,010										4,800	5,490	
850/V	670										280		
850/VW	10,290												
861/XY	760							480					
861/XYn	3,940					2,940	560	430					
861/Y	170							80					
861/Yn	400							10					
880/V	24,530										270	13,620	
882/WX	6,050										10,910	3,340	
882/WXn	3,820										2,710	3,340	
882/X	4,490										2,330	1,490	
882/XY	950										2,520	1,970	
882-880/VW	28,960										820	130	
882-880/W	6,310										14,200	14,760	
I	44,750	10	1,740	160	1,850	4,710	16,570	440	11,140	3,730	3,830	2,480	
R	17,980			1,520	500	3,100	250	3,150			1,560	2,520	
Reservoir	6,690							60			7,070	2,390	
									430	4,290		1,910	

TABLE 10

ACREAGE OF SOILS ON BLM LANDS

<u>Soil Series</u>	<u>Total</u>
36	31,200
370	47,700
371	93,500
372	87,800
380	30,200
381	23,000
382	30,900
701	19,400
704	2,600
705	20,400
706	39,100
710	2,100
712	7,200
715	2,200
716	2,300
718	94,700
719	39,300
721	29,800
722	9,500
731	6,900
732	4,300
740	6,800
741	3,600
745	18,600
750	22,200
770	19,600
781	36,200
790	900
806	2,700
809	30,100
810	27,300
824	7,700
825	6,300
840	8,000
842	3,800
850	4,900
861	4,500
880	16,800
882	20,500
1	7,700
R	38,700
	<u>911,000</u>

VII. GLOSSARY

- BEDROCK - The solid rock underlying soils and other superficial formations.
- COARSE FRAGMENTS - Rock or mineral particles greater than 2.0 mm. in diameter.
- COLLUVIUM - Heterogenous deposits of rock fragments and soil material accumulated at the base of steep slopes through the influence of gravity and local wash.
- FAULT - A break in rock strata or veins that causes a section to become dislocated along the line of fracture.
- LANDSLIDE - Rapid movement down slope of a mass of soil, rock, or debris.
- OPTIMUM MOISTURE - The exact amount of water necessary to coat each particle of soil so that the maximum weight per cubic foot for a given compactive effort can be attained.
- PIPING - Accelerated erosion which results in subterranean voids and tunnels.
- SAPROLITE - Soft weathered rock material that retains the original rock structure.
- SHEAR STRENGTH - The strength of the soil mass to resist internal sliding.
- SKELETAL - A name for a group of soils that have more than 35 percent coarse fragments in the soil profile. (The amount of coarse fragments in a soil reflects its water-holding capacity.)
- SOIL DEPTH - The thickness of the soil over a root-impeding layer.
- Deep - over 40 inches
Moderately deep - 20 to 40 inches
Shallow - 12 to 20 inches
- SOIL SERIES - A group of soils developed from a particular type of parent material and having genetic horizons that, except for texture of the surface layer, are similar in differentiating characteristics and in arrangement in the profile.

TEXTURAL CLASSES, SOIL

Loamy Soils. The texture of the mineral particles less than 2 mm in diameter is loamy very fine sand or finer, but the amount of clay is less than 35 percent by weight and the amount of rock fragments is less than 35 percent by volume.

Clayey Soils. The mineral particles less than 2 mm in diameter contains 35 percent or more clay by weight and the rock fragment content is less than 35 percent by volume.

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APPENDIX I - Laboratory Data

This appendix presents laboratory data for a few selected soils in the inventory area. Table 10 summarizes the physical properties and Table 11 gives the chemical properties of these soils. Data in the tables are useful to soil scientists in classifying soils and in forming concepts of soil genesis. They also are helpful in estimating the water capacity, erosion susceptibility and fertility of soils that suggest soil management techniques and practices for multiple-use planning.

PHYSICAL PROPERTIES FOR SELECTED SOILS

Soil Series Symbol	Soil Name	Sample Number and Location	Depth From Surface	Horizon	-----PARTICLE SIZE DISTRIBUTION (percentage)-----										MOISTURE HELD AT:	
					very coarse	coarse	medium	fine	very fine	total	Silt	Clay	Textural Class	1/3 Bar	15 Bars	
371	Unnamed	S71-ORE-10-3 (1-4) NW $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 29, T. 31 S., R. 7 W.	0-3	A1	5.20	5.8	5.4	12.4	12.6	41.3	43.4	15.3	Loam	--	8.2	
			3-9	B1	4.80	5.8	5.1	13.0	13.1	41.7	40.3	18.0	Loam	--	9.2	
			9-24	B2	3.30	5.7	5.2	0.8	24.6	39.7	38.8	21.5	Loam	--	8.4	
			24-34	B3	3.70	5.5	5.1	6.8	18.2	39.5	39.8	20.7	Loam	--	9.2	
380	Pollard	S71-ORE-10-4 (1-5) SW $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 29, T. 31 S., R. 7 W.	0-6	A1	4.50	3.9	3.6	8.6	8.5	29.1	43.8	27.7	Clay loam	--	12.7	
			6-15	B1	2.50	4.1	3.7	8.2	8.4	27.0	42.7	30.4	Clay loam	--	12.7	
			15-28	B21t	2.80	3.1	3.2	0.7	3.9	23.5	37.2	39.3	Clay loam	--	18.8	
			28-48	B22t	2.10	3.2	3.7	5.4	7.7	22.1	28.7	49.2	Clay	--	22.5	
48-70	B3	1.10	1.7	2.0	0.8	3.4	19.1	32.6	48.4	Clay	--	22.7				
380	Pollard	S71-ORE-10-2 (1-5) NW $\frac{1}{2}$ SW $\frac{1}{4}$ Sec. 11, T. 31 S., R. 8 W.	0-6	A1	4.80	5.4	3.4	1.0	11.2	25.8	34.9	39.3	Clay loam	--	18.9	
			6-12	B1	4.40	4.3	2.9	5.0	6.0	22.5	35.5	42.0	Clay	--	23.4	
			12-28	B21t	2.90	3.7	2.4	4.6	5.5	18.9	23.5	57.6	Clay	--	30.2	
			28-40	B22t	2.90	3.4	2.3	1.0	7.9	17.5	26.4	56.2	Clay	--	29.6	
40-70	B3	4.20	5.0	3.5	3.5	9.2	25.3	20.1	54.6	Clay	--	28.7				
721	Siskiyou	S71-ORE-17-1 (1-5) NW $\frac{1}{2}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 36, T. 35 S., R. 6 W.	0-4	A1	1.06	16.1	11.3	17.6	13.8	59.8	29.3	10.9	Sandy loam	29.5	9.9	
			4-11	A3	1.47	17.9	11.8	8.6	22.0	61.8	29.1	9.2	Sandy loam	21.1	6.3	
			11-19	B2	1.41	17.6	12.0	17.4	12.3	60.7	30.7	8.6	Sandy loam	18.7	5.6	
			19-31	C1	0.89	16.7	11.5	17.6	13.2	59.9	31.9	8.2	Sandy loam	19.1	5.5	
31-40	C2	1.24	20.9	12.8	21.5	14.2	70.7	20.5	8.8	Sandy loam	--	6.4				
722	Holland	S71-ORE-17-2 (1-7) NW $\frac{1}{2}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 4, T. 36 S., R. 6 W.	0-4	A1	1.60	16.2	10.8	16.1	11.6	56.3	30.0	13.7	Sandy loam	23.7	6.8	
			4-8	A3	1.40	14.5	11.0	0.9	26.6	54.5	32.9	12.5	Sandy loam	--	6.0	
			8-14	B1	0.60	13.2	10.5	11.2	15.9	52.4	29.9	17.7	Sandy loam	20.0	6.9	
			14-28	B21t	0.80	11.5	9.5	10.8	15.1	47.7	28.2	24.1	Sandy clay loam	21.8	10.8	
28-34	B22t	1.10	13.5	10.5	15.2	12.7	53.0	28.2	18.9	Sandy loam	--	10.1				
34-49	B3	2.40	18.9	11.5	16.2	12.4	61.4	27.0	11.6	Sandy loam	--	--				
49-60	C1	1.30	15.3	11.4	18.0	14.1	60.1	28.6	11.3	Sandy loam	--	--				
*741	Freezner	SE $\frac{1}{2}$ SE $\frac{1}{4}$ Sec. 21, T. 28 S., R. 2 E.	0-9	A1	4.90	8.9	3.2	6.2	5.5	28.7	47.1	24.2	Loam	--	14.9	
			9-16	B1	1.00	4.2	2.6	6.0	5.6	19.4	46.7	33.9	Clay loam	--	22.5	
			16-24	B21t	0.70	2.4	1.9	5.0	5.3	15.3	41.2	43.5	Silty clay	--	24.9	
			24-32	B22t	0.40	2.7	2.1	5.2	5.0	15.4	33.3	46.3	Clay	--	26.5	
32-45	B23t	0.50	2.6	2.5	5.6	5.1	16.3	39.5	44.2	Clay	--	26.8				
45-56	B3t	0.80	3.3	3.0	6.6	6.3	20.0	41.5	38.5	Clay loam	--	26.0				
56-72	C1	1.10	4.1	3.7	7.5	7.2	23.6	39.2	37.2	Clay loam	--	21.2				
*750	Dumont	NE $\frac{1}{2}$ NE $\frac{1}{4}$ Sec. 10, T. 29 S., R. 1 E.	0-4	A11	5.50	8.7	4.7	9.0	6.3	34.2	47.7	18.1	Loam	--	15.3	
			4-9	A12	3.60	8.1	4.7	8.6	6.8	31.8	45.8	22.6	Loam	--	11.9	
			9-14	B1	3.60	7.3	4.3	8.0	5.8	29.0	43.0	28.0	Clay loam	--	11.8	
			14-22	B21t	4.50	6.8	4.1	7.0	5.4	27.8	42.1	20.1	Clay loam	--	12.9	
22-35	B22t	3.80	4.2	3.1	5.9	4.6	21.6	35.3	43.1	Clay	--	17.0				
35-45	B23t	2.60	3.6	2.9	6.1	5.0	20.2	34.3	45.5	Clay	--	18.0				
45-52	B24t	1.80	2.7	2.2	4.8	4.2	15.7	32.4	51.9	Clay	--	21.8				
52-62	B25t	0.70	1.4	2.4	4.5	1.4	10.4	33.5	56.1	Clay	--	30.1				
62-72	C	0.50	1.7	2.7	10.6	8.7	24.2	37.9	37.9	Clay loam	--	26.9				

*Data taken from South Umpqua Area Soil Survey (Ref. 15).

Soil Series Symbol	Soil Name	Sample Number and Location	Depth From Surface	Horizon	Soil Reaction (Water 1:1) (pH)	Organic Matter (percent)	Phosphorous (PPM)	Ca	Mg	Na	K	EXTRACTABLE CATIONS meq/100g OF SOIL	H ⁺ Acidity	Cation Exchange Capacity meq/100g	Percent Base Saturation/
371	Unnamed	S71-ORE-10-3 (1-4) NW $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 29, T. 31 S., R. 7 W.	0-3	A1	5.6	2.20	23	5.10	1.40	0.05	0.56	8.3	15.41	46.1	
			3-9	B1	5.6	4.30	30	7.10	1.70	0.07	0.56	11.5	20.93	45.1	
			9-24	B2	5.7	1.20	7	4.40	1.30	0.10	0.63	13.1	19.53	32.9	
			24-34	B3	5.7	1.40	5	5.10	1.50	0.10	0.58	16.3	23.58	44.7	
380	Pollard	S71-ORE-10-4 (1-5) SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 29, T. 31 S., R. 7 W.	0-6	A1	5.4	4.50	9	5.10	1.70	0.07	1.00	13.9	21.77	36.2	
			6-15	B1	5.5	1.40	3	2.40	1.50	0.05	0.92	10.0	14.87	32.8	
			15-28	B21t	5.5	0.90	3	2.00	2.40	0.10	0.90	11.1	16.40	32.7	
			28-48	B22t	5.4	0.40	2	0.68	2.10	0.10	0.69	13.2	16.77	21.3	
48-70	B3	5.4	0.30	2	0.17	1.90	0.10	0.46	15.0	17.63	14.9				
380	Pollard	S71-ORE-10-2 (1-5) NW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 11, T. 31 S., R. 8 W.	0-6	A1	4.7	6.30	3	8.50	0.35	0.07	0.34	18.9	28.16	30.4	
			6-12	B1	4.9	4.30	2	0.34	0.42	0.05	0.36	19.4	20.57	4.9	
			12-28	B21t	5.2	1.80	2	0.68	0.56	0.05	0.51	18.1	19.90	9.0	
			28-40	B22t	5.4	0.80	2	0.17	0.21	0.05	0.28	17.0	17.70	4.0	
40-70	B3	5.3	1.00	2	0.17	0.28	0.02	0.31	17.3	18.08	4.3				
721	Siskiyou	S71-ORE-17-1 (1-5) NW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 3, T. 35 S., R. 6 W.	0-4	A1	6.5	6.73	177	12.20	1.30	0.10	0.58	11.0	25.18	56.3	
			4-11	A3	6.3	2.68	82	5.10	0.56	0.07	0.46	6.7	12.89	48.0	
			11-19	B2	6.0	0.81	21	3.40	0.56	0.07	0.36	4.9	9.29	47.3	
			19-31	C1	6.0	--	9	4.10	0.90	0.10	0.31	4.0	9.41	57.5	
31-40	C2	5.8	--	--	7.80	2.20	0.14	0.31	4.0	14.45	72.3				
722	Holland	S71-ORE-17-2 (1-7) NW $\frac{1}{4}$ SE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 4, T. 36 S., R. 6 W.	0-4	A1	6.3	3.64	63	6.40	1.40	0.10	0.42	6.3	14.62	56.9	
			4-8	A3	6.0	0.96	21	3.70	1.10	0.10	0.22	4.1	9.22	55.5	
			8-14	B1	5.9	0.71	9	3.40	1.50	0.10	0.11	4.1	9.21	55.5	
			14-28	B21t	5.6	--	2	4.70	3.60	0.14	0.07	4.3	12.81	66.4	
28-34	B22t	5.7	--	--	5.70	4.30	0.24	0.07	4.2	14.51	71.1				
34-49	B3	5.5	--	2	7.40	5.10	0.19	0.03	3.1	15.82	80.4				
49-60	C1	5.8	--	--	8.10	4.90	0.24	0.03	3.0	16.27	81.6				
2/741	Freezner	SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 21, T. 28 S., R. 2 E.	0-9	A1	5.4	2.30	--	9.80	3.10	0.10	0.90	20.8	39.80	40.0	
			9-16	B1	5.2	0.77	--	10.20	4.20	0.20	0.80	18.7	37.40	45.0	
			16-24	B21t	5.2	0.49	--	11.30	4.80	0.20	0.90	17.6	38.10	49.0	
			24-32	B225	5.1	0.23	--	11.60	5.20	0.10	1.10	16.4	37.80	52.0	
32-45	B23t	5.0	0.20	--	11.40	5.30	0.10	1.20	16.3	39.50	52.0				
45-56	B3t	5.1	0.14	--	10.80	5.40	0.20	1.20	16.4	38.50	52.0				
56-72	C1	5.2	0.20	--	8.60	4.70	0.20	1.20	17.6	36.50	47.0				
2/750	Dumont	NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 10, T. 29S., R. 1 E.	0-4	A11	6.4	4.47	--	14.50	1.90	0.10	1.00	18.5	33.40	49.0	
			4-9	A12	5.8	1.50	--	4.60	1.60	0.10	0.70	13.5	21.20	34.0	
			9-14	B1	5.6	0.69	--	4.40	1.20	0.10	0.70	11.1	18.00	37.0	
			14-22	B21t	5.4	0.41	--	5.00	2.10	0.40	0.40	9.4	18.80	46.0	
22-35	B22t	5.4	0.20	--	3.80	2.20	0.10	0.30	13.6	20.70	32.0				
35-45	B23t	5.3	0.11	--	3.90	2.40	0.10	0.30	13.4	22.90	33.0				
45-52	B24t	5.3	0.08	--	3.90	2.80	0.10	0.30	19.0	34.10	27.0				
52-62	B25t	5.0	0.12	--	4.80	5.00	0.10	0.40	37.1	51.20	22.0				
62-72	C	4.8	0.18	--	2.80	5.70	0.10	0.30	37.6	45.00	19.0				

1/By the sum of the cations.

2/Data taken from South Umpqua Area Soils Survey Report (Ref. 15).

APPENDIX II - Soil Classification

Soils are classified to help soil scientists and others remember and understand their significant characteristics. Classification enables scientists to assemble knowledge of the soils, to see the relationship between them and the whole environment and to develop principles that help to understand their behavior and their response to management. First, through classification and then through use of soil maps, knowledge of soils can be applied to specific management units and other tracts of land.

Soils are placed in narrow categories for organization and application of knowledge about their behavior within recreation areas, planning units or districts. They are placed in broad categories for study and comparison of large areas such as countries and continents.

The classification system consists of 6 categories. Beginning with the most inclusive or most generalized, these categories are: order, suborder, great group, subgroup, family and series. All soils of the world are classified in only 10 classes at the order level, whereas, there are about 8,000 soil series in the United States alone.

The placement of soil series from the area into families and subgroups is given in Table 12. The subgroup names can also be used to determine the classification at the great group, suborder and order levels of generalization. The last word in the subgroup name is the name of the great group. For example, Typic Xerochrepts, Dystric Xerochrepts and Lithic Xerochrepts are three different subgroups of the Xerochrept great group. The last two syllables of the great group name are the suborder name. Ochrepts, Xerolls and Xerults are the most common suborders in this area. The last syllable of the suborder name refers to the order. Ochrepts are from the order Inceptisols, Xerolls are from the order Mollisols, and Xerults are from the order Ultisols.

Soils of the inventory area are classified in 5 of the 10 orders: Inceptisols, Mollisols, Alfisols, Ultisols and Vertisols. Inceptisols are young soils in which horizons have definitely started to develop. Mollisols have relatively thick, dark-colored surface horizons with 1 percent or more organic matter and a high base saturation (mollic epipedon). Alfisols are soils that have either light-colored surface horizons with a subsoil layer of clay accumulation (argillic horizon) or intermediate to high base saturation, or have dark-colored surface horizons of intermediate base saturation. Ultisols have distinct horizons with moderate or strong development. They contain a subsoil layer of clay accumulation (argillic horizon) that has a low base saturation. Vertisols are soils that shrink to develop large cracks when dry and show evidence of churning and mixing when swelled during the wet season.

Each order is subdivided into suborders, primarily on the basis of those soil characteristics that show the greatest genetic similarity. The suborders have a narrower climatic range than the orders. Criteria for suborders mostly reflect the presence or absence of a seasonal high-water table or soil differences resulting from the climate or vegetation.

Each suborder is divided into great groups on the basis of uniformity in the kinds and sequences of major soil horizons and features. Examples of horizons used to make separations are those in which clay or humus have accumulated. Soil temperature, soil moisture and major differences in chemical composition are examples of features used.

Great groups are subdivided into subgroups. One of the subgroups represents the central (typic) segment of a great group and the others, called intergrades, contain those soils having properties of that great group but also one or more properties of soils in another great group, suborder or order. The names of subgroups are derived by placing one or more adjectives before the name of the great group. An example of a subgroup is Dystric Lithic Xerochrepts.

Each subgroup is divided into families primarily on the basis of properties important to the growth of plants or behavior of soils when used for engineering purposes. Some important properties used are texture, coarse-fragment content, mineralogy and soil temperature. An example is the loamy-skeletal, mixed, mesic family of Dystric Lithic Xerochrepts.

The series consists of groups of soils that are formed from a particular kind of parent material and have genetic horizons that, except for the texture of the surface soil, are similar in differentiating characteristics and in their arrangement in the soil profile. Among these characteristics are: color, structure, depth, chemical reaction and mineralogical chemical composition.

PLACEMENT OF SOIL SERIES IN THE SOILS CLASSIFICATION SYSTEM

TABLE

SOIL SERIES	FAMILY	SUBGROUP
(36) Witzel	loamy-skeletal, mixed, mesic	Lithic Ultic Haploxeroll
370	loamy-skeletal, mixed, mesic	Dystric Xerochrept
371	loamy-skeletal, over fragmental, mixed, mesic	Typic Xerochrept
372	loamy-skeletal, mixed, mesic	Lithic Xerochrept
(380) Pollard	fine, mixed, mesic	Typic Haploxerult
381	clayey-skeletal, mixed, mesic	Typic Haploxerult
382	clayey-skeletal, mixed, mesic	Typic Haploxerult
701	loamy-skeletal, mixed, mesic	Lithic Xerochrept
(704) Carney	very fine, montmorillonitic, mesic	Typic Chromoxerert
705	clayey-skeletal, mixed, mesic	Pachic Ultic Argixeroll
(706) Medco	very fine, mixed, mesic	Ultic Haploxeroll
(710) Coker	very fine, montmorillonitic, mesic	Chromic Pelloxerert
(712) Jumpoff	fine, mixed, mesic	Ultic Haploxeralf
(715) Brader	fine-loamy, mixed, mesic, shallow	Typic Xerochrept
(716) Debenger	fine-loamy, mixed, mesic	Typic Xerochrept
(718) Beekman	loamy-skeletal, mixed, mesic	Typic Xerochrept
(719) Manzanita	fine, mixed, mesic	Typic Haploxeralf
(721) Siskiyou	coarse-loamy, mixed, mesic	Typic Xerochrept
(722) Holland	fine-loamy, mixed, mesic	Ultic Haploxeralf
(731) Straight	loamy-skeletal, mixed, mesic	Dystric Xerochrept
732	loamy-skeletal, mixed, mesic	Dystric Lithic Xerochrept
(740) Geppert	loamy-skeletal, mixed, mesic	Pachic Ultic Haploxeroll
(741) Freezner	fine, mixed, mesic	Ultic Haploxeralf
(745) Laurelhurst	fine, montmorillonitic, mesic	Pachic Ultic Haploxeroll
(750) Dumont	clayey, kaolinitic, mesic	Typic Haploxerult
(770) Pearsoll	clayey-skeletal, serpentinitic, mesic	Lithic Xerochrept
(781) Colestine	fine-loamy, mixed, mesic	Typic Xerochrept
790	clayey-skeletal, montmorillonitic, mesic	Pachic Argixeroll
806	loamy-skeletal, mixed, frigid	Lithic Xerumbrept
809	loamy-skeletal, mixed, frigid	Typic Xerumbrept
810	loamy-skeletal, mixed, frigid	Pachic Xerumbrept
824	loamy-skeletal, over fragmental, mixed, frigid	Dystric Xerochrept
825	loamy-skeletal, over fragmental, mixed, frigid	Dystric Lithic Xerochrept
840	fine, mixed, frigid	Pachic Argixeroll
842	clayey-skeletal, mixed, frigid	Pachic Argixeroll
850	very fine, montmorillonitic, frigid	Ultic Haploxeroll
(861) Rogue	coarse-loamy, mixed, frigid	Typic Xerochrept
880	fine-loamy, mixed, frigid	Pachic Ultic Argixeroll
882	loamy-skeletal, mixed, frigid	Pachic Ultic Argixeroll

MISCELLANEOUS LAND TYPES

(1) Alluvial Land	unclassified
(R) Rock Land	unclassified

APPENDIX III - Technical Soil Series Descriptions

This appendix describes the soil series of the District in numerical order. The soils are described in detail following the national format and procedures for official soil series descriptions.

The classification, soil profile and site location only were recorded for those soils occurring in the survey area that previously have been described by the Soil Conservation Service or by other BLM districts. New series identified by the BLM are written in a manner to include all characteristics and information required for official correlation.

(36) WITZEL SERIES

Classification: Loamy-skeletal, mixed, mesic, Lithic Ultic Haploxeroll.

Typifying Pedon: Witzel very cobbly loam - grassland
(Colors are for moist soil unless otherwise noted.)

- A1 0-4"--Dark brown (7.5YR 3/2) very cobbly loam, brown (7.5YR 5/4) dry; moderate fine granular structure; hard, friable, slightly sticky, slightly plastic; many roots; many very fine and fine irregular pores; 50 percent cobbles and gravel; medium acid (pH 6.0); clear smooth boundary. (2-6" thick)
- B21 4-9"--Dark brown (7.5YR 3/2) very cobbly clay loam, brown (7.5YR 5/4) dry; moderate fine subangular blocky structure; hard, firm, sticky, plastic; many roots, common very fine tubular pores; 60 percent cobbles and gravel; medium acid (pH 6.0); gradual wavy boundary. (3-10" thick)
- B22 9-19"--Dark reddish brown (5YR 3/4) very cobbly clay loam, reddish brown (5YR 5/4) dry; weak medium subangular blocky structure; hard, friable, sticky, plastic; many roots; common very fine tubular pores; 60 percent cobbles and pebbles; medium acid (pH 5.8); abrupt wavy boundary. (0-12" thick)
- IIR 19-21"--Fractured andesite bedrock.

Location: Jackson County, Oregon; about 2 miles east of Medford in NE $\frac{1}{2}$ Section 23, T. 37 S., R. 1 W., Willamette Meridian.

Series Established: Benton County (Benton Area), Oregon, 1970.

370 SERIES

Classification: Loamy-skeletal, mixed, mesic, Dystric Xerochrept.

Typifying Pedon: 370 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- A1 0-2"--Dark brown (7.5YR 3/2) gravelly loam, brown (10YR 5/3) dry; weak very fine granular structure; soft, loose, nonsticky, nonplastic; many fine roots; many very fine irregular pores; 25 percent gravel; slightly acid (pH 6.3); abrupt smooth boundary. (2-3" thick)
- B1 2-10"--Brown (7.5YR 4/4) gravelly clay loam, light brown (7.5YR 6/4) dry; weak fine granular structure; soft, very friable, nonsticky, slightly plastic; many fine roots; many very fine tubular pores; 25 percent gravel; medium acid (pH 6.0); clear smooth boundary. (5-10" thick)
- B2 10-26"--Brown (7.5YR 4/4) gravelly clay loam, light brown (7.5YR 6/4) dry; weak medium to fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine roots; many fine tubular pores; 40 percent gravel and cobbles; medium acid (pH 6.0); clear wavy boundary. (8-18" thick)
- B3 26-60"--Yellowish brown (10YR 5/4) gravelly clay loam, very pale brown (10YR 7/4) dry; weak medium and fine subangular blocky structure; hard, friable, slightly sticky, plastic; few fine roots; common fine tubular pores; 45 percent gravel and cobbles; medium acid (pH 5.8); gradual wavy boundary. (24-35" thick)
- C1 60-70"+--Yellowish brown (10YR 5/4) very gravelly clay loam, very pale brown (10YR 7/4) dry; massive; hard, friable, slightly sticky, slightly plastic; few fine roots; few fine tubular pores; 60 percent gravel and cobbles; medium acid (pH 5.8).

Location: Curry County, Oregon; about 19 miles west of Glendale, Oregon; SW $\frac{1}{2}$ NE $\frac{1}{2}$ Section 17, T. 32 S., R. 9 W., Willamette Meridian.

Series Proposed: Douglas County (Roseburg District, BLM), Oregon, 1971.

371 SERIES

Classification: Loamy-skeletal, mixed, mesic, Dystric Xerochrept.

Typifying Pedon: 371 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Layer of leaves, needles, twigs and moss.
- A1 0-5"--Dark brown (10YR 4/3) gravelly loam, light gray (10YR 7/7) dry; weak very fine granular structure; soft, loose, nonsticky, nonplastic; many fine roots; many very fine and fine irregular pores; 40 percent gravel; slightly acid (pH 6.2); clear wavy boundary. (2-8" thick)

- B1 5-24"--Yellowish brown (10YR 5/4) very gravelly loam, light gray (10YR 7/2) dry; weak fine and medium subangular blocky structure; soft, friable, nonsticky, nonplastic; many fine roots; many fine and very fine tubular pores; 50 percent gravel and cobbles; medium acid (pH 6.0); clear wavy boundary. (13-21" thick)
- B2 24-34"--Brownish yellow (10YR 6/6) very gravelly loam, yellow (10YR 7/6) dry; weak fine and medium subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; common fine roots; many fine tubular pores; 50 percent gravel and cobbles; medium acid (pH 5.9); clear irregular boundary. (4-14" thick)

Location: Josephine County, Oregon; SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 1, T. 38 S., R. 7 W., Willamette Meridian.

Series Proposed: Douglas County (Roseburg District, BLM), Oregon, 1971.

372 SERIES

Classification: Loamy-skeletal, mixed, mesic, Dystric Lithic Xerochrept.

Typifying Pedon: 372 gravelly loam - open forest
(Colors are for moist soil unless otherwise noted.)

- A1 0-4"--Dark brown (10YR 3/3) gravelly loam, brown (10YR 5/3) dry; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many fine roots; many very fine irregular pores; 25 percent gravel; medium acid (pH 5.8); clear smooth boundary. (2-5" thick)
- B2 4-18"--Brown (10YR 4/4) very gravelly loam, light yellowish brown (10YR 6/4) dry; slightly hard, friable, nonsticky, nonplastic; many fine roots; many fine and very fine pores; 55 percent gravel; medium acid (pH 5.6); clear wavy boundary. (10-16" thick)
- R 18"--Fractured metamorphic rock.

Location: Douglas County, Oregon; NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 27, T. 32 S., R. 9 W., Willamette Meridian.

Series Proposed: Douglas County (Roseburg District, BLM), Oregon, 1971.

(380) POLLARD SERIES

Classification: Fine, mixed, mesic, Typic Haploxerult.

Typifying Pedon: Pollard loam - forested
(Colors are for moist soil unless otherwise noted.)

- O1 1-0"--Litter of moss, leaves, needles and twigs.
- A1 0-3"--Dark brown (7.5YR 3/2) loam, brown (7.5YR 4/4) dry; weak fine granular, soft, very friable, nonsticky, nonplastic; common fine and medium roots; many irregular pores; 5 percent gravel; slightly acid (pH 6.4); abrupt wavy boundary. (1-4" thick)
- B1 3-9"--Brown (7.5YR 4/4) clay loam, brown (7.5YR 5/4) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium and few large roots; many irregular pores; 15 percent gravel; slightly acid (pH 6.2); clear wavy boundary. (4-8" thick)
- B21t 9-19"--Yellowish red (5YR 4/6) clay, light reddish brown (5YR 6/4) dry; moderate medium subangular blocky structure; hard, friable, sticky, plastic; common fine and few medium roots; many very fine tubular pores; common thin clay films; 5 percent gravel; few black stains; medium acid (pH 6.0); clear smooth boundary. (10-15" thick)
- B22t 19-30"--Yellowish red (5YR 4/6) clay, light reddish brown (5YR 6/4) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; common fine and few medium roots; many very fine tubular pores; common thin and few moderately thick clay films; 5 percent gravel; common black stains; medium acid (pH 6.0); gradual smooth boundary. (15-33" thick)
- B23t 30-47"+--Red (2.5YR 4/6) clay, red (2.5YR 5/6) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine and medium roots; many very fine tubular pores; few thin and moderately thick clay films; common black stains; medium acid (pH 5.8).

Location: Douglas County, Oregon; SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 12, T. 32 S., R. 8 W., Willamette Meridian.

Series Proposed: Douglas County (Roseburg District, BLM), Oregon, 1971.

381 SERIES

Classification: Clayey-skeletal, mixed, mesic, Typic Haploxerult.

Typifying Pedon: 381 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- All 0-3"--Dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 5/2) dry; weak fine granular structure; loose, nonsticky, nonplastic; many fine and medium roots; many irregular pores; 25 percent gravel; slightly acid (pH 6.4); abrupt wavy boundary. (1-4" thick)

- A12 3-7"--Dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 5/4) dry; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; many fine and medium roots; many irregular pores; 25 percent gravel; slightly acid (pH 6.2); clear wavy boundary. (2-4" thick)
- B1 7-14"--Brown (7.5YR 4/4) gravelly clay loam, strong brown (7.5YR 5/6) dry; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many fine and common medium roots; many fine and very fine tubular pores; 25 percent gravel and 5 percent cobbles; slightly acid (pH 6.2); abrupt smooth boundary. (5-10" thick)
- B21t 14-20"--Reddish brown (5YR 4/4) gravelly clay, yellowish red (5YR 5/6) dry; moderate, medium subangular blocky structure; hard, friable, sticky, plastic; many fine and few medium roots; many fine and very fine tubular pores; common thin and few moderately thick clay films; 30 percent gravel and 10 percent cobbles; medium acid (pH 6.0); clear smooth boundary. (4-10" thick)
- B22t 20-34"--Yellowish red (5YR 4/6) very gravelly clay, yellowish red (5YR 5/6) dry; hard, firm, sticky, plastic; common fine and few medium roots; many fine tubular pores; common thin and moderately thick clay films; 40 percent gravel and 10 percent cobbles; medium acid (pH 5.8); gradual wavy boundary. (8-20" thick)
- R 34"+--Fractured soft and hard metamorphic bedrock.

Location: Douglas County, Oregon; NW¹/₄NW¹/₄ Section 9, T. 32 S., R. 5 W., Willamette Meridian.

Series Proposed: Douglas County (Roseburg District, BLM), Oregon, 1971.

382 SERIES

Classification: Clayey-skeletal, mixed, mesic, Typic Haploxerult.

Typifying Pedon: 382 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Litter of leaves, needles, twigs and small branches.
- A11 0-1"--Dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 5/2) dry; weak fine granular structure; loose, nonsticky, nonplastic; many fine and medium, and few large roots; many irregular pores; 30 percent gravel; slightly acid (pH 6.5); abrupt smooth boundary. (1-2" thick)
- A12 1-5"--Dark brown (7.5YR 4/4) gravelly clay loam, light brown (7.5YR 6/4) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many

- fine and common medium roots; many irregular pores; 35 percent gravel and 5 percent cobbles; slightly acid (pH 6.4); clear smooth boundary. (4-6" thick)
- B1 5-11"--Brown (7.5YR 4/4) gravelly clay loam, pink (7.5YR 7/4) dry; weak medium subangular blocky structure; hard, friable, slightly sticky, plastic; many fine and common medium roots; many very fine tubular pores; 35 percent gravel and 5 percent cobbles; slightly acid (pH 6.2); clear wavy boundary. (5-10" thick)
- B2t 11-46"--Yellowish red (5YR 5/6) very gravelly clay, pink (5YR 7/4) dry; weak medium and coarse subangular blocky structure; hard, firm, sticky, plastic; common fine and few medium roots; many very fine and fine tubular pores; continuous moderately thick clay film on ped faces and in pores; 40 percent gravel and 10 percent cobbles; medium acid (pH 6.0); gradual wavy boundary. (18-40" thick)
- B3t 46-74"--Yellowish red (5YR 5/6) very gravelly silty clay, pink (5YR 7/4) dry; weak medium subangular blocky structure; hard, firm, sticky, plastic, many fine and very fine tubular pores; many moderately thick clay films on ped faces and in pores; 50 percent gravel and 10 percent cobbles; medium acid (pH 6.0); gradual wavy boundary. (25-35" thick)
- C1 74-86"--Yellowish red (5YR 5/6) very gravelly silty clay, pink (5YR 7/4) dry; massive; hard, firm, sticky, plastic; common fine and very fine pores; 50 percent gravel and 15 percent cobbles; medium acid (pH 5.8).

Location: Curry County, Oregon; NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 30, T. 32 S., R. 9 W., Willamette Meridian.

Series Proposed: Douglas County (Roseburg District, BLM), Oregon, 1971.

701 SERIES

The 701 series is a member of the loamy-skeletal, mixed, mesic family of Lithic Xerochrepts. Typically, 701 soils have thin dark brown very gravelly loam A horizons and dark grayish brown very gravelly loam B horizons over bedrock.

Typifying Pedon: 701 gravelly loam - forest and grass
(Colors are for moist soil unless otherwise noted.)

- O1 1-0"--Forest litter of leaves, needles and twigs.
- A1 0-4"--Dark brown (10YR 3/3) gravelly loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; slightly hard, very friable, nonsticky, slightly plastic; many medium roots; many fine irregular pores; 30 percent gravel and 5 percent cobbles; neutral (pH 6.6); clear smooth boundary. (3-6" thick)

- B1 4-8"--Dark grayish brown (10YR 4/2) gravelly loam, brown (10YR 5/3) dry; weak fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many medium roots; many fine tubular pores; 35 percent gravel and 10 percent cobbles; slightly acid (pH 6.4); clear smooth boundary. (3-8" thick)
- B2 8-13"--Dark grayish brown (10YR 4/2) very gravelly loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; hard, friable, slightly sticky, plastic; many medium roots; many fine tubular pores; 35 percent gravel and 10 percent cobbles; slightly acid (pH 6.2); abrupt smooth boundary. (4-8" thick)
- R 13"--Metamorphic bedrock; upper 2 inches is paralithic.

Type Location: Jackson County, Oregon; NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 17, T. 37 S., R. 4 W., Willamette Meridian.

Range in Characteristics: Mean annual soil temperature ranges from 47° to 52° F. The soils usually are dry in the control section for more than 60 consecutive days during the summer. The soils are moist during the winter months. Depth to bedrock is 12 to 20 inches. The textures usually are very gravelly loam throughout, but some subsoils are very gravelly clay loam. Gravel and cobble content ranges from 35 to 70 percent. Color hue of the A horizon is 10YR, value is 2 or 3 moist and 4 or 5 dry, and chroma is 2 or 3 moist and 2 or 3 dry. The B horizon has hue of 10YR or 7.5YR, value of 3 or 4 moist and 5 to 7 dry, and chroma of 3 or 4 moist and dry. It has weak fine or weak medium subangular blocky structure.

Competing Series and Their Differentiae: These are the Vena, Witzel and Winberry series. Vena soils are moderately deep. Witzel soils have a mollic epipedon. Winberry soils have a frigid temperature regime.

Setting: The 701 soils occur on steep to very steep foothills at elevations between 1,200 and 4,000 feet. Most areas are on south-facing slopes. Slope gradients range from 35 to 85+ percent. The soils formed in colluvium from medisedimentary and medivolcanic rocks. The summers are warm and dry and the winters are cool and moist. Mean annual precipitation is 20 to 35 inches. The mean annual air temperature ranges from 45° to 54° F.; the mean January temperature centers on 37° F.; and the mean July temperature centers on 70° F. The frost-free period ranges from 120 to 180 days.

Principal Associated Soils: These are the Beekman, Colestine and Manzanita soils. The Beekman and Colestine soils are moderately deep. The Manzanita soils are deep, clayey and reddish colored.

Drainage and Permeability: Well drained; medium to rapid runoff; moderate to moderately rapid permeability.

Use and Vegetation: Water supply, wildlife and timber production. Present vegetation is black oak, madrone, Douglas-fir, ponderosa pine, trailing blackberry, wedgeleaf ceanothus and grasses.

Distribution and Extent: The southeastern Siskiyou Mountains, Oregon. The series is of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

(704) CARNEY SERIES

Classification: Very fine, montmorillonitic, mesic, Typic Chromoxerert.

Typifying Pedon: Carney clay - pasture
(Colors for moist soil unless otherwise noted.)

- All 0-1½"--Dark brown (10YR 3/3) clay, dark grayish brown (10YR 4/2) dry; strong fine granular structure; very firm, very sticky, very plastic; abundant fine roots; many fine interstitial pores; neutral (pH 7.2); clear smooth boundary. (1-2" thick)
- A12 1½-6"--Dark brown (10YR 3/3) clay, dark grayish brown (10YR 4/2) dry; strong fine and medium subangular structure; very firm, very sticky, very plastic; abundant fine roots; many fine interstitial pores; neutral (pH 7.2); clear smooth boundary. (4-6" thick)
- AC 6-12"--Dark brown (10YR 3/3) clay, dark grayish brown (10YR 4/2) dry; moderate coarse prismatic breaking to strong coarse and medium angular blocky structure; appears massive when wet; extremely hard, firm, very sticky, very plastic, few fine roots; common very fine tubular pores; neutral (pH 7.0); clear smooth boundary. (5-7" thick)
- C1 12-35"--Dark brown (10YR 3/3) clay, dark grayish brown (10YR 4/2) dry; massive with vertical cracks 6-18" apart; extremely hard, very firm, very sticky, very plastic; intersecting slickensides; few fine roots; common fine tubular pores; neutral (pH 7.0); abrupt smooth boundary. (22-28" thick)
- IIR 35"--Yellow, massive, micaceous, tuffaceous Eocene Umpqua formation sandstone that is calcareous in the fractures.

Type Location: Location is 500 feet south of Section Line and 170 feet east of Agate Road centerline, 50 feet south of driveway, NE¼NW¼ Section 5, T. 36 S., R. 2 W., Willamette Meridian, Jackson County, Oregon.

Series Proposed: Jackson County, Oregon, Soil Survey 1967.

705 SERIES

The 705 series is a member of the clayey-skeletal, montmorillinitic, mesic family of Pachic Ultic Argixerolls. Typically, 705 soils have dark reddish brown, cobbly clay loam A horizons and dark reddish brown, very cobbly clay B horizons over andesite bedrock.

Typifying Pedon: 705 cobbly clay loam - range and forest
(Colors are for moist soil unless otherwise noted.)

- A1 0-2"--Dark reddish brown (5YR 2/2) cobbly clay loam, brown (7.5YR 4/2) dry; weak medium granular structure; slightly hard, friable, sticky, plastic; many fine and very fine roots; many very fine pores; 10 percent gravel and 15 percent cobbles; neutral (pH 6.8); abrupt smooth boundary. (2-3" thick)
- A3 2-7"--Dark reddish brown (5YR 2/2) cobbly clay loam, brown (7.5YR 4/2) dry; weak medium, subangular blocky structure; hard, firm, sticky, plastic; common fine roots; many very fine pores; 15 percent gravel and 20 percent cobbles; slightly acid (pH 6.4); clear wavy boundary. (2-8" thick)
- B21t 7-22"--Dark reddish brown (5YR 3/2) very cobbly clay, brown (7.5YR 4/2) dry; strong medium subangular blocky structure; very hard, firm, sticky, very plastic; common fine and medium roots; many very fine tubular pores; common thin clay film; 20 percent gravel, 35 percent cobbles and 10 percent stones; slightly acid (pH 6.3); gradual wavy boundary. (7-15" thick)
- B22t 22-31"--Dark brown (7.5YR 3/2) very gravelly clay, brown (7.5YR 4/2) dry; strong coarse subangular blocky structure; extremely hard, very firm, very sticky, very plastic; few fine and medium roots; many very fine tubular pores; many moderately thick clay films; 25 percent gravel, 15 percent cobbles and 5 percent stones; medium acid (pH 6.0); abrupt wavy boundary. (8-16" thick)
- R 31"--Andesite bedrock; first 3 inches are saprolitic.

Type Location: Jackson County, Oregon; SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 12, T. 41 S., R. 3 E., Willamette Meridian.

Range in Characteristics: The mean annual soil temperature ranges from 47° to 54° F. Soils usually are moist but dry in the control section for 60 consecutive days or more during the summer months. The depth to andesite bedrock ranges from 20 to 40 inches. The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 moist and 4 or 5 dry, and chroma of 2 or 3 moist and 2 to 4 dry. It is loam or clay loam with coarse fragments ranging from 20 to 35 percent. The B22t horizon has hue of 5YR or 7.5 YR, value of 3 or 4 moist and 4 or 5 dry, and chroma of 2 to 5 moist and dry. It is clay or heavy clay loam with coarse fragments ranging from 35 to 75 percent.

Competing Series and Their Differentiae: They are the Carney and Debenger series. Carney soils have fewer than 35 percent coarse fragments and have profiles that open and close each year. Debenger soils have ochric epipedons and are medium textured.

Setting: The 705 soils are on moderately sloping to very steep foothills and mountain slopes at elevations of 1,200 to 4,000 feet. Slope gradients range from 10 to 85+ percent. The soils formed in colluvium from basic volcanic rocks. The summers are warm and dry and the winters are cool and moist. Mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature is 50° to 54° F.; the mean January temperature centers on 36° F.; and the mean July temperature centers on 72° F. The frost-free period is 140 to 170 days.

Principal Associated Soils: They are the Witzel, Medco and Laurelhurst series. Witzel soils are less than 20 inches deep to bedrock. Medco soils are moderately well drained. Laurelhurst soils are deeper than 40 inches to bedrock.

Drainage and Permeability: Well drained; rapid runoff; slow permeability.

Use and Vegetation: Grazing, wildlife, timber production and water supply. Vegetation is white oak, black oak, madrone, ponderosa pine, Douglas-fir, poison oak and Idaho fescue.

Distribution and Extent: Western Cascades in southwestern Oregon. The series is of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

(706) MEDCO SERIES

Classification: Very fine, mixed, mesic, Ultic Haploxeroll.

Typifying Pedon: Medco gravelly loam - range
(Colors are for moist soil unless otherwise noted.)

- A1 0-5"--Dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 4/2) dry; moderate fine and very fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine, medium and large roots; many irregular pores; 15 percent pebbles and 5 percent cobbles; slightly acid (pH 6.4); clear smooth boundary. (4-6" thick)
- A3 5-13"--Dark brown (7.5YR 3/2) clay loam, brown (7.5YR 4/2) dry; moderate fine and very fine subangular blocky structure; hard, firm, sticky, plastic; many fine, medium and large roots; 10 percent pebbles and 5 percent cobbles; slightly acid (pH 6.2); abrupt smooth boundary. (6-9" thick)
- IIB21 13-23"--Brown (7.5YR 4/3) clay, brown (7.5YR 5/2) dry; weak coarse angular blocky structure; extremely hard, extremely firm, very

sticky, very plastic; few fine and medium roots; few very fine pores; few slickensides; 10 percent pebbles; medium acid (pH 6.0); clear smooth boundary. (7-10" thick)

IIB22 23-27"--Brown (7.5YR 4/4) gravelly clay, brown (7.5YR 5/3) dry; massive; extremely hard, extremely firm, very sticky, very plastic; few fine and medium roots; few intersecting slickensides; 20 percent pebbles; medium acid (pH 6.0); abrupt smooth boundary. (7-15" thick)

IIIC 27-36"--Brown (7.5YR 4/4) saprolite from volcanic breccia; common black stains in fractures; medium acid (pH 5.8).

Type Location: Jackson County, Oregon; $\frac{1}{4}$ mile north of Oregon Highway 62 on the Lost Creek Access Road in the SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 23, T. 33 S., R. 1 E., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1972.

(710) COKER SERIES

Classification: Very fine, montmorillonitic, mesic, Chromic Pelloxerert.

Typifying Pedon: Coker clay - cultivated
(Colors are for moist soil unless otherwise noted.)

Ap 0-4"--Very dark gray (10YR 3/1) clay, dark gray (10YR 4/1) dry; strong fine and very fine granular structure; extremely hard, extremely firm, very sticky, very plastic; many fine and very fine roots; many interstitial pores; neutral (pH 7.0); abrupt smooth boundary. (3-5" thick)

A12 4-10"--Very dark gray (10YR 3/1) clay, dark gray (10YR 4/1) dry; weak medium and coarse angular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few pressure faces; many fine and very fine roots; common very fine tubular pores; neutral (pH 7.2); clear smooth boundary. (5-7" thick)

A13 10-20"--Very dark gray (10YR 3/1) clay, dark gray (10YR 4/1) dry; moderate coarse and medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; common slickensides; common fine and very fine roots; common very fine tubular pores; neutral (pH 7.2); gradual smooth boundary. (5-15" thick)

A14 20-33"--Very dark gray (10YR 3/1) clay, dark gray (10YR 4/1) dry; moderate coarse and medium prismatic structure; extremely hard, extremely firm, very sticky, very plastic; common slickensides; common fine roots; common very fine tubular pores; few small soft lime masses; mildly alkaline (pH 7.8); clear wavy boundary. (10-15" thick)

- AC 33-46"--Dark grayish brown (10YR 4/2) clay, grayish brown (10YR 5/2) dry; common tongues of very dark gray (10YR 3/1 and dark gray (10YR 4/1) dry; weak coarse prismatic structure; extremely hard, extremely firm, very sticky, very plastic; many intersecting slickensides; common fine roots; few very fine tubular pores; few small soft lime masses; moderately alkaline (pH 8.0); gradual wavy boundary. (12-18" thick)
- C1 46-59"--Dark grayish brown (10YR 4/2) clay, grayish brown (10YR 5/2) dry; massive; extremely hard, extremely firm, very sticky, very plastic; many intersecting slickensides; common fine roots; few very fine tubular pores; common small soft lime masses; moderately alkaline (pH 8.4); gradual wavy boundary. (10-18" thick)
- C2 59-70"--Dark grayish brown (10YR 4/2) clay, grayish brown (10YR 5/2) dry; massive; extremely hard, extremely firm, very sticky, very plastic; few fine roots; few very fine tubular pores; common soft lime masses; moderately alkaline (pH 8.4).

Type Location: Jackson County, Oregon; in pear orchard south of Corey Road, three rows south of road and 24 tree rows east of irrigation ditch in NW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 27, T. 36 S., R. 1 W., Willamette Meridian.

Series Established: Jackson County, Oregon, 1911.

(712) JUMPOFF SERIES

Classification: Fine, mixed, mesic, Ultic Haploxeralf.

Typifying Pedon: Jumpoff gravelly clay loam - forested
(Colors are for moist soil unless otherwise noted.)

- O1 1-0"--Litter of leaves, needles and twigs.
- A11 0-2"--Very dark grayish brown (10YR 3/2) gravelly clay loam, dark grayish brown (10YR 4/2) dry; weak fine granular structure; slightly hard, friable, nonsticky, slightly plastic; many very fine roots; many irregular pores; 30 percent gravel; slightly acid (pH 6.4); abrupt smooth boundary. (1-3" thick)
- A12 2-5"--Dark grayish brown (10YR 4/2) gravelly clay loam, light brownish gray (10YR 6/2) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium roots; many very fine tubular pores; 30 percent gravel; slightly acid (pH 6.4); clear smooth boundary. (2-5" thick)
- Blt 5-15"--Brown (10YR 5/3) clay, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; hard, firm, sticky, plastic; common fine and medium roots; many very fine tubular pores; many thin clay films; 10 percent gravel; slightly acid (pH 6.2); clear wavy boundary. (5-10" thick)

- B21t 15-22"--Strong brown (7.5YR 5/6) clay, light brown (7.5YR 6/4) dry; common fine faint brown (10YR 5/3) and yellowish brown (10YR 5/4) mottles; moderate medium subangular blocky structure; very hard, firm, sticky, plastic; few medium and coarse roots: common very fine tubular pores; continuous thick clay films; slightly acid (pH 6.2); gradual smooth boundary. (5-12" thick)
- B22t 22-34"--Brown (10YR 5/3) clay, pale brown (10YR 6/3) dry; common medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse subangular blocky structure; very hard, very firm, very sticky, very plastic; few medium and coarse roots; common very fine tubular pores; continuous thick clay films; slightly acid (pH 6.2); gradual smooth boundary. (10-15" thick)
- B3t 34-52"--Brown (10YR 5/3) clay, pale brown (10YR 6/3) dry; common medium distinct strong brown (7.5YR 5/6) mottles; moderate coarse prismatic structure; very hard, very firm, very sticky, very plastic; few fine tubular pores; continuous thick clay films; slightly acid (pH 6.4); clear smooth boundary. (15-25" thick)
- C1 52-60"--Saprolite from metamorphic bedrock.

Location: Josephine County, Oregon; NE $\frac{1}{4}$ NE $\frac{1}{4}$ Section 16, T. 34 S., R. 5 W., Willamette Meridian.

Series Proposed: Josephine County, Oregon, 1973.

(715) BRADER SERIES

Classification: Fine-loamy, mixed, mesic, shallow, Typic Xerochrept.

Typifying Pedon: Brader loam - range
(Colors are for moist soil unless otherwise noted.)

- A1 0-4"--Dark brown (7.5YR 3/4) loam, brown (7.5YR 4/4) dry; weak fine granular structure; hard, friable, slightly sticky, slightly plastic; many fine roots; slightly acid (pH 6.0); clear wavy boundary. (2-6" thick)
- B2 4-13"--Dark brown (7.5YR 3/4) clay loam, brown (7.5YR 4/4) dry; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few fine roots; slightly acid (pH 6.0); abrupt wavy boundary. (8-18" thick)
- C1 13-16"--Variegated yellowish brown (10YR 5/6) and brown (7.5YR 4/4) weathered sandstone; massive.
- R 16-20"--Partially consolidated sandstone.

Type Location: Jackson County, Oregon; SW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 25, T. 35 S., R. 2 W., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1967.

(716) DEBENGER SERIES

Classification: Fine-loamy, mixed, mesic, Typic Xerochrept.

Typifying Pedon: Debenger loam - range
(Colors are for moist soil unless otherwise noted.)

- A11 0-5"--Dark brown (7.5YR 3/4) loam, brown (7.5YR 5/4) dry; moderate medium platy structure; friable, slightly sticky, slightly plastic; abundant roots; abundant interstitial pores; slightly acid (pH 6.2); clear smooth boundary. (4-6" thick)
- A12 5-9"--Reddish brown (5YR 4/4) loam, reddish brown (5YR 5/4) dry; moderate coarse platy and moderate medium subangular blocky structure; friable, slightly sticky, slightly plastic; abundant fine roots; many fine interstitial pores; slightly acid (pH 6.2); clear smooth boundary. (3-5" thick)
- B21 9-18"--Reddish brown (5YR 4/4) clay loam, yellowish red (5YR 4/6) dry; moderate medium subangular blocky structure; firm, sticky, plastic; few fine roots; common very fine tubular pores; medium acid (pH 6.0); clear smooth boundary. (5-15" thick)
- B22 18-27"--Yellowish red (5YR 4/6) clay loam, yellowish red (5YR 4/6) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots; common very fine tubular pores; medium acid (pH 5.9); abrupt smooth boundary. (8-20" thick)
- IIR 27-30"+--Partially decomposed Umpqua formation sandstone.

Type Location: Jackson County, Oregon; 1750 feet south, 220 feet west of NE corner of SE $\frac{1}{2}$ NW $\frac{1}{4}$ Section 14, T. 35 S., R. 2 W., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1967.

(718) BEEKMAN SERIES

Classification: Loamy-skeletal, mixed, mesic, Typic Xerochrept.

Typifying Pedon: Beekman gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- A1 0-5"--Dark brown (10YR 3/3) gravelly loam, brown (10YR 5/3) dry; weak fine granular structure; soft, friable, nonsticky, slightly plastic; many fine and very fine and few medium roots; many interstitial pores; 40 percent angular pebbles; slightly acid (pH 5.2); clear smooth boundary. (2-8" thick)
- A3 5-14"--Dark brown (10YR 4/3) very gravelly loam, yellowish brown (10YR 5/4) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine

and very fine roots; many interstitial pores; 60 percent angular pebbles; medium acid (pH 6.0); gradual smooth boundary. (0-12" thick)

- B2 14-25"--Brown (10YR 4/3) very gravelly loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and medium and few coarse roots; many very fine tubular pores; 55 percent angular pebbles; slightly acid (pH 6.2). (10-24" thick)
- C 25-36"--Fractured metamorphosed bedrock.

Type Location: Josephine County, Oregon; about 3 miles southeast of Placer along the McCoy Creek Road in the NW $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 14, T. 34 S., R. 5 W., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1973.

(719) MANZANITA SERIES

Classification: Fine, mixed, mesic, Typic Haploxeralf.

Typifying Pedon: Manzanita loam - forested
(Colors are for moist soil unless otherwise noted.)

- All 0-4"--Dark brown (7.5YR 3/2) loam, brown (7.5YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine roots; many very fine tubular pores; slightly acid (pH 6.2); abrupt smooth boundary. (2-5" thick)
- A12 4-9"--Dark brown (7.5YR 3/3) loam, brown (7.5YR 5/3) dry; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; many fine tubular pores; slightly acid (pH 6.2); clear smooth boundary. (3-8" thick)
- B1 9-15"--Dark reddish brown (5YR 3/5) clay loam, reddish brown (5YR 5/4) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; common fine and very fine roots; many very fine tubular pores; few thin dark reddish brown (5YR 3/5) clay films; medium acid (pH 6.0); clear smooth boundary. (5-11" thick)
- B21t 15-26"--Yellowish red (5YR 3/6) heavy clay loam, yellowish red (5YR 4/6) dry; moderate fine and medium subangular blocky structure; very hard, firm, very sticky, very plastic; few fine and medium roots; many fine and very fine tubular pores; common thin and few moderately thick clay films; medium acid (pH 6.0); clear wavy boundary. (4-12" thick)

- B22t 26-40"--Yellowish red (5YR 3/6) heavy clay loam, yellowish red (5YR 4/6) dry; moderate fine subangular blocky structure; very hard, firm, very sticky, very plastic; few medium roots; many very fine and fine tubular pores; common thin and moderately thick (5YR 3/6) clay films; few black stains; medium acid (pH 5.8); clear smooth boundary. (12-20" thick)
- B3t 40-52"--Yellowish red (5YR 3/6) heavy clay loam, yellowish red (5YR 4/6) dry; weak medium subangular blocky structure; very hard, firm, very sticky, very plastic; common very fine tubular pores; common thin and few moderately thick (5YR 3/6) clay films; 5 percent partially weathered pebbles; few black concretions and common black stains; medium acid (pH 5.7). (10-14" thick)
- C 52-64"--Yellowish red (5YR 3/6) heavy clay loam, yellowish red (5YR 4/6) dry; massive; very hard, firm, sticky, plastic; few medium roots; many very fine and fine tubular pores; 20 percent weathered pebbles; few moderately thick (5YR 3/6) clay films in root channels; common black stains; medium acid (pH 5.7).

Location: Jackson County, Oregon; about 800 feet east of Griffin Creek Road and 200 feet south of Pioneer Road in the NE $\frac{1}{4}$ SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 11, T. 38 S., R. 2 W., Willamette Meridian.

Series Established: Clear Lake Area, California, 1927.

(721) SISKIYOU SERIES

Classification: Coarse-loamy, mixed, mesic, Typic Xerochrept.

Typifying Pedon: Siskiyou gravelly sandy loam - forested
(Colors are for moist soil unless otherwise noted.)

- A1 0-4"--Very dark grayish brown (10YR 3/2) gravelly sandy loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many very fine roots; many interstitial pores; 20 percent small pebbles; medium acid (pH 6.0); clear wavy boundary. (2-6" thick)
- AC1 4-11"--Dark brown (10YR 4/3) coarse sandy loam, very pale brown (10YR 7/3) dry; weak fine and medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common interstitial pores; common fine and medium roots; 15 percent small pebbles; medium acid (pH 5.6); clear wavy boundary. (0-9" thick)
- AC2 11-19"--Dark yellowish brown (10YR 4/4) coarse sandy loam, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; hard friable, nonsticky, nonplastic; few fine and medium roots; common interstitial pores; 15 percent small pebbles; medium acid (pH 5.6); clear wavy boundary. (0-9" thick)

- C1 19-31"--Yellowish brown (10YR 5/4) loamy coarse sand, light gray (10YR 7/2) dry; massive; hard, friable, nonsticky, nonplastic; few roots; common interstitial pores: 15 percent pebbles; medium acid (pH 5.6); clear wavy boundary. (8-15" thick)
- C2 31-36"--Pale brown (10YR 6/3) loamy coarse sand, light gray and white (10YR 7/2, 8/2) dry; massive; slightly hard, friable, nonsticky, nonplastic; few roots; common interstitial pores; strongly acid (pH 5.2); gradual wavy boundary. (4-10" thick)
- C3 36-46"--Granodiorite bedrock. Dark brown (7.5YR 4/4) stains in fractures.

Type Location: Josephine County, Oregon; about 2 miles northwest of Grants Pass and 500 feet northeast of the overpass where Frontage Road crosses Interstate 5 in NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 36, T. 35 S., R. 6 W., Willamette Meridian.

Series Established: Medford Area, Oregon, 1911.

(722) HOLLAND SERIES

Classification: Fine-loamy, mixed, mesic, Ultic Haploxeralf.

Typifying Pedon: Holland sandy loam - forested
(Colors are for moist soil unless otherwise noted.)

- O1 $\frac{1}{2}$ -0"--Duff layer.
- A1 0-4"--Dark grayish brown (10YR 4/2) sandy loam, light brownish gray (10YR 6/2) dry; weak fine and very fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; slightly acid (pH 6.2); abrupt smooth boundary. (2-6" thick)
- A3 4-8"--Brown (7.5YR 5/3) loam, very pale brown (10YR 7/3) dry; weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; slightly acid (pH 6.2); clear smooth boundary. (0-8" thick)
- B1 8-14"--Brown (7.5YR 5/4) loam, light brown (7.5YR 6/4) dry; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; medium acid (pH 5.8); clear wavy boundary. (4-12" thick)
- B21t 14-28"--Yellowish red (5YR 5/6) clay loam, reddish yellow (7.5YR 6/6) dry; moderate medium subangular blocky structure; very hard, firm, sticky, plastic; few roots; few moderately thick clay films (5YR 4/6); medium acid (pH 5.6); gradual wavy boundary. (10-20" thick)
- B22t 28-35"--Yellowish red (5YR 5/6) clay loam, very pale brown (10YR 7/4) with reddish yellow (5YR 6/6) coatings, dry; moderate

medium subangular blocky structure; very hard, firm, sticky, plastic; few roots; common moderately thick, red (2.5YR 4/6) clay films; medium acid (pH 5.6); gradual wavy boundary. (7-12" thick)

- B3 35-50"--Yellowish brown (10YR 5/6) coarse sandy clay loam, very pale brown (10YR 7/4) dry; weak medium subangular blocky structure; hard, friable, sticky, plastic; few roots; few moderately thick, red (2.5YR 4/6) clay films; strongly acid (pH 5.4); gradual wavy boundary. (14-25" thick)
- C 50-60"--Saprolite from granodiorite, moderately thick, red (2.5YR 4/6) clay films in fractures.

Location: Josephine County, Oregon; about 0.1 mile north of $\frac{1}{4}$ corner marker and 20 feet east of lane in NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 4, T. 36 S., R. 6 W., Willamette Meridian.

Series Established: Fresno Area, Oregon, 1912.

(731) STRAIGHT SERIES

Classification: Loamy-skeletal, mixed, mesic, Dystric Xerochrept.

Typifying Pedon: Straight gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 0-1"--Loose litter of needles, twigs, leaves and cones.
- A1 0-6"--Dark brown (7.5YR 4/4) gravelly loam, brown (7.5YR 5/2) dry; moderate fine and medium granular structure; soft, friable, non-sticky, nonplastic; many very fine to medium roots; many very fine and fine irregular pores; few black concretions; 30 percent gravel, 10 percent cobbles; medium acid (pH 6.0); clear smooth boundary. (3-7" thick)
- B21 6-20"--Reddish brown (5YR 4/4) very gravelly loam, light reddish brown (5YR 6/4) dry; weak fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common very fine to medium roots; many very fine and fine pores; few black concretions; 45 percent gravel and 15 percent cobbles; medium acid (pH 6.0); gradual wavy boundary. (7-17" thick)
- B22 20-36"--Reddish brown (5YR 4/4) very gravelly loam, light reddish brown (5YR 6/4) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine to coarse roots; many very fine and fine pores; 45 percent gravel and 15 percent cobbles; medium acid (pH 5.8); clear wavy boundary. (10-18" thick)
- C 36"--Strongly weathered reddish colored tuff and breccia bedrock.

Location: Jackson County, Oregon: near spur logging road in NE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 23, T. 32 S., R. 1 W., Willamette Meridian.

Series Proposed: Douglas County (South Umpqua Area), Oregon, 1958.

732 SERIES

The 732 series is a member of the loamy-skeletal, mixed, mesic family of Dystric Lithic Xerochrepts. Typically, 732 soils have dark brown very gravelly loam A horizons, and brown very gravelly loam B horizons over hard volcanic bedrock.

Typifying Pedon: 732 very gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

A1 0-4"--Dark brown (7.5YR 3/2) very gravelly loam, pinkish gray (7.5YR 6/2) dry; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine to coarse roots; many fine irregular pores; 50 percent gravel and 15 percent cobbles; slightly acid (pH 6.4); clear smooth boundary. (3-9" thick)

B2 4-16"--Brown (7.5YR 4/4) very cobbly loam, light brown (7.5YR 6/4) dry; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many very fine to coarse roots; many fine tubular pores; 20 percent gravel and 50 percent cobbles; medium acid (pH 6.0); abrupt wavy boundary. (7-13" thick)

IIR 16"--Hard, fractured andesite with roots and soil material in cracks.

Type Location: Jackson County, Oregon; NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 23, T. 32 S., R. 1 W., Willamette Meridian.

Range in Characteristics: Mean annual soil temperature ranges from 47° to 52° F. The soils usually are dry in the control section for more than 60 consecutive days during the summer. The soils are moist during the winter months. Depth to bedrock ranges from 12 to 20 inches. The textures usually are gravelly loam throughout, but some subsoils are gravelly clay loam. Coarse-fragment content ranges from 20 to 50 percent gravel and 15 to 50 percent cobbles. The A horizon has chroma of 2 or 3 moist and value of 6 or 7 dry. The B2 or AC horizon, where present, has moderate, fine and medium subangular blocky or weak to moderate granular structure.

Competing Series and Their Differentiae: These are the Henline, Prong and McMullin series. They are all dark colored. Henline and Prong soils have cryic temperature regimes. The McMullin soils have fewer than 35 percent coarse fragments in the control section.

Setting: The 732 soils have steep to very steep slopes in mountainous areas of the western Cascades at elevations of 2,000 to 4,000 feet; slope

gradients dominantly are 50 to 80 percent but range from 35 to over 90 percent. The soils formed in colluvium weathered from igneous rocks, dominantly andesite, tuffs and breccia. The climate is subhumid with cool, wet winters and hot, dry summers. The mean annual precipitation is 35 to 55 inches. The mean annual air temperature is about 47° to 52° F.; the mean January temperature centers on 35° F; and the mean July temperature centers on 68° F. The frost-free period ranges from 100 to 150 days.

Principal Associated Soils: These are the Straight and Freezner soils. Straight soils have a paralithic contact at depths of 20 to 40 inches. Freezner soils have fine-textured argillic horizons. There are numerous areas of rock land associated with 732 soils.

Drainage and Permeability: Well drained; medium to rapid runoff; moderate permeability.

Use and Vegetation: Water supply, wildlife and timber production. Present vegetation mainly is ponderosa pine, madrone, incense-cedar, Douglas-fir and an understory of chinquapin, oceanspray, serviceberry and blackberry.

Distribution Extent: The west side of the southern Cascade Mountains, Oregon. The series is of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

(740) GEPPERT SERIES

Classification: Loamy-skeletal, mixed, mesic, Pachic Ultic Haploxeroll.

Typifying Pedon: Geppert cobbly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 ½-0"--Partially decomposed litter of needles, leaves and twigs.
- A11 0-4"--Dark reddish brown (5YR 2/2) cobbly loam, dark brown (7.5YR 3/3) dry; weak fine subangular blocky and moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; many fine and very fine and few medium roots; irregular pores; 25 percent cobbles and 15 percent pebbles; neutral (pH 6.6); clear smooth boundary. (2-8" thick)
- A12 4-13"--Dark reddish brown (5YR 3/3) cobbly loam, dark brown (7.5YR 3/3) dry; weak medium subangular blocky parting to moderate fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and few medium roots; many interstitial pores; 30 percent cobbles and 15 percent pebbles; slightly acid (pH 6.4); clear smooth boundary. (4-10" thick)
- B21 13-24"--Dark reddish brown (5YR 3/3) very cobbly clay loam, dark reddish gray (5YR 4/2) dry; moderate medium subangular blocky

structure; hard, friable sticky, plastic; common fine and medium and few coarse roots; many very fine tubular pores; 50 percent cobbles and 15 percent pebbles; slightly acid (pH 6.4); clear wavy boundary. (6-15" thick)

B22 24-30"--Dark reddish brown (5YR 3/3) very cobbly clay loam, dark reddish gray (5YR 4/2) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few fine roots; common very fine tubular pores; common black stains on rock fragments; 60 percent cobbles and 20 percent pebbles; medium acid (pH 6.0); clear wavy boundary. (5-10" thick)

C 30-35"--Partially weathered andesite.

Type Location: Jackson County, Oregon; 2 miles north of Butte Falls and $\frac{1}{2}$ mile northwest of Fredenburg Ranch in the SE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 35, T. 34 S., R. 2 E., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1972.

(741) FREEZNER SERIES

Classification: Fine, mixed, mesic, Ultic Haploxeralf.

Typifying Pedon: Freezner gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

01 1-0"--Loose litter of leaves, needles and twigs.

A1 0-8"--Dark brown (7.5YR 4/4) gravelly loam, light brown (7.5YR 6/4) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine to medium roots; many very fine and fine pores; common white mycelia on faces of peds; many fine dark reddish brown and black concretions; strongly acid (pH 5.4); clear smooth boundary. (4-9" thick)

B1 8-15"--Brown (7.5YR 4/4) clay loam, light brown (7.5YR 6/4) dry; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine to coarse roots; many very fine and fine pores; few fine dark reddish brown and black concretions; strongly acid (pH 5.5); clear smooth boundary. (6-15" thick)

B21t 15-21"--Reddish brown (5YR 4/4) clay, yellowish red (5YR 5/6) dry; moderate medium and coarse subangular blocky structure; very hard, firm, very sticky, very plastic; few fine and very fine roots; common very fine and fine pores; nearly continuous moderately thick clay films on faces of peds and in pores; strongly acid (pH 5.4); gradual smooth boundary. (5-10" thick)

- B22t 21-42"--Yellowish red (5YR 5/6) clay, yellowish red (5YR 5/6) dry; strong medium and coarse subangular blocky structure; very hard, firm, very sticky, very plastic; few very fine roots; few very fine and fine pores; common moderately thick red (2.5YR 4/6) clay films on ped faces and in pores; strongly acid (pH 5.1); gradual smooth boundary. (20-25" thick)
- B3t 42-60"--Brown (7.5YR 4/4) heavy clay loam, reddish yellow (7.5YR 6/6) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; few very fine roots; few very fine pores; common thin yellowish red (5YR 4/6) clay films on ped faces; few fine black stains; very strongly acid (pH 5.0).

Location: Jackson County, Oregon; near spur logging road in NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 12, T. 33 S., R. 1 W., Willamette Meridian.

Series Established: Douglas County (South Umpqua Area), Oregon, 1974.

(745) LAURELHURST SERIES

Classification: Fine, montmorillonitic, mesic, Pachic Ultic Haploxeroll.

Typifying Pedon: Laurelhurst silty clay - forested
(Colors are for moist soil unless otherwise noted.)

- A1 0-8"--Very dark brown (10YR 2/2) silty clay, very dark brown (10YR 2/2) dry; strong fine and very fine granular structure; slightly hard, friable, sticky, plastic; common fine and very fine roots; many irregular pores; 10 percent hard pebbles; neutral (pH 6.8); clear smooth boundary. (6-10" thick)
- B1 8-25"--Very dark brown (10YR 2/2) clay, dark brown (7.5YR 4/2) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; common fine and very fine roots; many very fine pores; 5 percent hard pebbles; neutral (pH 6.8); clear smooth boundary. (12-30" thick)
- B21 25-36"--Dark brown (7.5YR 3/2) clay, dark brown (7.5YR 4/2) dry; weak medium subangular blocky structure; very hard, firm, very sticky, very plastic; common medium and coarse and few fine roots; few very fine pores; few small pressure faces; 5 percent hard pebbles; neutral (pH 6.6); clear smooth boundary. (8-15" thick)
- B22 36-44"--Dark brown (7.5YR 3/2) clay, brown (7.5YR 4/2) dry; weak medium subangular blocky structure; very hard, firm, very sticky, very plastic; common medium and coarse roots; few very fine pores; common small pressure faces; 15 percent weathered pebbles; slightly acid (pH 6.4). (6-10" thick)
- C 44-48"--Weathered volcanic tuff bedrock.

Type Location: Jackson County, Oregon; about 7 miles northeast of Ashland in the SW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 34, T. 38 S., R. 2 E., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1955.

(750) DUMONT SERIES

Classification: Clayey, kaolinitic, mesic, Typic Haploxerult.

Typifying Pedon: Dumont loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Litter of twigs, needles, leaves and grass.
- A11 0-5"--Dark reddish brown (5YR 3/2) loam, reddish brown (5YR 4/4) dry; weak fine and medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many irregular pores; 10 percent shot-like fragments 1-3 mm.; medium acid (pH 6.0); clear wavy boundary. (3-6" thick)
- A12 5-8"--Dark reddish brown (5YR 3/3) loam, reddish brown (5YR 4/4) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine to medium roots; common very fine and fine tubular pores: 10 percent shot-like fragments 1-3 mm.; medium acid (pH 5.8); clear wavy boundary. (3-6" thick)
- B1 8-19"--Dark reddish brown (2.5YR 3/4) clay loam, reddish brown (5YR 4/4) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common very fine to medium roots; many very fine tubular pores; few shot-like fragments; medium acid (pH 5.8); clear wavy boundary. (0-11" thick)
- B21t 19-27"--Dark reddish brown (2.5YR 3/4) clay, yellowish red (5YR 4/6) dry; moderate fine and very fine subangular blocky structure; hard, firm, sticky, plastic; few very fine to medium roots; few fine and very fine tubular pores; few fine concretions; common thin clay films; medium acid (pH 5.6); clear smooth boundary. (7-10" thick)
- B22t 27-50"+--Dark reddish brown (2.5YR 3/4) clay, yellowish red (5YR 4/6) dry; moderate medium and coarse subangular blocky structure; hard, firm, sticky, plastic; few very fine to medium roots; few fine and very fine pores; few fine concretions; few black stains; common thin clay films; medium acid (pH 5.6).

Location: Jackson County, Oregon; SE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 9, T. 34 S., R. 3 E., Willamette Meridian.

Series Established: Douglas County (South Umpqua Area), Oregon, 1974.

(770) PEARSOIL SERIES

Classification: Clayey-skeletal, serpentinitic, mesic, Lithic Xerochrept.

Typifying Pedon: Pearsoll very gravelly clay loam - range
(Colors are for moist soil unless otherwise noted.)

- A1 0-5"--Dark reddish brown (5YR 3/3) very gravelly clay loam, reddish brown (5YR 4/4) dry; moderate fine and very fine subangular blocky structure; very hard, friable sticky, plastic; common fine and very fine and few medium roots; common irregular pores; 40 percent angular pebbles and 20 percent cobbles; slightly acid (pH 6.4); clear wavy boundary. (2-9" thick)
- B2 5-14"--Dark reddish brown (5YR 3/4) very cobbly clay, reddish brown (5YR 4/4) crushed, reddish brown (5YR 4/4) dry; weak medium subangular blocky structure; very hard, firm, very sticky, very plastic; few fine and very fine roots; common fine and very fine tubular pores; 65 percent cobbles and 15 percent pebbles; neutral (pH 6.6); abrupt wavy boundary. (7-15" thick)
- R 14"--Fractured serpentinite bedrock.

Type Location: Josephine County, Oregon; $\frac{1}{2}$ mile south of Waldo (site) and 50 feet above the Waldo Lookout Road in NW $\frac{1}{4}$ SE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 28, T. 40 S., R. 8 W., Willamette Meridian.

Series Proposed: Josephine County, Oregon, 1957.

(781) COLESTINE SERIES

Classification: Fine-loamy, mixed, mesic, Typic Xerochrept.

Typifying Pedon: Colestine gravelly silt loam - forested
(Colors are for moist soil unless otherwise noted.)

- A1 0-4"--Dark brown (10YR 3/3) gravelly silt loam, yellowish brown (10YR 5/4) dry; weak medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine roots; many interstitial pores; 40 percent hard angular pebbles; neutral (pH 6.8); abrupt smooth boundary. (2-6" thick)
- A12 4-12"--Dark brown (10YR 3/3) gravelly loam, yellowish brown (10YR 5/4) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and very fine and few medium and coarse roots; many fine and very fine tubular pores; 30 percent hard angular pebbles; slightly acid (pH 6.4); clear smooth boundary. (5-10" thick)
- B1 12-24"--Dark yellowish brown (10YR 4/4) gravelly clay loam, light yellowish brown (10YR 6/4) dry; moderate medium subangular

blocky structure; slightly hard, firm, slightly sticky, slightly plastic; few medium and coarse roots; common very fine tubular pores; 25 percent hard angular pebbles; slightly acid (pH 6.2); gradual smooth boundary. (5-15" thick)

B2 24-34"--Dark yellowish brown (10YR 4/4) gravelly clay loam, light yellowish brown (10YR 6/4) dry; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common fine and very fine tubular pores; common bleached sand and silt coatings on ped faces; 20 percent hard angular pebbles; slightly acid (pH 6.4); clear wavy boundary. (5-15" thick)

C 34-36"--Fractured partially weathered metamorphic bedrock.

Type Location: Josephine County, Oregon; about 1 mile southwest of Golden in SE $\frac{1}{4}$ NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 31, T. 33 S., R. 5 W., Willamette Meridian.

Series Proposed: Jackson County, Oregon, 1972.

790 SERIES

The 790 series is a member of the clayey-skeletal, montmorillonitic, mesic family of Pachic Argixerolls. Typically, 790 soils have very dark grayish brown, very gravelly clay loam A horizons and dark brown, very cobbly clay B horizons underlain by volcanic bedrock.

Typifying Pedon: 790 gravelly loam - range
(Colors are for moist soil unless otherwise noted.)

A11 0-3"--Very dark grayish brown (10YR 3/2) gravelly loam, grayish brown (10YR 5/2) dry; weak fine and medium granular structure; soft, very friable, slightly sticky, slightly plastic; many fine and very fine roots; many very fine pores; 15 percent gravel; neutral (pH 6.6); clear smooth boundary. (2-5" thick)

A12 3-8"--Very dark grayish brown (10YR 3/2) gravelly clay loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; slightly hard, friable, sticky, slightly plastic; common fine roots; many very fine pores; 20 percent gravel; neutral (pH 6.8); clear smooth boundary. (1-5" thick)

B1t 8-16"--Dark brown (7.5YR 3/2) very cobbly clay loam, dark grayish brown (10YR 4/2) dry; weak medium subangular blocky structure; very hard, firm, sticky, very plastic; common fine and medium roots; many very fine tubular pores; few thin clay films: 55 percent cobbles; neutral (pH 6.8); clear wavy boundary. (5-15" thick)

B2t 16-25"--Dark brown (7.5YR 3/2) very cobbly clay, dark brown (7.5YR 3/2) dry; strong coarse and medium subangular blocky structure;

extremely hard, very firm, very sticky, very plastic; few fine and medium roots; many very fine tubular pores; many moderately thick clay film; 55 percent cobbles; neutral (pH 6.6); clear wavy boundary. (8-16" thick)

R 25"--Andesite bedrock; first 2 inches are saprolitic.

Type Location: Klamath County, Oregon; SW $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 33, T. 40 S., R. 8 E., Willamette Meridian.

Range in Characteristics: Mean annual soil temperature ranges from 47° to 54° F. Soils usually are moist but are dry in all parts of the control section for more than 60 consecutive days and the mean annual soil temperatures exceed 41° F. Depth to andesite bedrock ranges from 20 to 40 inches. The sola are neutral or slightly acid. Some pedons are mildly alkaline in the lower part. The A horizon has 5 to 30 percent gravel and 0 to 10 percent cobbles and stones. It has hue of 10YR, value of 2 or 3 moist, 4 or 5 dry, and chroma of 2 or 3 moist or dry. The Bt horizon ranges from 45 to 65 total coarse fragments. It has hue of 10YR or 7.5YR, value of 2 or 3 moist and 3 to 5 dry, and chroma of 2 to 4 moist and dry. It is heavy clay loam or clay texture and has subangular blocky structure.

Competing Soils and Their Differentiae: These are the Carney and Booth series. Carney soils have fewer than 35 percent coarse fragments and have profiles that open and close each year. Booth soils have a frigid temperature regime.

Setting: The 790 soils occur on moderately steep to steep hillslopes above the Klamath Basin floor. They primarily are on southerly aspects between elevations of 4,000 to 5,000 feet. Slope gradients range from 10 to 60 percent. The soils are formed on consolidated volcanic tuff and tuffaceous breccia, andesite, basalt and welded tuffs. The climate is semiarid with about 12 to 16 inches average annual precipitation distributed mostly in winter and spring. The mean annual air temperature is 46° to 49° F. The frost-free period ranges from 90 to 120 days.

Principal Associated Soils: These are the 810, 880, 882 and Lorella series. The 810 and 880 and 882 soils are deeper than 40 inches to bedrock, have less than 35 percent clay in their subsoils and have a frigid temperature regime. The Lorella soils are less than 20 inches deep to bedrock.

Drainage and Permeability: Well drained; rapid runoff; slow permeability.

Use and Vegetation: Range, water supply and wildlife; native vegetation is juniper, big sagebrush, low sagebrush, currant, bluebunch wheatgrass, Idaho fescue and Sandberg bluegrass.

Distribution and Extent: Hills and plateaus in the southeastern part of the Cascade Mountains. The series is inextensive.

Series Proposed: Klamath County (Medford District, BLM), Oregon, 1974.

806 SERIES

The 806 series is a member of the loamy-skeletal, mixed, frigid family of Lithic Xerumbrepts. Typically, 806 soils have dark brown very gravelly loam A horizons and dark reddish brown very gravelly loam B horizons over hard volcanic bedrock.

Typifying Pedon: 806 very gravelly loam - grass and forest
(Colors are for moist soil unless otherwise noted.)

- A1 0-8"--Dark brown (7.5YR 3/2) very gravelly loam, dark brown (10YR 4/3) dry; weak fine and medium granular structure; soft, very friable, nonsticky, nonplastic; many roots; many fine and very fine irregular pores; 45 percent gravel and shot and 5 percent cobbles; slightly acid (pH 6.4); gradual wavy boundary. (3-8" thick)
- A3 8-13"--Dark brown (7.5YR 3/2) very gravelly loam, dark yellowish brown (10YR 4/4) dry; weak fine and medium subangular blocky structure; soft, friable, nonsticky, nonplastic; many roots; many fine and very fine tubular pores; 35 percent gravel and 15 percent cobbles; slightly acid (pH 6.3); gradual wavy boundary. (5-10" thick)
- B2 13-19"--Dark reddish brown (5YR 3/3) very gravelly loam, brown (7.5YR 5/4) dry; weak medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many roots; many fine and very fine tubular pores; 50 percent gravel and 20 percent cobbles; medium acid (pH 6.0); abrupt wavy boundary. (2-12" thick)
- IIR 19"--Hard andesite bedrock, partially fractured.

Type Location: Jackson County, Oregon; NE $\frac{1}{4}$ SW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 20, T. 38 S., R. 3 E., Willamette Meridian.

Range in Characteristics: Depth to a lithic contact is 12 to 20 inches. Mean annual soil temperature ranges from about 43° to 47° F. The soils usually are dry in the control section for more than 60 consecutive days during the summer. The soils are moist during the winter months. The textures usually are very gravelly or very cobbly loam throughout. Coarse-fragment content ranges from 35 to 75 percent in the control section. The soils are slightly to medium acid. The A horizon has hue of 7.5YR or 10YR, value of 2 or 3 moist and 4 or 5 dry and chroma of 2 or 3 moist and 2 through 4 dry. The B horizon has hue of 7.5YR or 5YR, value of 4 or 5 dry and chroma of 2 or 3 moist and 3 or 4 dry. It has weak to moderate subangular blocky structure. The bedrock is andesite or basalt which commonly is partially fractured.

Competing Series and Their Differentiae: These are the Witzel, Winberry and Yellowstone series. Witzel soils have a mesic temperature regime.

Winberry soils have an ochric epipedon. Yellowstone soils have sandy loam subsoils and a cryic temperature regime.

Setting: The 806 soils are on gentle to very steep slopes of the Cascade Mountains at elevations of 4,000 to 6,000 feet. Slope gradients range from 2 to 85 percent. The soils formed in colluvium mostly from light colored volcanic rocks. Winters are cold and moist and summers are cool and dry. Average annual precipitation ranges from 35 to 60 inches. The mean annual air temperature ranges from 41° to 49° F.; the mean January temperature centers on 30° F.; and the mean July temperature is about 58° F. The frost-free season ranges from 70 to 100 days.

Principal Associated Soils: These are the 809, 810, 840 and 882 soils. The 809 soils are moderately deep and the 810 soils are over 40 inches to bedrock. The 840 soils have fine textured argillic horizons and are deeper than 40 inches to bedrock.

Drainage and Permeability: Well drained; medium to rapid runoff; moderate permeability.

Use and Vegetation: Grazing and wildlife. Vegetation is white fir, Douglas-fir, black oak and grasses.

Distribution and Extent: Southern Cascade Mountains, Oregon. The series is of minor extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

809 SERIES

The 809 series is a member of the loamy-skeletal, mixed, frigid family of Typic Xerumbrepts. Typically, 809 soils have dark reddish brown gravelly loam A1 horizons, and brown very gravelly clay loam B2 horizons.

Typifying Pedon: 809 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Litter of needles and twigs.
- A1 0-5"--Dark reddish brown (5YR 3/2) gravelly loam, dark reddish brown (5YR 3/3) dry; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common fine and very fine roots; many irregular pores; 45 percent gravel; slightly acid (pH 6.4); clear smooth boundary. (3-6" thick)
- A3 5-17"--Dark reddish brown (5YR 3/3) gravelly loam, reddish brown (5YR 4/4) dry; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common fine and medium roots; many very fine irregular and tubular pores; 45 percent gravel; slightly acid (pH 6.2); gradual wavy boundary. (6-12" thick)

- B2 17-26"--Reddish brown (5YR 4/4) very gravelly clay loam, brown (7.5YR 5/4) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; many fine tubular pores; 50 percent gravel; medium acid (pH 6.0); gradual wavy boundary. (8-12" thick)
- C1 26-36"--Brown (7.5YR 4/4) very gravelly loam, brown (7.5YR 4/4) dry; massive; soft, friable, nonsticky, slightly plastic; few fine and medium roots; many irregular pores; 55 percent gravel and 5 percent cobbles; medium acid (pH 6.0); abrupt wavy boundary. (10-14" thick)
- C2 36-42"--Soft weathered andesite bedrock.

Type Location: Jackson County, Oregon; SW $\frac{1}{2}$ NW $\frac{1}{2}$ NW $\frac{1}{4}$ Section 33, T. 38 S., R. 4 E., Willamette Meridian.

Range in Characteristics: These soils are usually moist but dry during the summer months for 60 consecutive days or more in all parts between 4 and 12 inches. The mean annual soil temperature is 42° to 46° F. Depth to bedrock ranges from 20 to 40 inches. The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 moist and 3 to 5 dry, and chroma of 2 or 3 moist and dry. Weathered subrounded rock fragments range from 10 to 45 percent gravel and 0 to 15 percent cobbles. The B horizon has hue of 5YR or 7.5YR, value of 3 or 4 moist and 4 or 5 dry, and chroma of 3 or 4 moist and dry. It is loam or clay loam with partially weathered rock fragments ranging from 35 to 55 percent gravel and 0 to 20 percent cobbles.

Competing Soils and Their Differentiae: These are the Farva and Oatman series. Farva soils have an ochric epipedon. Oatman soils have a cryic temperature regime.

Setting: The 809 soils are on gently sloping ridge tops and moderately sloping to steep sideslopes of the Cascade Mountains at elevations of 3,500 to 6,000 feet. Areas less than 4,000 feet in elevation generally are on north slopes. Slopes range from 2 to 80 percent. The soils formed in colluvium from basic volcanic rocks. Winters are cold and moist and summers are cool and dry. Average annual precipitation ranges from 40 to 60 inches. The mean annual air temperature ranges from 43° to 47° F.; the mean January temperature centers on 30° F.; and the mean July temperature centers on 58° F. The frost-free period ranges from 70 to 100 days.

Principal Associated Soils: These are the 810 and 806 series. The 810 soils are deeper than 40 inches to bedrock. The 806 soils are 12 to 20 inches to bedrock.

Drainage and Permeability: Well drained; medium to rapid runoff; moderately rapid permeability.

Use and Vegetation: Soils are used for timber production, grazing, water supply, wildlife and recreation. Vegetation dominantly is white fir, Douglas-fir, Pacific yew, serviceberry, snowberry and bunchgrasses.

Distribution and Extent: Southern Cascades in southwestern Oregon and possibly northern California. The soils are of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

810 SERIES

The 810 series is a member of the loamy-skeletal, mixed, frigid family of Pachic Xerumbrepts. Typically, 810 soils have dark reddish brown gravelly and very gravelly loam A horizons, and dark brown very gravelly clay loam B2 horizons.

Typifying Pedon: 810 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Litter of needles and twigs.
- A1 0-6"--Dark reddish brown (5YR 3/2) gravelly loam, dark reddish gray (5YR 4/2) dry; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine pores; 35 percent gravel, 10 percent cobbles, 10 percent "shot" 1 to 3 mm.; medium acid (pH 6.0); clear wavy boundary. (4-8" thick)
- A3 6-22"--Dark reddish brown (5YR 3/3) very gravelly loam, reddish brown (5YR 4/4) dry; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common fine and coarse roots; many very fine tubular pores; 30 percent gravel, 10 percent cobbles, 20 percent stones; slightly acid (pH 6.5); gradual wavy boundary. (15-20" thick)
- B2 22-38"--Dark reddish brown (5YR 3/4) very gravelly clay loam, brown (7.5YR 5/4) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few fine and medium roots; many fine tubular pores; 30 percent gravel, 10 percent cobbles, 20 percent stones; slightly acid (pH 6.2); gradual wavy boundary. (15-20" thick)
- C1 38-50"--Reddish brown (5YR 4/4) cobbly clay loam, brown (7.5YR 5/4) dry; massive; hard, friable, slightly sticky, slightly plastic; few medium roots; many irregular pores; 15 percent cobbles, 5 percent gravel, 5 percent stones; medium acid (pH 6.0); abrupt smooth boundary. (10-12" thick)
- C2 50-54"--Soft weathered andesite bedrock.

Type Location: Jackson County, Oregon; near Hoxie Creek Road in NW $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 19, T. 38 S., R. 4 E., Willamette Meridian.

Range in Characteristics: These soils are usually moist but dry in the control section during the summer months for 60 consecutive days or more. The mean annual soil temperature is 42° to 47° F. Depth to a paralithic contact ranges from 20 to 40 inches. The amount of unweathered rock fragments in the control section ranges from 35 to 75 percent and includes 10 to 50 percent cobbles, 10 to 35 percent gravel, and 5 to 20 percent stones. The A1 horizon has hue of 5YR or 7.5YR, value of 2 or 3 moist and 4 or 5 dry, and chroma of 2 or 3 moist and 2 to 4 dry. The B horizon has hue of 5YR or 7.5YR, value of 3 or 4 moist and 4 or 5 dry, and chroma of 4 to 5 moist and dry. It is loam or clay loam. The C1 horizon is clay loam or loam.

Competing Series and Their Differentiae: These are the Holderman, Oatman and Henline series. The Holderman and Oatman soils have ochric epipedons. Oatman and Henline soils have cryic temperature regimes.

Setting: The 810 soils are on gently sloping to steep slopes of the Cascade Mountains at elevations of 3,500 to 6,000 feet. Areas less than 4,000 feet in elevation are generally on north-facing slopes. Slope gradients range from 2 to 60 percent. The soils formed in colluvium from basic volcanic rocks. Winters are cold and moist and summers are cool and dry. Average annual precipitation ranges from 40 to 60 inches. The mean annual air temperature ranges from 43° to 47° F.; the mean January temperature centers on 30° F.; and the mean July temperature centers on 58° F. The frost-free season ranges from 70 to 100 days.

Principal Associated Soils: These are the 806, 809, 880 and 882 series. The 806 and 809 soils are less than 40 inches to bedrock. The 880 and 882 soils have argillic horizons.

Drainage and Permeability: Well drained; medium runoff; moderately rapid permeability.

Use and Vegetation: Soils are used for timber production, grazing, water supply, wildlife and recreation. Vegetation dominantly is white fir, Douglas-fir, Pacific yew, serviceberry, snowberry and bunchgrasses.

Distribution and Extent: Southern Cascades of southwestern Oregon and possibly northern California. The soils are of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

824 SERIES

The 824 series is a member of the loamy-skeletal, mixed, frigid family of Dystric Xerochrepts. Typically, 824 soils have thin very dark grayish brown gravelly loam A horizons and yellowish brown gravelly and cobbly B horizons over altered sedimentary and volcanic bedrock.

Typifying Pedon: 824 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Undecomposed litter from grasses, needles, leaves and twigs.
- A11 0-2"--Very dark grayish brown (10YR 3/2) gravelly loam, grayish brown (10YR 5/2) dry; weak fine granular structure: soft, very friable, nonsticky, nonplastic; many fine roots; many irregular pores; 20 percent gravel; slightly acid (pH 6.2); abrupt smooth boundary. (1-2" thick)
- A12 2-6"--Very dark grayish brown (10YR 3/2) gravelly loam, brown (10YR 5/3) dry; weak medium and fine granular structure; soft, very friable, nonsticky, nonplastic; many fine and few medium roots; many irregular pores; 15 percent gravel; slightly acid (pH 6.2); clear smooth boundary. (3-6" thick)
- B1 6-12"--Dark yellowish brown (10YR 3/4) gravelly loam, yellowish brown (10YR 5/4) dry; weak medium subangular blocky parting to weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and few medium roots; common fine and medium tubular pores; 40 percent gravel and cobbles; slightly acid (pH 6.2); clear smooth boundary. (4-7" thick)
- B2 12-19"--Dark brown (7.5YR 4/4) gravelly light clay loam, light brown (7.5YR 6/4) dry; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common fine and few medium roots; common fine and medium tubular pores; 35 percent gravel and cobbles; slightly acid (pH 6.2); clear wavy boundary. (5-10" thick)
- B3 19-32"--Yellowish brown (10YR 5/6) gravelly light clay loam, very pale brown (10YR 7/3) dry; weak medium subangular blocky parting to weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common fine and few medium roots; common fine and very fine tubular pores; 35 percent gravel and cobble; medium acid (pH 5.8); gradual smooth boundary. (12-14" thick)
- C1 32-42"--Brownish yellow (10YR 6/6) gravelly heavy loam, very pale brown (10YR 7/4) dry; massive; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; few fine and very fine tubular pores; slightly acid (pH 6.2).

Type Location: Josephine County, Oregon; about 12 miles southwest of Applegate, Oregon, in the NW $\frac{1}{4}$ Section 10, T. 39 S., R. 6 W., Willamette Meridian, near logging road.

Range in Characteristics: The soils are usually moist but, in most years, they are dry between 4 and 12 inches for more than 60 consecutive days during the summer months. The mean annual soil temperature ranges from 44° to 46° F. Solum thickness ranges from 20 to 40 inches. Coarse fragments range from 35 to 50 percent throughout the solum with an accumulation

of gravel-sized fragments in the surface 5 or 6 inches. The A horizon has hue of 10YR or 7.5YR, value of 3 to 4 moist and 5 or 6 dry, and chroma of 2 to 4 moist and dry. Texture is gravelly loam. The B horizon has hue of 7.5YR or 10YR, value of 3 to 5 moist and 5 to 7 dry, and chroma of 3 to 6 moist and dry. Texture is gravelly clay loam or very cobbly clay loam.

Competing Series and Their Differentiae: These are the Trask, Straight, Coyata and Boze series. The Trask, Straight and Coyata soils have mesic temperature regimes. The Boze soils have fewer than 35 percent coarse fragments in the control section.

Setting: The 824 soils occur on steep to very steep hills at elevations of 3,500 to 5,000 feet. Slope gradients range from 35 to 75 percent. The regolith consists of moderately fine textured gravelly colluvium from metamorphic, volcanic and sedimentary rocks. The climate is characterized by cool, dry summers and cold, moist winters, with an annual precipitation of 30 to 50 inches. The mean annual air temperature is about 46° to 48° F.

Principal Associated Series: These include the 825 series. The 825 series is less than 20 inches deep.

Drainage and Permeability: Well drained; medium to rapid runoff; moderate permeability.

Use and Vegetation: Timber production, water supply and wildlife. The native vegetation includes white fir, Douglas-fir, madrone, snowbrush, Oregon grape and grasses.

Distribution and Extent: Southwestern Oregon and northern California. The series is of moderate extent.

Series Proposed: Josephine County (Medford District, BLM), Oregon, 1972.

825 SERIES

The 825 series is a member of the loamy-skeletal, mixed, frigid family of Dystric Lithic Xerochrepts. Typically, 825 soils have thin dark brown very gravelly loam A horizons and strong brown, very cobbly loam B horizons over metamorphic and sedimentary rock.

Typifying Pedon: 825 very gravelly loam - open forest
(Colors are for moist soil unless otherwise noted.)

A1 0-4"--Dark brown (7.5YR 4/4) very gravelly loam, light brown (7.5YR 6/4) dry; weak, very fine granular structure; soft, friable, nonsticky, nonplastic; many fine roots; few fine irregular pores; 40 percent gravel; medium acid (pH 5.8); clear smooth boundary. (2-4" thick)

B2 4-15"--Strong brown (7.5YR 5/6) very cobbly loam, pink (7.5YR 7/4) dry; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; many fine roots; many fine tubular pores; 50 percent gravel and cobbles; medium acid (pH 5.8); clear smooth boundary. (10-17" thick)

R 15"+--Fractured metamorphosed sandstone.

Type Location: Josephine County, Oregon; about 9 miles west of Mt. Peavine near logging road in NW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 18, T. 34 S., R. 9 W., Willamette Meridian.

Range in Characteristics: Depth to a lithic contact is 12 to 20 inches. Changes in depth occur erratically over a span of a few feet. The mean annual soil temperature ranges from 44° to 46° F. The soils usually are dry in all parts for 60 consecutive days or more during the summer months. Coarse fragments make up 35 to 70 percent of the profile. The textures usually are gravelly loam throughout but some subsoils are gravelly clay loam. The A horizons have hue of 10YR or 7.5YR, value of 3 to 5 moist and 5 or 6 dry, and chroma of 2 to 4 moist and 3 or 4 dry. The B horizons have hue of 10YR or 7.5YR, value of 4 or 5 moist and 6 or 7 dry, and chroma of 3 to 5 moist and 4 to 6 dry.

Competing Series and Their Differentiae: They are the Yellowstone, Yollabolly and Kilchis series. Yellowstone soils have umbric epipedons. Yollabolly soils are more acid and lack B horizons. Kilchis soils have a mesic temperature regime.

Setting: The 825 soils occur on steep to very steep hills at elevations of 3,500 to 6,000 feet. Slope gradients range from 35 to 90 percent. The regolith consists of medium textured gravelly colluvium from metamorphic and sedimentary rocks. The climate is characterized by cool, dry summers and cold, moist winters, with an annual precipitation of 30 to 50 inches. The mean annual air temperature is about 46° to 48° F. and the frost-free season is less than 110 days.

Principal Associated Series: This is the 824 series. The 824 series is moderately deep.

Drainage and Permeability: Well drained; medium to rapid runoff; moderate permeability.

Use and Vegetation: Timber production, water supply and wildlife. The native vegetation includes white fir, ponderosa pine, Douglas-fir, live oak, rhododendron, salal, princess pine and grasses.

Distribution and Extent: Southwestern Oregon and northern California. The series is of moderate extent.

Series Proposed: Josephine County (Medford District, BLM), Oregon, 1972.

840 SERIES

The 840 series is a member of the fine, mixed, frigid family of Pachic Argixerolls. Typically, 840 soils have very dark grayish brown gravelly loam and gravelly clay loam A horizons, and dark brown and dark yellowish brown clay loam and clay Bt horizons over dark yellowish brown clay loam C horizons.

Typifying Pedon: 840 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1½-0"--Layer of needles, twigs, leaves and branches.
- A11 0-5"--Very dark grayish brown (10YR 3/2) gravelly loam, dark grayish brown (10YR 4/2) dry; strong fine and very fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; many very fine tubular and many irregular pores; 20 percent gravel; neutral (pH 6.6); abrupt smooth boundary. (5-10" thick)
- A12 5-9"--Very dark grayish brown (10YR 3/2) clay loam, dark grayish brown (10YR 4/2); moderate fine and very fine subangular blocky structure; slightly hard, friable sticky, plastic; common fine and medium roots; many very fine tubular pores; 15 percent gravel; neutral (pH 6.6); clear smooth boundary. (4-8" thick)
- Blt 9-18"--Dark brown (7.5YR 3/2) clay loam, brown (7.5YR 4/2) dry; moderate medium and fine subangular blocky structure; hard, firm, sticky, plastic; common medium and few fine and coarse roots; few very fine tubular pores; few thin and moderately thick clay films; slightly acid (pH 6.5); clear smooth boundary. (2-10" thick)
- B2t 18-28"--Dark brown (7.5YR 3/2) clay, brown (10YR 4/3) dry; moderate medium and fine subangular blocky structure; very hard, firm, very sticky, very plastic; common medium and few fine and coarse roots; many very fine tubular pores; common moderately thick clay films; slightly acid (pH 6.4); gradual wavy boundary. (10-20" thick)
- IIB3t 28-44"--Dark yellowish brown (10YR 4/4) clay, yellowish brown (10YR 5/4) dry; weak medium and coarse subangular blocky structure; very hard, firm, very sticky, very plastic; few roots; many very fine tubular pores; common moderately thick clay films; slightly acid (pH 6.2); gradual wavy boundary. (0-16" thick)
- IIC 44-60"--Dark yellowish brown (10YR 4/4) clay loam, yellowish brown (10YR 5/4) dry; massive; hard, firm, sticky, plastic; few moderately thick clay films; medium acid (pH 6.0).

Type Location: Jackson County, Oregon; near Grizzly Peak in NE¼NE¼ Section 17, T. 38 S., R. 2 E., Willamette Meridian.

Range in Characteristics: These soils are usually dry during the summer for 60 consecutive days or more in all parts between 4 and 12 inches. The mean annual soil temperature is 42° to 47° F. Depth to bedrock is more than 40 inches. Solum thickness is commonly 40 to 60 inches. The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 moist and 3 or 4 dry, and chroma of 2 or 3 moist or dry. It is silt loam, loam or clay loam. Rock fragments range from 10 to 20 percent pebbles and 5 to 20 percent cobbles. The B2t horizon has hue of 7.5YR or 5YR, value of 3 or 4 moist and 4 or 5 dry, and chroma of 2 or 3 moist or dry. It is silty clay or clay with 40 to 50 percent clay. Rock fragments range from 0 to 10 percent pebbles and 0 to 10 percent cobbles. Fragments are mostly weathered in the B2 and B3 horizons.

Competing Series and Their Differentiae: This is the Tatouche series. Tatouche soils have umbric epipedons.

Setting: The 840 soils occur on gently sloping to steep ridge tops and sideslopes at elevations of 3,500 to 6,000 feet. Areas below 4,000 feet generally are on north-facing slopes. Slope gradients range from 5 to 60 percent. The soils formed in colluvium from basic volcanic rocks. The winters are cold and moist and the summers are cool and dry. Mean annual precipitation ranges from 35 to 55 inches. The mean annual air temperature ranges from 40° to 45° F.; the mean January temperature centers on 30° F.; and the mean July temperature centers on 58° F. The frost-free period ranges from 70 to 100 days.

Principal Associated Soils: These are the 842 and 850 series. The 842 soils are moderately deep and contain more than 35 percent coarse fragments in the control section. The 850 soils are moderately well drained.

Drainage and Permeability: Well drained; medium to rapid runoff; moderately slow permeability.

Use and Vegetation: Timber production, water supply and wildlife. Native vegetation includes white fir, Douglas-fir, incense-cedar and ponderosa pine.

Distribution and Extent: Western Cascades of southwestern Oregon and possibly northern California. The soils are of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

842 SERIES

The 842 series is a member of the clayey-skeletal, mixed, frigid, family of Pachic Argixerolls. Typically, 842 soils have black and very dark brown gravelly loam and gravelly clay loam A horizons, and very dark grayish brown and dark brown cobbly clay loam and cobbly clay B horizons.

Typifying Pedon: 842 gravelly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1½-0"--Litter of needles, twigs, leaves and branches.
- A11 0-4"--Black (10YR 2/1) gravelly loam, very dark gray (10YR 3/1) dry; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many fine and medium roots; many very fine irregular pores; 15 percent gravel and 10 percent cobbles; slightly acid (pH 6.4); clear smooth boundary. (2-4" thick)
- A12 4-13"--Very dark brown (10YR 2/2) gravelly clay loam, very dark gray (10YR 3/1) dry; weak fine and medium subangular blocky structure; slightly hard, friable slightly sticky, slightly plastic; common fine and medium roots; many very fine tubular pores; 15 percent gravel and 10 percent cobbles; slightly acid (pH 6.4); abrupt smooth boundary. (4-10" thick)
- B1 13-26"--Very dark grayish brown (10YR 3/2) very cobbly clay loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; hard, friable, slightly sticky, plastic; common medium and few fine roots; common very fine tubular pores; 20 percent gravel, 30 percent cobbles and 5 percent stones; slightly acid (pH 6.2); clear wavy boundary. (5-15" thick)
- B2t 26-37"--Brown (10YR 4/3) very cobbly clay, yellowish brown (10YR 5/4) dry; weak coarse subangular blocky structure; very hard, firm, sticky, plastic; few fine and medium roots; common very fine tubular pores; common thin clay films; 10 percent gravel, 50 percent cobbles and 10 percent stones; slightly acid (pH 6.1); clear wavy boundary. (7-15" thick)
- R 37"--Strongly fractured tuff bedrock.

Type Location: Jackson County, Oregon; NW¼SE¼SW¼ Section 7, T. 39 S., R. 2 E., Willamette Meridian.

Range in Characteristics: These soils are usually dry during the summer for 60 consecutive days or more in all parts between 4 and 12 inches. The mean annual soil temperature is 43° to 47° F. Depth to bedrock is 20 to 40 inches. The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 moist and 3 or 4 dry, and chroma of 1 to 3 moist and dry. It is silt loam, loam or clay loam. Rock fragments range from 10 to 20 percent gravel and 5 to 20 percent cobbles. The B2t horizon has hue of 10YR or 7.5YR, value of 3 or 4 moist and 4 or 5 dry, and chroma of 2 to 4 moist and dry. It is clay loam or clay. Rock fragments range from 10 to 20 percent gravel, 10 to 50 percent cobbles and 0 to 10 percent stones.

Competing Soils and Their Differentiae: These are the Silverton and Tatouche series. The Silverton soils have a mesic temperature regime. Tatouche soils have umbric epipedons.

Setting: The 842 soils occur on moderately steep to steep ridge tops and sideslopes at elevations of 3,500 to 6,000 feet. Areas below 4,000

feet generally are on north-facing slopes. Slope gradients range from 5 to 80 percent. The soils formed in colluvium from basic volcanic rocks. The winters are cold and moist and the summers are cool and dry. Mean annual precipitation ranges from 35 to 55 inches. The mean annual air temperature ranges from 43° to 47° F.; the mean January temperature centers on 30° F.; and the mean July temperature centers on 58° F. The frost-free period ranges from 70 to 100 days.

Principal Associated Soils: These are the Tatouche, 840 and 850 series. The Tatouche and 840 soils have fewer than 35 percent coarse fragments in the control section. The 850 soils are moderately well drained.

Drainage and Permeability: Well drained; medium runoff; moderately slow permeability.

Use and Vegetation: Timber production, water supply and wildlife habitat. Native vegetation consists of white fir, Douglas-fir, incense-cedar and associated shrubs and forbs.

Distribution and Extent: Western Cascades of southwestern Oregon and possibly northern California. The series is inextensive.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

850 SERIES

The 850 series is a member of the very fine, montmorillonitic, frigid family of Ultic Haploxerolls. Typically, 850 soils have very dark brown and very dark grayish brown loam and clay loam A horizons abruptly over dark brown and light yellowish brown clay B horizons.

Typifying Pedon: 850 loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 ½-0"--Conifer needles and forest litter, loose and partially decomposed in lower part.
- A11 0-4"--Very dark brown (10YR 2/2) loam, dark brown (10YR 4/2) dry; moderate fine and medium granular structure; slightly hard, friable slightly sticky, slightly plastic; many fine and common medium roots; many interstitial pores; 5 percent pebbles and 5 percent cobbles; strongly acid (pH 5.5); abrupt smooth boundary. (2-4" thick)
- A12 4-12"--Very dark grayish brown (10YR 3/2) clay loam, brown (10YR 5/3) dry; moderate medium subangular blocky structure; slightly hard, friable, sticky, plastic; many fine and common medium roots; many very fine tubular pores; 5 percent pebbles and 5 percent cobbles; strongly acid (pH 5.4); abrupt smooth boundary. (7-9" thick)

- IIB21 12-18"--Brown (10YR 4/3) clay, brown (10YR 4/3) dry; weak medium and coarse subangular blocky structure; extremely hard, extremely firm, very sticky, very plastic; few medium and coarse roots; many very fine tubular pores; 5 percent pebbles and 5 percent cobbles; strongly acid (pH 5.2); gradual wavy boundary. (4-10" thick)
- IIB22 18-38"--Light yellowish brown (2.5Y 6/4) clay, light yellowish brown (2.5Y 6/4) dry; massive; extremely hard, extremely firm, very sticky, very plastic; few medium and coarse roots; many very fine tubular pores; 5 percent pebbles and cobbles; very strongly acid (pH 4.8); gradual wavy boundary. (12-24" thick)
- IIC 38-60"--Variegated light olive brown (2.5Y 5/4), light yellowish brown (2.5Y 6/4) clay; massive; extremely hard, extremely firm, very sticky, very plastic; 5 percent pebbles and cobbles; very strongly acid (pH 4.6).

Type Location: Jackson County, Oregon; about $\frac{1}{4}$ mile northeast of Shale City in SE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Section 9, T. 38 S., R. 2 E., Willamette Meridian.

Range in Characteristics: The soils are usually dry during the summer for 60 consecutive days or more in all parts between 4 and 12 inches. The mean annual soil temperature is about 42° to 47° F. The 10- to 40-inch control section averages more than 60 percent clay. Solum thickness is less than 40 inches. Depth to bedrock is 40 to 60 inches or more. The sola are strongly to very strongly acid becoming more acid with depth. The A horizon has hue of 10YR to 7.5YR, value of 2 or 3 moist and 4 or 5 dry, and chroma of 2 or 3 moist and dry. It is loam or clay loam texture. Rock fragments range from 5 to 10 percent pebbles and 5 to 15 percent hard cobbles. Commonly there is a stone line at the base of this horizon. The B horizon has hue of 2.5Y or 10YR, value of 4 to 6 moist and dry, and chroma of 3 or 4 moist and dry. Rock fragments range from 10 to 20 percent pebbles and 0 to 15 percent cobbles in the B and C horizons. The C horizon is stratified with rock fragments. Saprolite from tuff, volcanic breccia or andesite is below 40 inches to over 60 inches.

Competing Series and Their Differentiae: These are the Bybee, Hazelair, Medco and Price series. Bybee soils have ochric epipedons. Hazelair and Medco soils have mesic soil temperature regimes. Price soils have less than 60 percent clay and have hue of 5YR and 2.5YR in the B horizons.

Setting: The 850 soils are on nearly level to moderately steep hillslopes at elevations of 4,000 to 5,500 feet. Slope gradients range from 1 to 35 percent. Slopes are doubly convex with peripheral shallow basins. The soils formed in clayey alluvium weathered from tuff, andesite and volcanic breccia. The summers are cool and dry and winters are cold and moist with an annual precipitation of 30 to 55 inches. The mean annual temperature is about 40° to 45° F. and the frost-free season is less than 120 days.

Principal Associated Soils: These are the Tatouche, 840 and Bybee series. Tatouche and 840 soils have argillic horizons. Bybee soils have ochric epipedons that lack sufficient depth of the surface layer to be umbric.

Drainage and Permeability: Moderately well drained; slow to medium surface runoff; very slow permeability.

Use and Vegetation: Used for timber production, wildlife, water supply and recreation. Native vegetation consists of white fir, Douglas-fir, incense-cedar, black oak, Oregon grape and wild strawberry.

Distribution and Extent: Cascade Mountains of southwestern Oregon and possibly northern California. The series is of moderate extent.

Series Proposed: Jackson County (Medford District, BLM), Oregon, 1974.

(861) ROGUE SERIES

Classification: Coarse-loamy, mixed, frigid, Typic Xerochrept.

Typifying Pedon: Rogue cobbly coarse sandy loam - forested
(Colors are for moist soil unless otherwise noted.)

- All 0-6"--Very dark grayish brown (10YR 3/2) cobbly coarse sandy loam, brown (10YR 5/3) dry; weak fine granular structure; loose, very friable, nonsticky, nonplastic; many fine and very fine roots; few fine irregular pores; 20 percent cobbles and 15 percent pebbles; neutral (pH 6.8); abrupt smooth boundary. (4-8" thick)
- B21 6-17"--Brown (10YR 4/3) cobbly coarse sandy loam, pale brown (10YR 6/3) dry; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; many fine and medium roots; many very fine irregular pores; 20 percent cobbles and 10 percent pebbles; neutral (pH 6.7); clear smooth boundary. (6-15" thick)
- B22 17-34"--Yellowish brown (10YR 5/4) cobbly coarse sandy loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, friable, nonsticky, nonplastic; many fine and medium roots, few coarse roots; many very fine irregular pores; 20 percent cobbles and 10 percent pebbles; slightly acid (pH 6.4); clear wavy boundary. (10-20" thick)
- C1 34-48"--Light olive brown (2.5Y 5/4) coarse sandy loam, very pale brown (10YR 8/3) dry; massive; hard, friable, nonsticky, nonplastic; few medium and coarse roots; many very fine irregular pores; medium acid (pH 6.0); clear wavy boundary. (10-20" thick)
- C2 48-54"--Light yellowish brown (2.5Y 6/4) coarse sandy loam, very pale brown (10YR 8/3) dry; massive; hard, friable, nonsticky, nonplastic; few very fine irregular pores; medium acid (pH 5.8).

Type Location: Jackson County, Oregon; about 8 miles southwest of Ashland, Oregon; along north side of timber access road (Hillcrest Orchard property) in NE $\frac{1}{4}$ NW $\frac{1}{4}$ Section 18, T. 40 S., R. 2 E., Willamette Meridian.

Series Proposed: Jackson County, Oregon 1973.

880 SERIES

The 880 series is a member of the fine-loamy, mixed, frigid family of Pachic Ultic Argixerolls. Typically, 880 soils have dark reddish brown loam A horizons, and dark reddish brown clay loam B horizons.

Typifying Pedon: 880 loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 1-0"--Litter of needles and twigs.
- A1 0-3"--Dark reddish brown (5YR 2/2) loam, brown (7.5YR 4/2) dry; weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine roots; many very fine irregular pores; slightly acid (pH 6.4); abrupt smooth boundary. (2-4" thick)
- A3 3-8"--Dark reddish brown (5YR 3/3) loam, reddish brown (5YR 4/3) dry; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and common coarse roots; many very fine tubular pores; neutral (pH 6.6); gradual wavy boundary. (3-7" thick)
- B1 8-17"--Dark reddish brown (5YR 3/3) clay loam, reddish brown (5YR 4/3) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and common coarse roots; many very fine tubular pores; slightly acid (pH 6.4); clear smooth boundary. (6-10" thick)
- B21t 17-24"--Dark reddish brown (5YR 3/3) clay loam, reddish brown (5YR 5/3) dry; weak medium subangular blocky structure; hard, firm, sticky, slightly plastic; many fine and common coarse roots; many very fine tubular pores; slightly acid (pH 6.2); gradual smooth boundary. (6-12" thick)
- B22t 24-50"--Dark reddish brown (5YR 3/3) clay loam, reddish brown (5YR 5/3) dry; moderate medium subangular blocky structure; hard, firm, sticky, plastic; many fine and common coarse roots; many very fine tubular pores; slightly acid (pH 6.2); clear wavy boundary. (20-30" thick)
- C 50-60"--Dark reddish brown (5YR 5/3) clay loam, reddish brown (5YR 4/3) dry, massive; hard, firm, sticky, plastic; few fine and coarse roots; common very fine tubular pores; medium acid (pH 5.8).

Type Location: Klamath County, Oregon; NW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 7, T. 40 S., R. 5 E., Willamette Meridian.

Range in Characteristics: The mean annual soil temperature ranges from 42° to 47° F. These soils usually are moist but dry in the control section during the summer months for 60 consecutive days or more. Depth to bedrock is 40 to more than 70 inches. The A horizon has about 0 to 20 percent pebbles. It is slightly acid. The B2 horizon has about 0 to 20 percent pebbles and 0 to 15 percent cobbles. It is medium or slightly acid. Sola have hue of 7.5YR, 5YR and 2.5YR. The A horizon has value of 2 or 3 moist and 4 dry, and chroma of 2 or 3 moist and dry. The B horizon has value of 3 or 4 moist and 4 or 5 dry, and chroma of 3 or 4 moist and dry. It is clay loam.

Competing Series and Their Differentiae: These are the Roseburg and Pinehurst series. Roseburg soils have a mesic temperature regime. Pinehurst soils are more acid. Pokegema soils are similar, but they are in a fine, halloysitic family.

Setting: The 880 soils are on gently sloping to moderately steep slopes of the Cascade Mountains at elevations of 3,500 feet to 4,800 feet. Slope gradients range from 2 to 35 percent. The soils formed in colluvium from basic volcanic rocks. The winters are cold and moist and the summers are cool and dry. The mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature ranges from 41° to 47° F.; the mean January temperature centers on 30° F.; and the mean July temperature centers on 58° F. The frost-free period ranges from 70 to 100 days.

Principal Associated Soils: These are the 882, 790, 809 and 810 series. The 882 soils are in a loamy-skeletal family. The 790 soils are in a clayey-skeletal family. The 809 and 810 soils are more acid.

Drainage and Permeability: Well drained; slow runoff; moderate to moderately slow permeability.

Use and Vegetation: Timber production, water supply, grazing and wildlife. Vegetation is white fir, Douglas-fir, ponderosa pine, hardwoods and various understory species.

Distribution and Extent: Southeastern Cascades in southern Oregon and possibly northern California. The soils are of moderate extent.

Series Proposed: Klamath County (Medford District, BLM), Oregon, 1973.

882 SERIES

The 882 series is a member of the loamy-skeletal, mixed, frigid, family of Pachic Ultic Argixerolls. Typically, 882 soils have dark reddish brown cobbly loamy A horizons, and dark reddish brown very gravelly clay loam B2t horizons.

Typifying Pedon: 882 cobbly loam - forested
(Colors are for moist soil unless otherwise noted.)

- 01 2-0"--Litter of leaves, needles and twigs.
- A1 0-3"--Dark reddish brown (5YR 2/2) cobbly loam, brown (7YR 4/2) dry; weak very fine granular structure; soft, very friable, nonsticky, nonplastic; many fine roots; many irregular pores; 15 percent cobbles and 5 percent gravel; few stones scattered on surface; neutral (pH 6.6); gradual smooth boundary. (2-6" thick)
- A3 3-10"--Dark reddish brown (5YR 3/3) cobbly loam, brown (7.5YR 5/4) dry; weak very fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many fine roots; many irregular pores; 30 percent cobbles and 10 percent gravel; slightly acid (pH 6.4); gradual smooth boundary. (0-10" thick)
- B11 10-17"--Dark reddish brown (5YR 3/3) cobbly loam, reddish brown (5YR 5/3) dry; weak medium and fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common fine and very fine roots; common very fine tubular pores; 30 percent cobbles and 15 percent gravel; slightly acid (pH 6.4); gradual smooth boundary. (5-10" thick)
- B12 17-35"--Dark reddish brown (5YR 3/3) very cobbly loam, reddish brown (5YR 5/3) dry; weak medium subangular blocky structure; slightly hard, friable nonsticky, nonplastic; common fine roots; common very fine tubular pores; 40 percent cobbles and 10 percent gravel; slightly acid (pH 6.4); clear smooth boundary. (12-18" thick)
- IIB21t 35-42"--Dark reddish brown (2.5YR 3/4) very cobbly clay loam, yellowish red (5YR 4/6) dry; weak medium subangular blocky structure; hard, friable, sticky, plastic; common fine roots; common very fine tubular pores; common thin clay films; 40 percent cobbles and 10 percent gravel; slightly acid (pH 6.2); clear wavy boundary. (5-10" thick)
- IIB22t 42-49"--Dark red (2.5YR 3/6) cobbly heavy loam, red (2.5YR 4/6) dry; weak medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common fine roots; common very fine tubular pores; many thin clay films; 35 percent cobbles; medium acid (pH 6.0); abrupt wavy boundary. (5-12" thick)
- R 49"+--Fractured, partially weathered andesite bedrock.

Type Location: Klamath County, Oregon; near Parker Mountain lookout in NW $\frac{1}{4}$ SW $\frac{1}{4}$ Section 7, T. 40 S., R. 5 E., Willamette Meridian.

Range in Characteristics: Mean annual soil temperature ranges from 42° to 47° F. Depth to bedrock ranges from 40 to over 70 inches. The A

horizon has 15 to 30 percent cobbles and 0 to 15 percent gravel and stones. The Bt horizon has 30 to 40 percent cobbles and 5 to 20 percent gravel and stones. The A horizon has hue of 5YR and 7.5YR, value of 2 or 3 moist and 4 or 5 dry, and chroma of 2 or 3 moist and 2 to 4 dry. The Bt horizon has hue of 7.5YR, 5YR and 2.5YR, value of 3 or 4 moist and 4 through 6 dry, and chroma of 4 to 6 moist and 3 to 6 dry. It is heavy loam and clay loam texture.

Competing Series and Their Differentiae: The Woodcock and Tournquist series are similar. Woodcock soils have a cryic temperature regime. Tournquist soils are in a fine-loamy family.

Setting: The 882 soils are on moderately steep to very steep slopes of the Cascade Mountains at elevations from 4,000 feet to 6,200 feet. Slope gradients range from 5 to over 60 percent. The soils formed in stony colluvium mostly derived from andesite rock. The winters are cold and moist and the summers are cool and dry. The mean annual precipitation ranges from 20 to 35 inches. The mean annual air temperature ranges from 41° to 47° F.; the mean January temperature centers on 30° F.; and the mean July temperature centers on 58° F. The frost-free period ranges from 70 to 100 days.

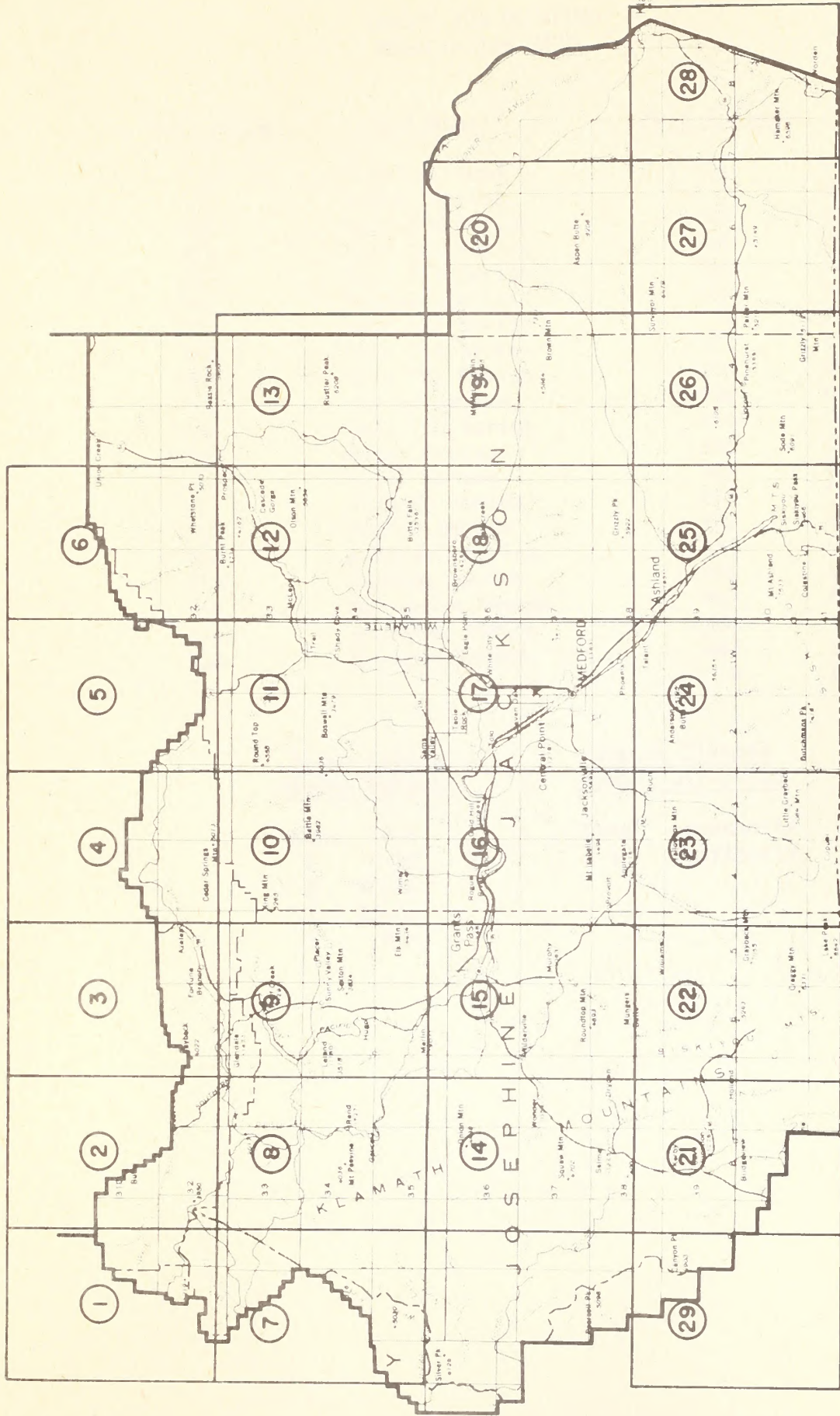
Principal Associated Soils: These are the 880, 790, 809 and 810 series. The 880 soils have fewer than 35 percent coarse fragments in the control section. The 790 soils have over 35 percent clay in the subsoil. The 809 and 810 soils are more acid.

Drainage and Permeability: Well drained; medium runoff; moderate permeability.

Use and Vegetation: Timber production, range, water supply and wildlife. Vegetation is ponderosa pine, Douglas-fir and white fir, hardwoods and various understory species.

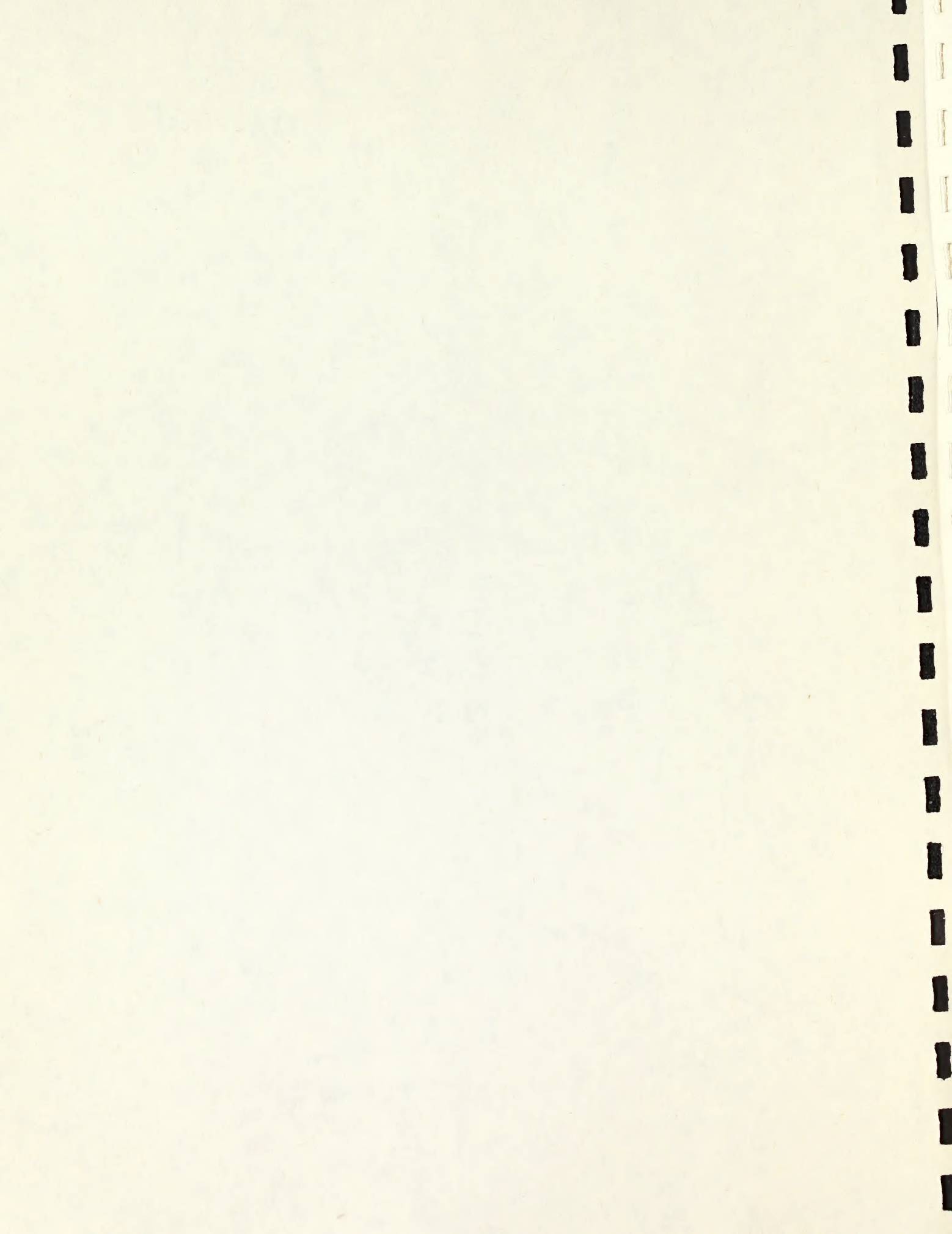
Distribution and Extent: Southeastern Cascades in southern Oregon and possibly northern California. The soils are of moderate extent.

Series Proposed: Klamath County (Medford District, BLM), Oregon, 1973.



INDEX TO MAP SHEETS

MEDFORD DISTRICT



LEGEND FOR DETAILED
ASSOCIATION MAPS

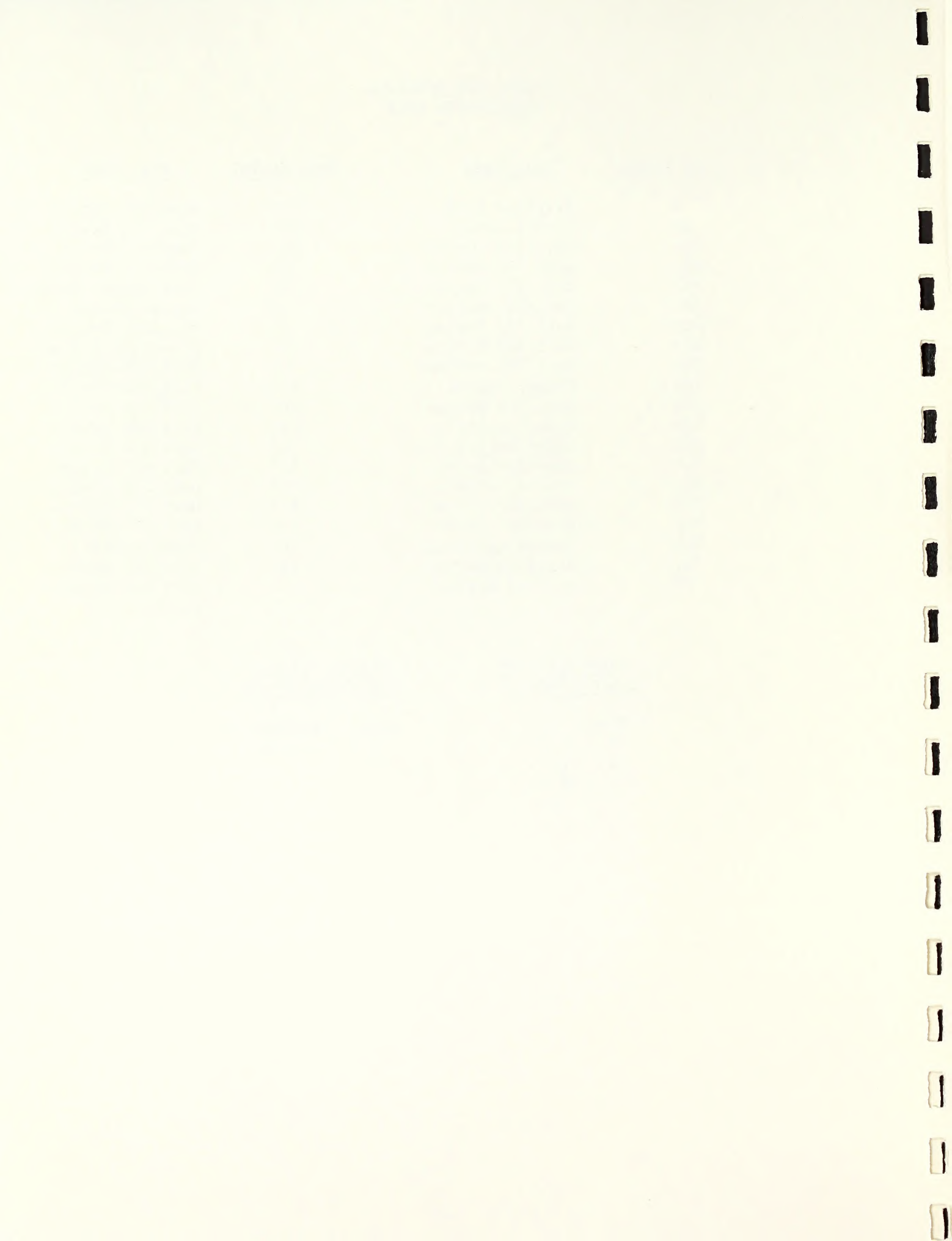
<u>Soil Symbol</u>	<u>Soil Name</u>	<u>Soil Symbol</u>	<u>Soil Name</u>
1	Alluvial land	731	Straight Series
36	Witzel Series	732	Unit 732 Series
370	Unit 370 Series	740	Geppert Series
371	Unit 371 Series	741	Freezner Series
372	Unit 372 Series	745	Laurelhurst Series
380	Pollard Series	750	Dumont Series
381	Unit 381 Series	770	Pearsoll Series
382	Unit 382 Series	781	Colestine Series
701	Unit 701 Series	790	Unit 790 Series
704	Carney Series	806	Unit 806 Series
705	Unit 705 Series	809	Unit 809 Series
706	Medco Series	810	Unit 810 Series
710	Coker Series	824	Unit 824 Series
712	Jumpoff Series	825	Unit 825 Series
715	Brader Series	840	Unit 840 Series
716	Debenger Series	842	Unit 842 Series
718	Beekman Series	850	Unit 850 Series
719	Manzanita Series	861	Rogue Series
721	Siskiyou Series	880	Unit 880 Series
722	Holland Series	882	Unit 882 Series
		R	Rockland

Slope Classes
Symbol Percent

None	0-3
V	0-10
W	10-35
X	35-60
Y	60+

Aspect Classes
Symbol Direction

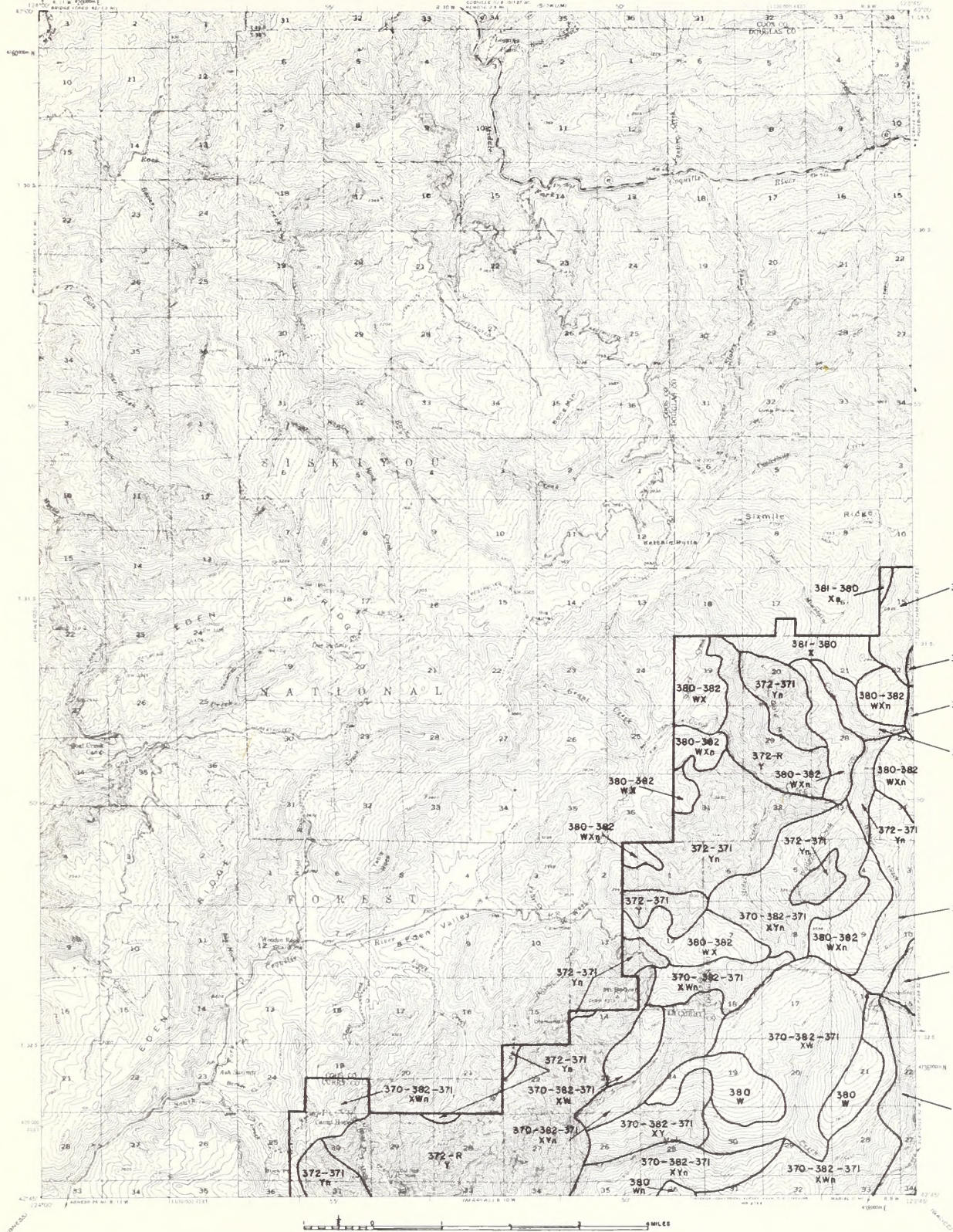
None	southerly
n	northerly





UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

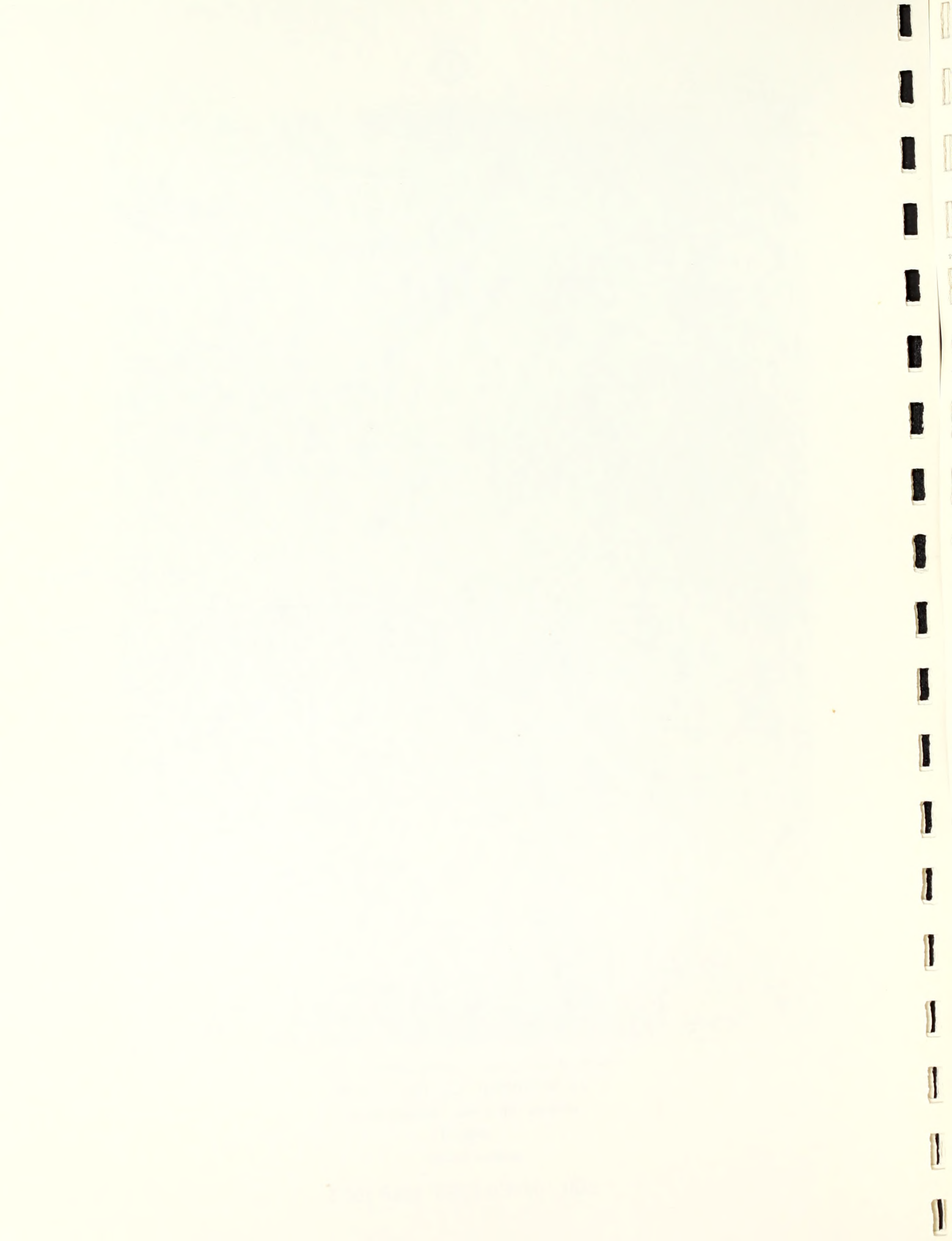
BONE MOUNTAIN QUADRANGLE
OREGON
15 MINUTE SERIES (TOPOGRAPHIC)



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON

MEDFORD DISTRICT

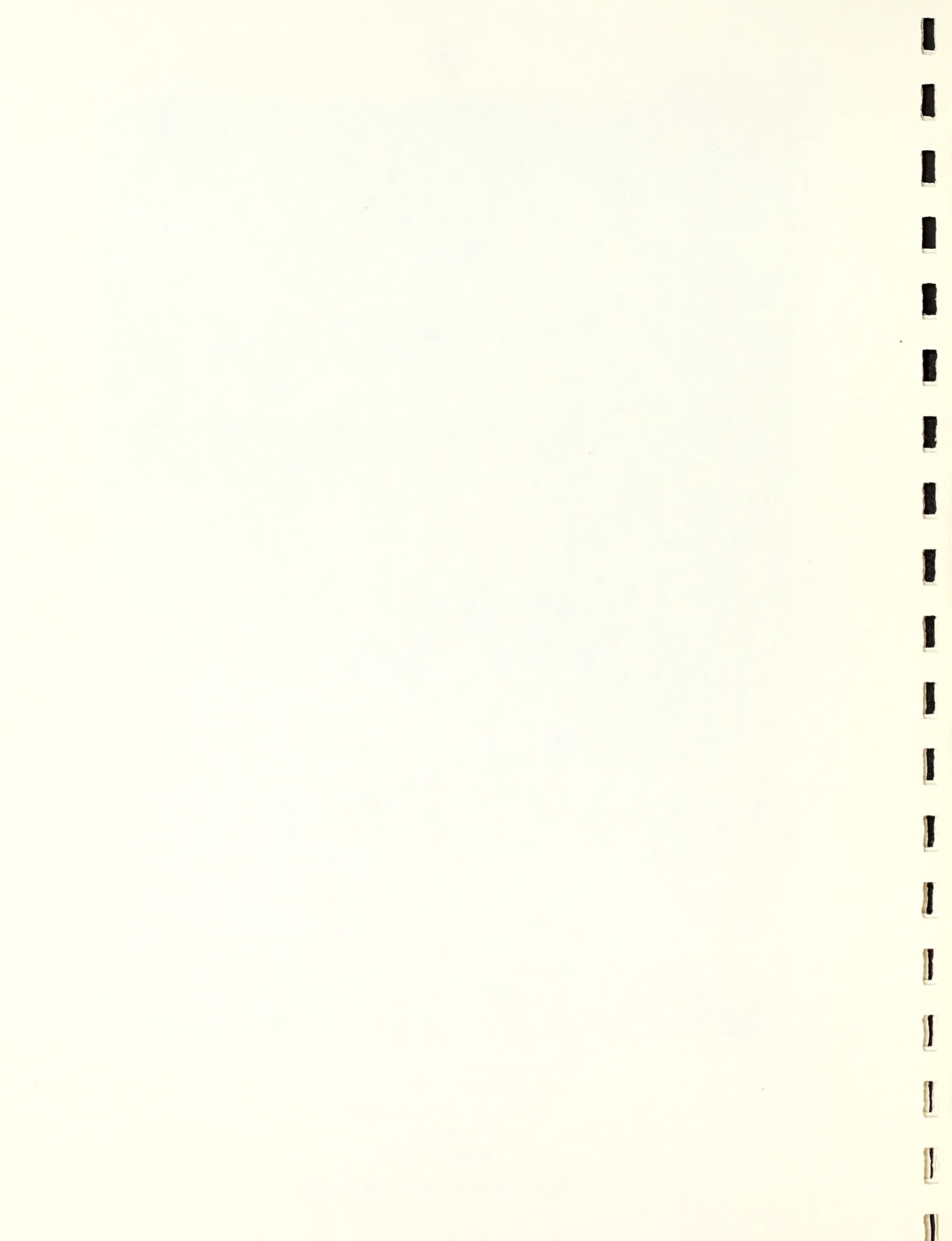
SOIL INVENTORY MAP 1973

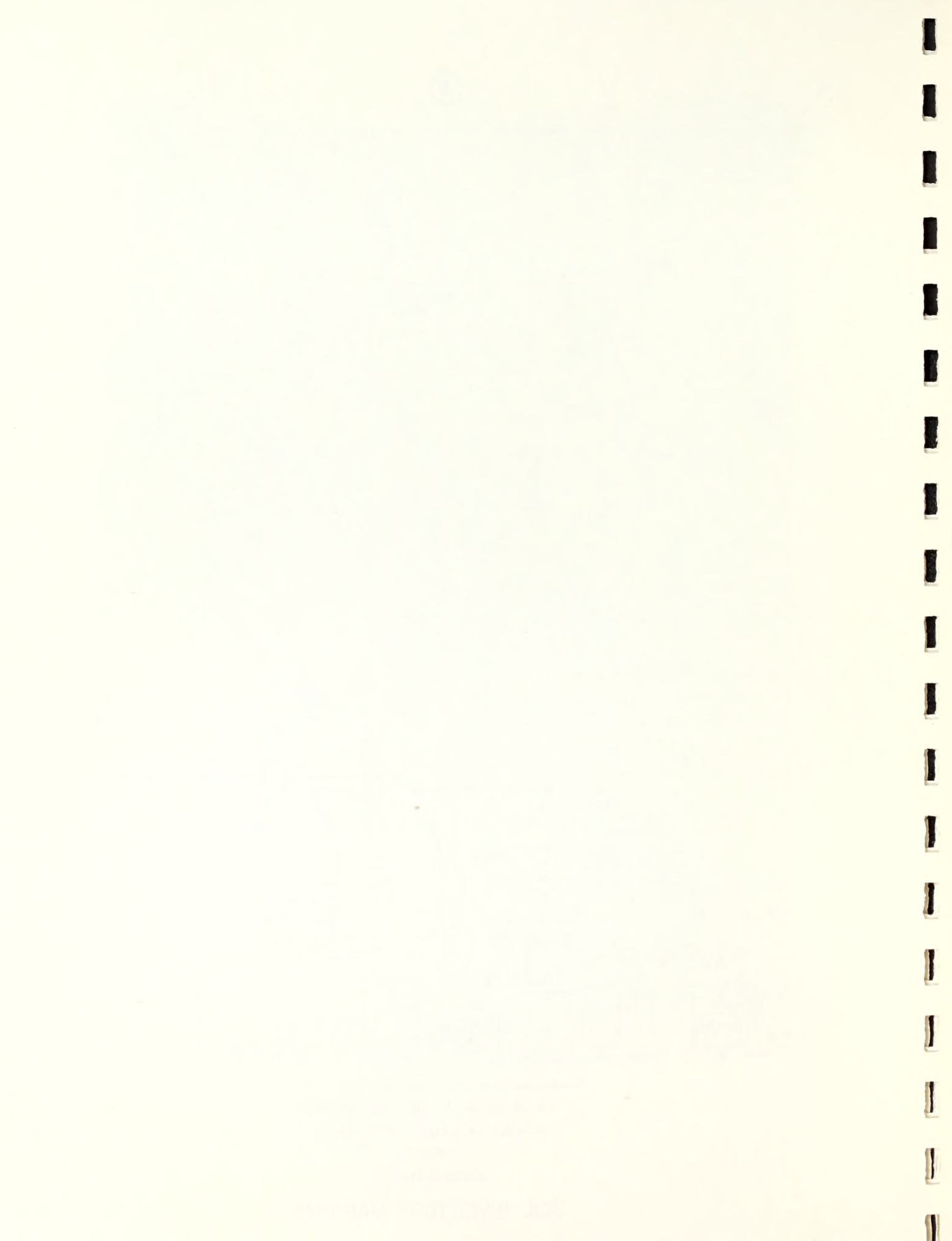


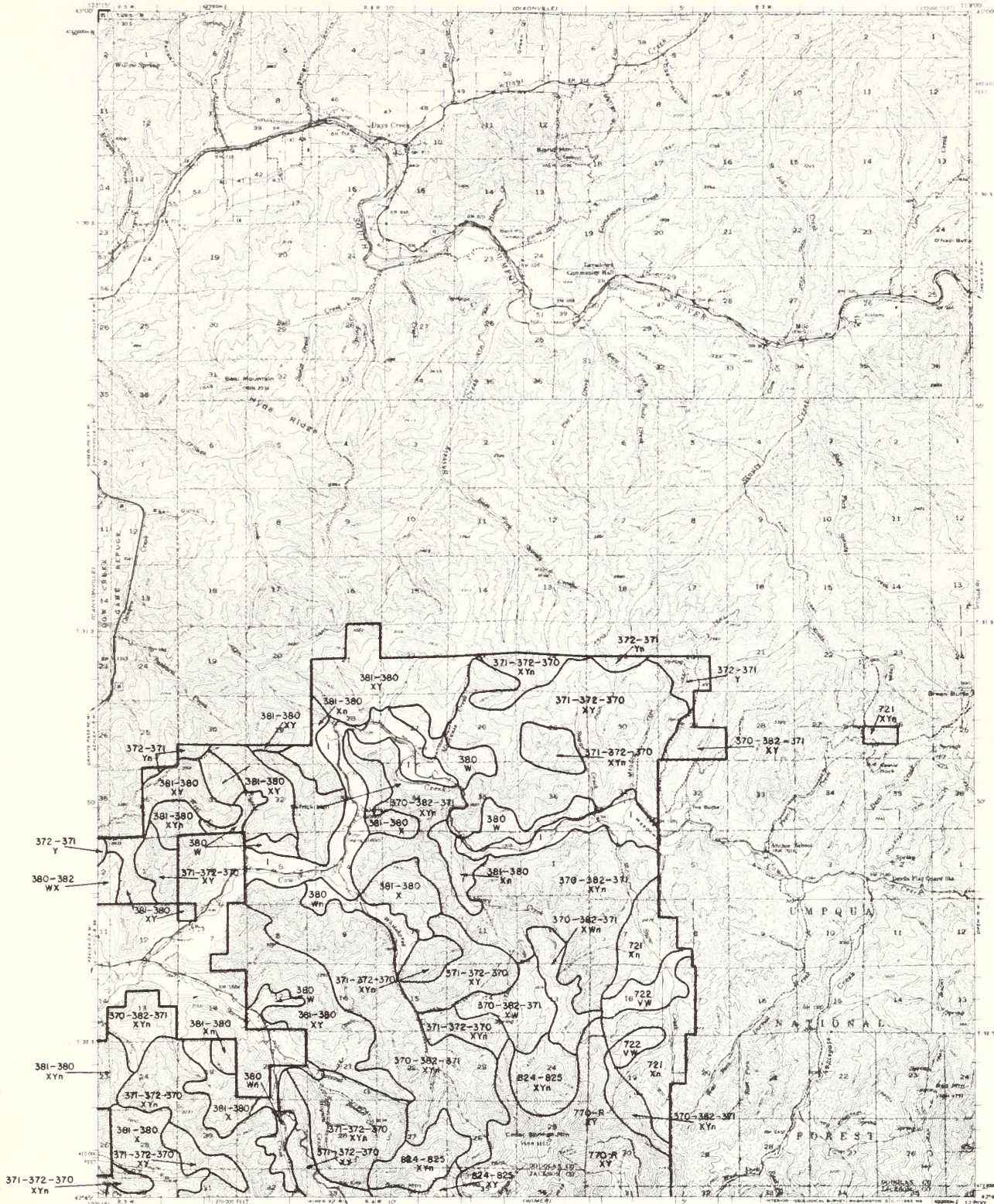


U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON
MEDFORD DISTRICT

SOIL INVENTORY MAP 1973

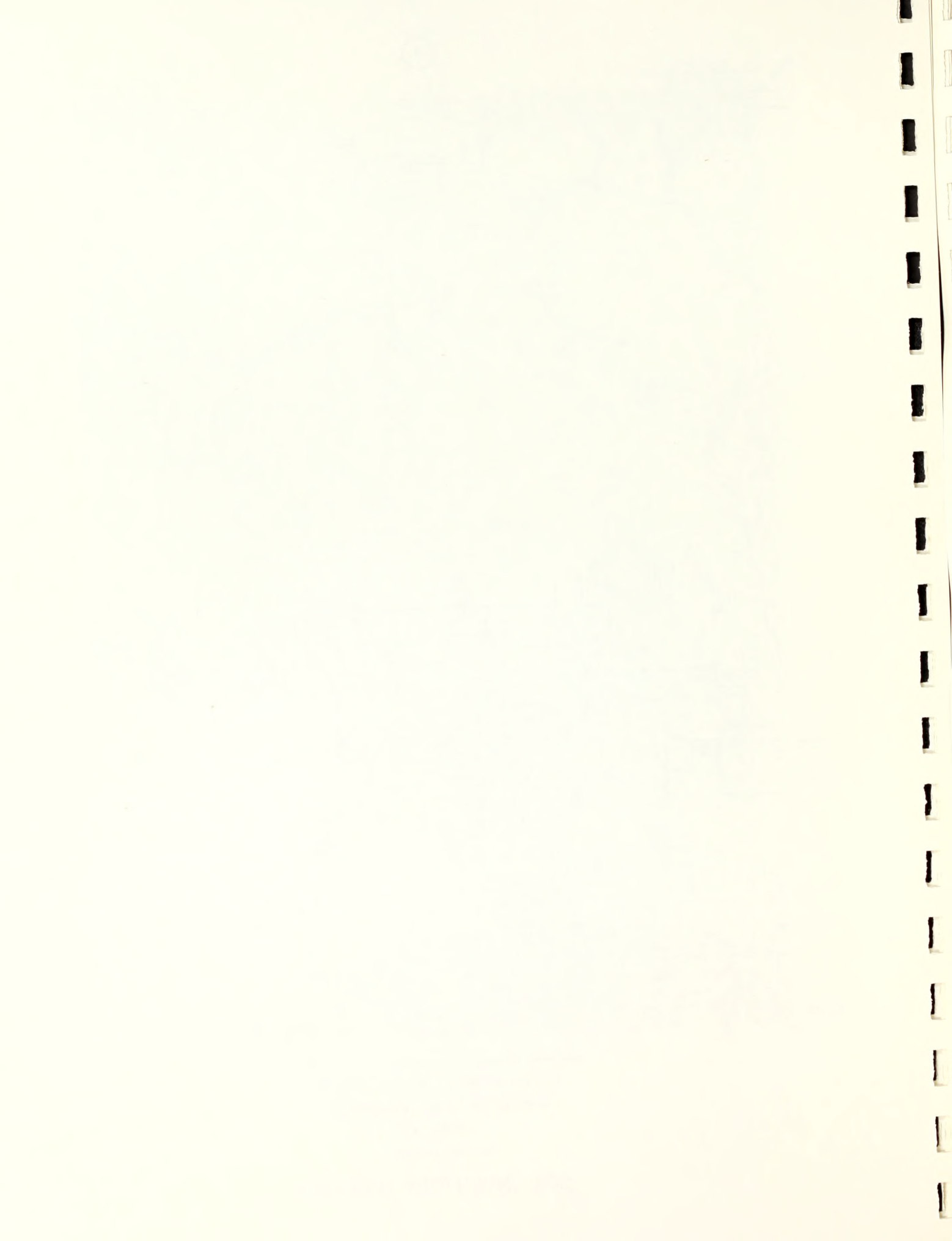


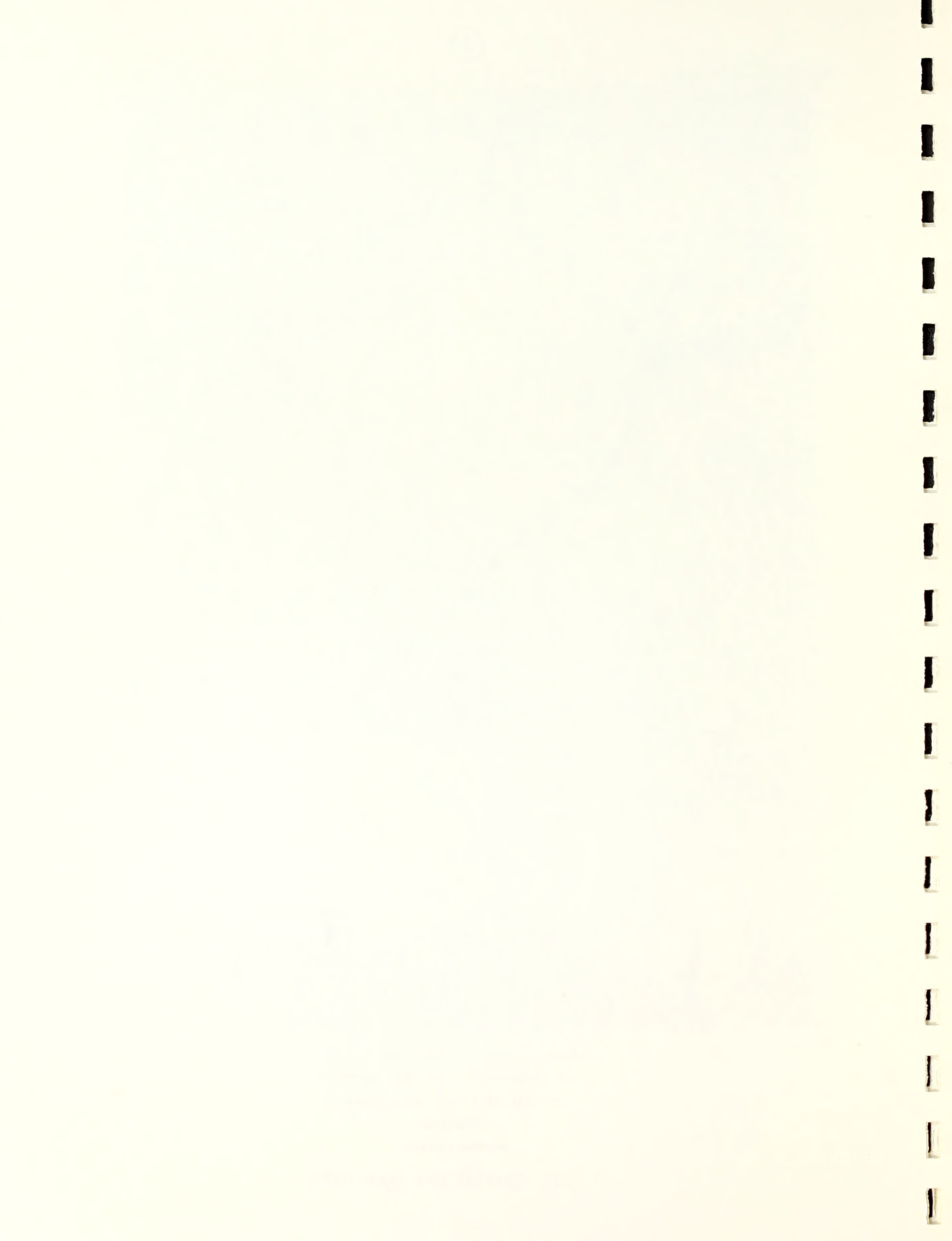


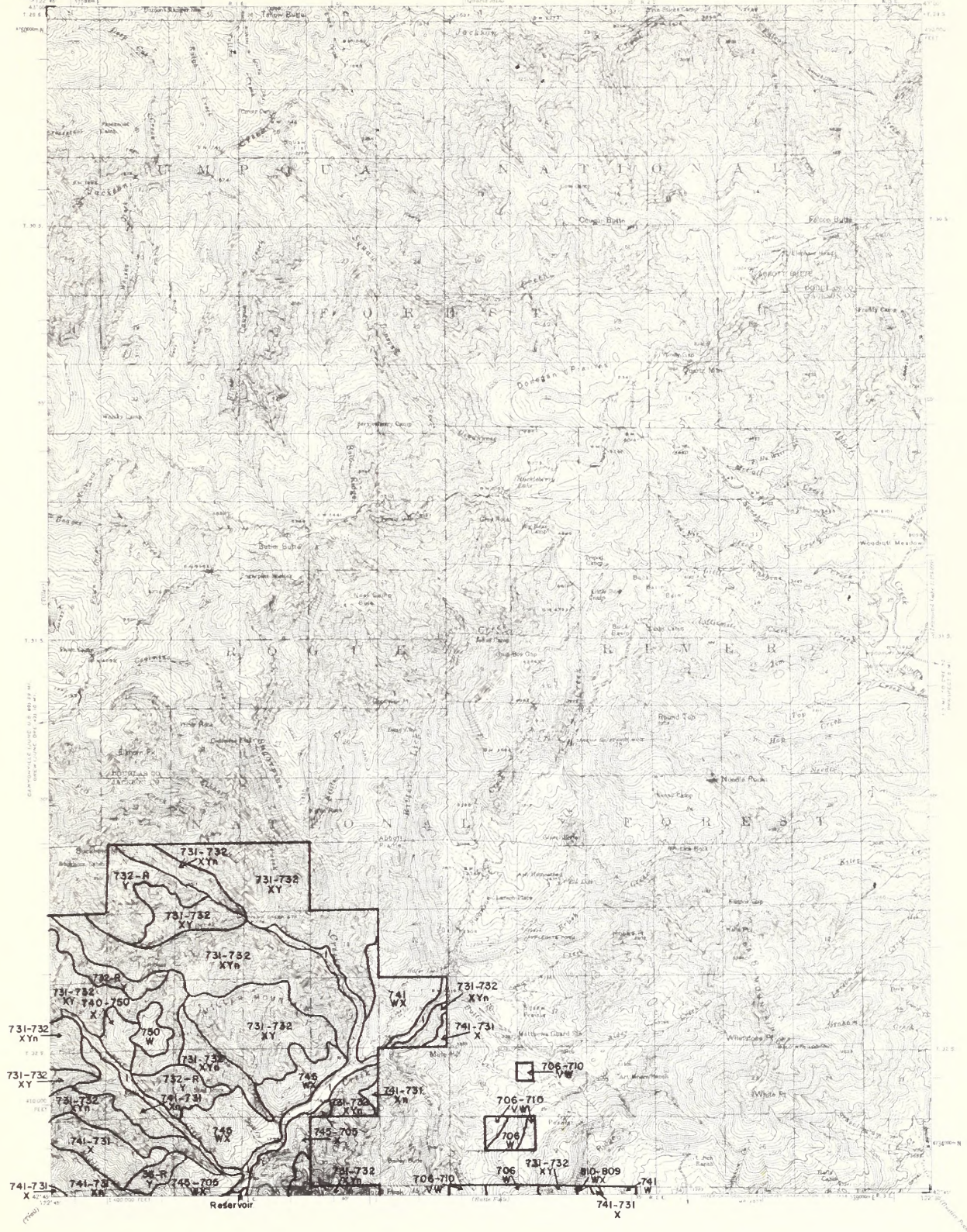


U.S. DEPARTMENT OF THE INTERIOR
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OREGON
MEDFORD DISTRICT

SOIL INVENTORY MAP 1973



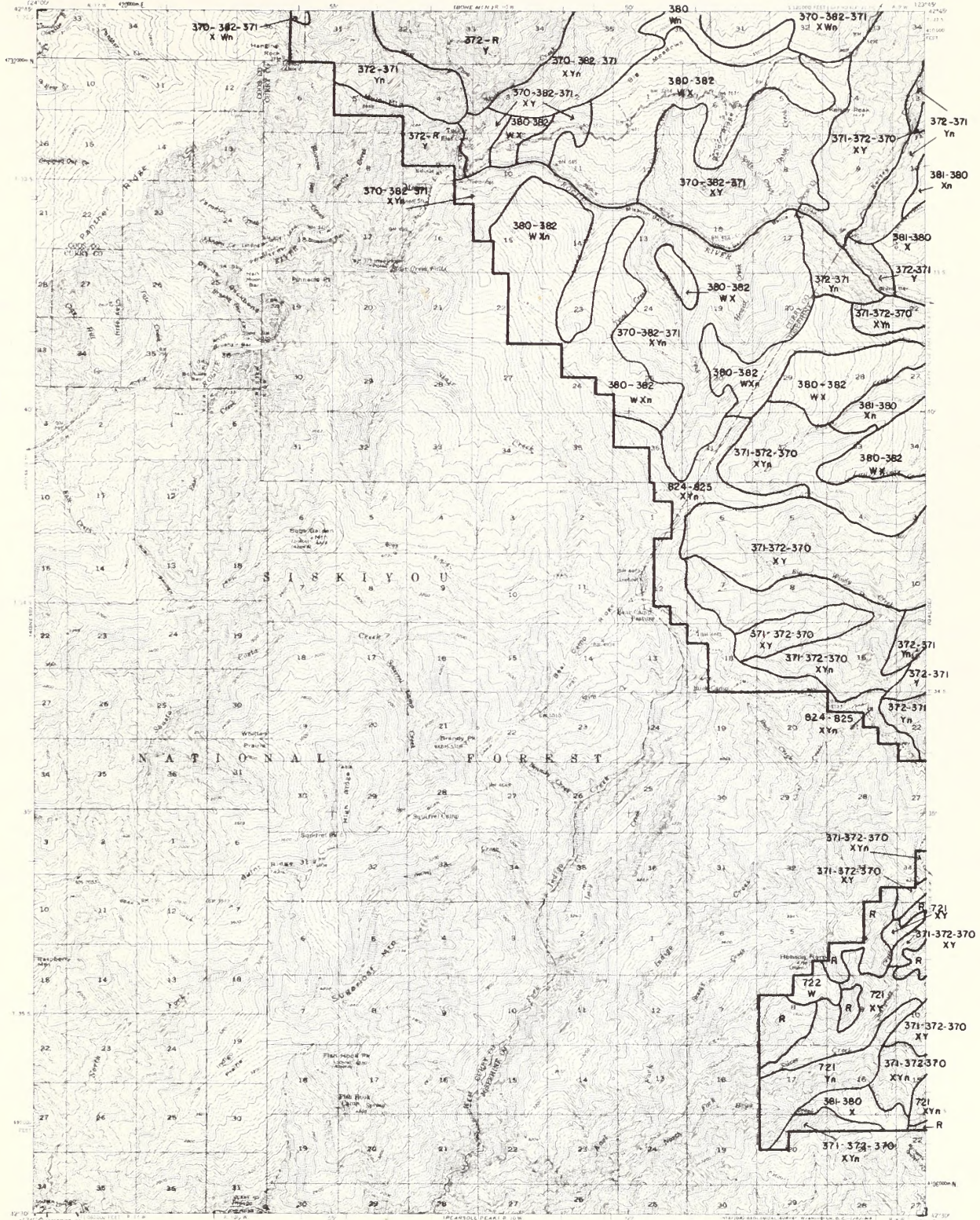




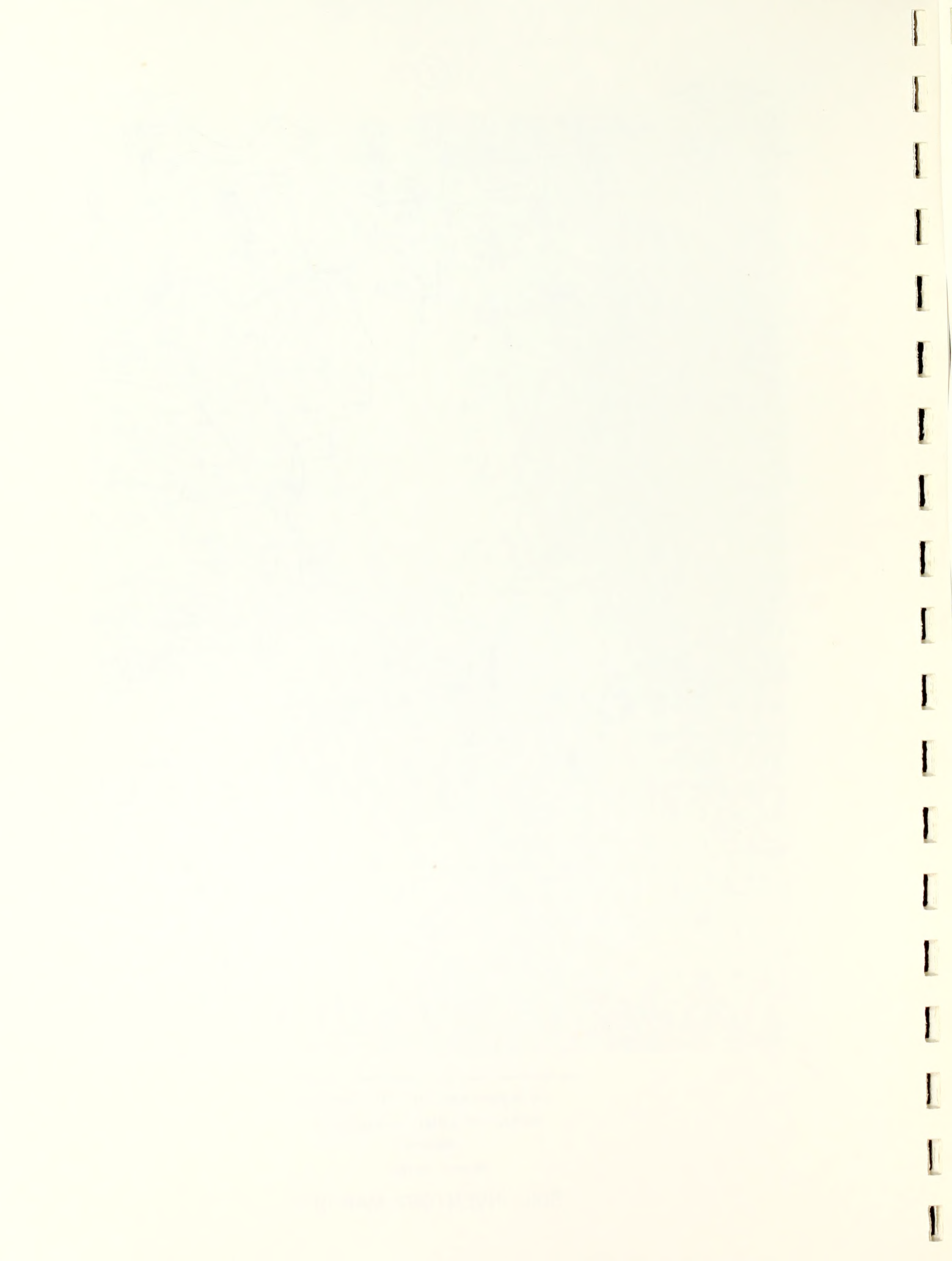
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON
MEDFORD DISTRICT

SOIL INVENTORY MAP 1973



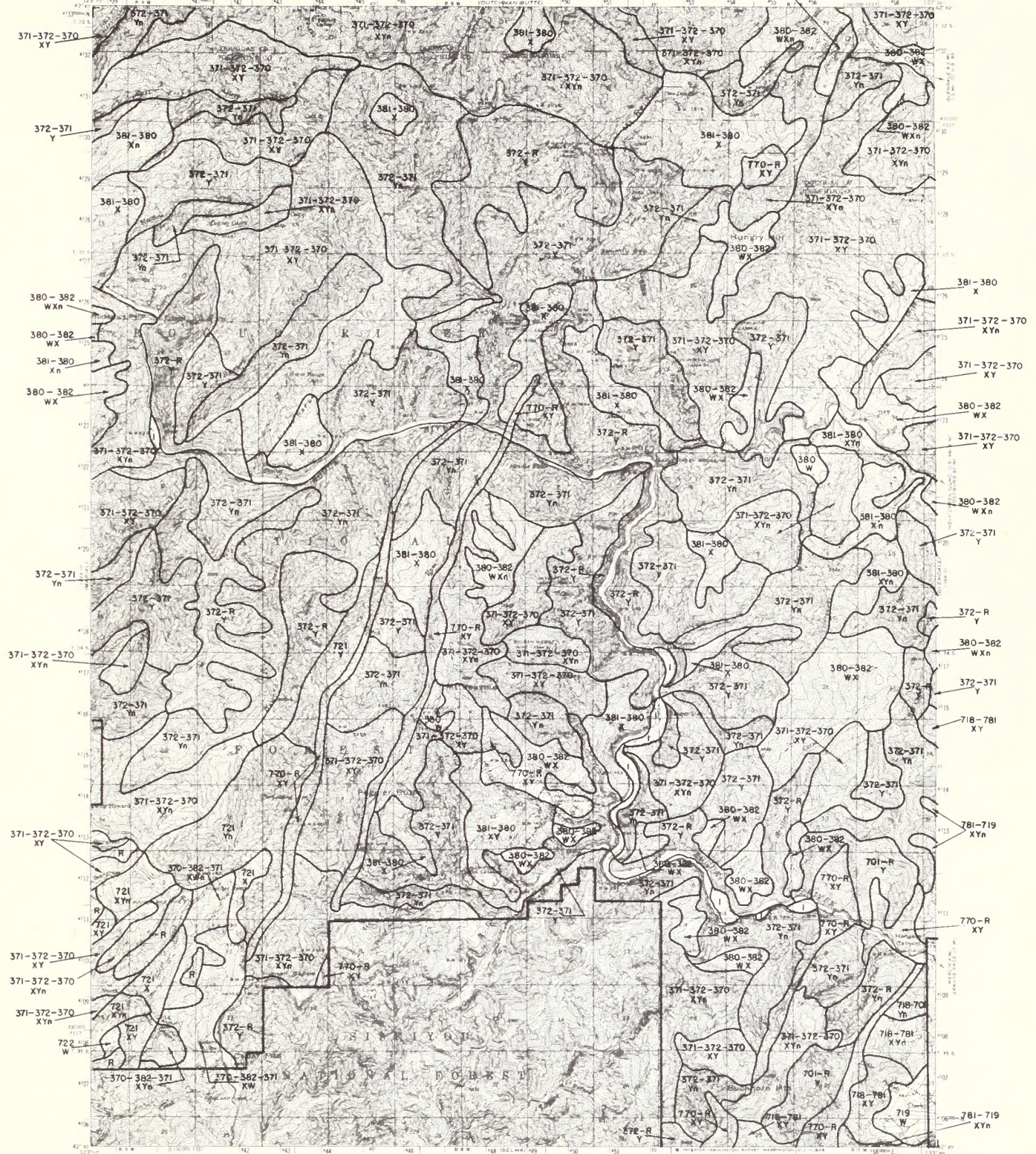


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BUREAU OF LAND MANAGEMENT
OREGON
MEDFORD DISTRICT
SOIL INVENTORY MAP 1973



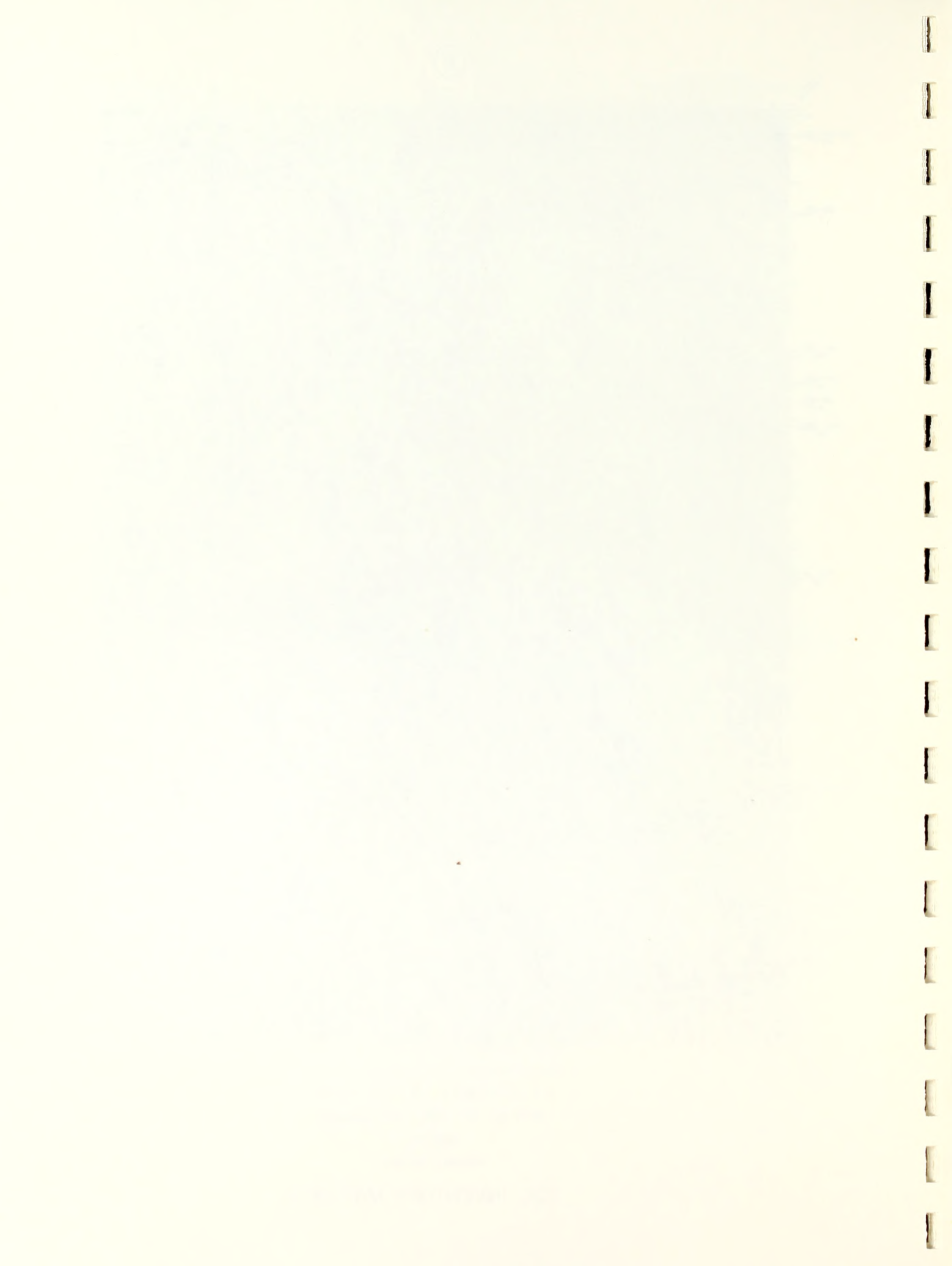
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

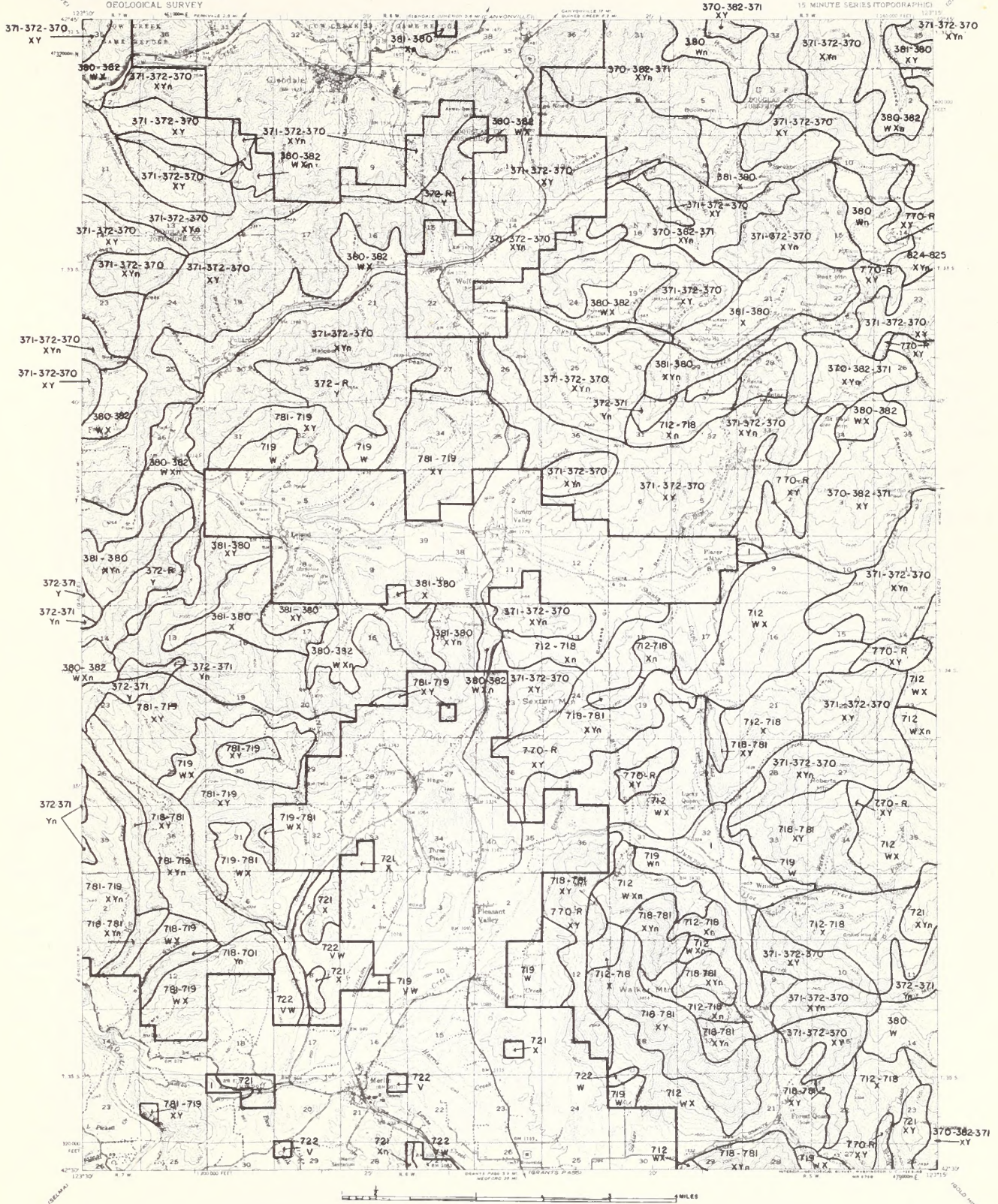
770-R
XY
CALICE QUADRANGLE
15-MINUTE SERIES



U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON
MEDFORD DISTRICT

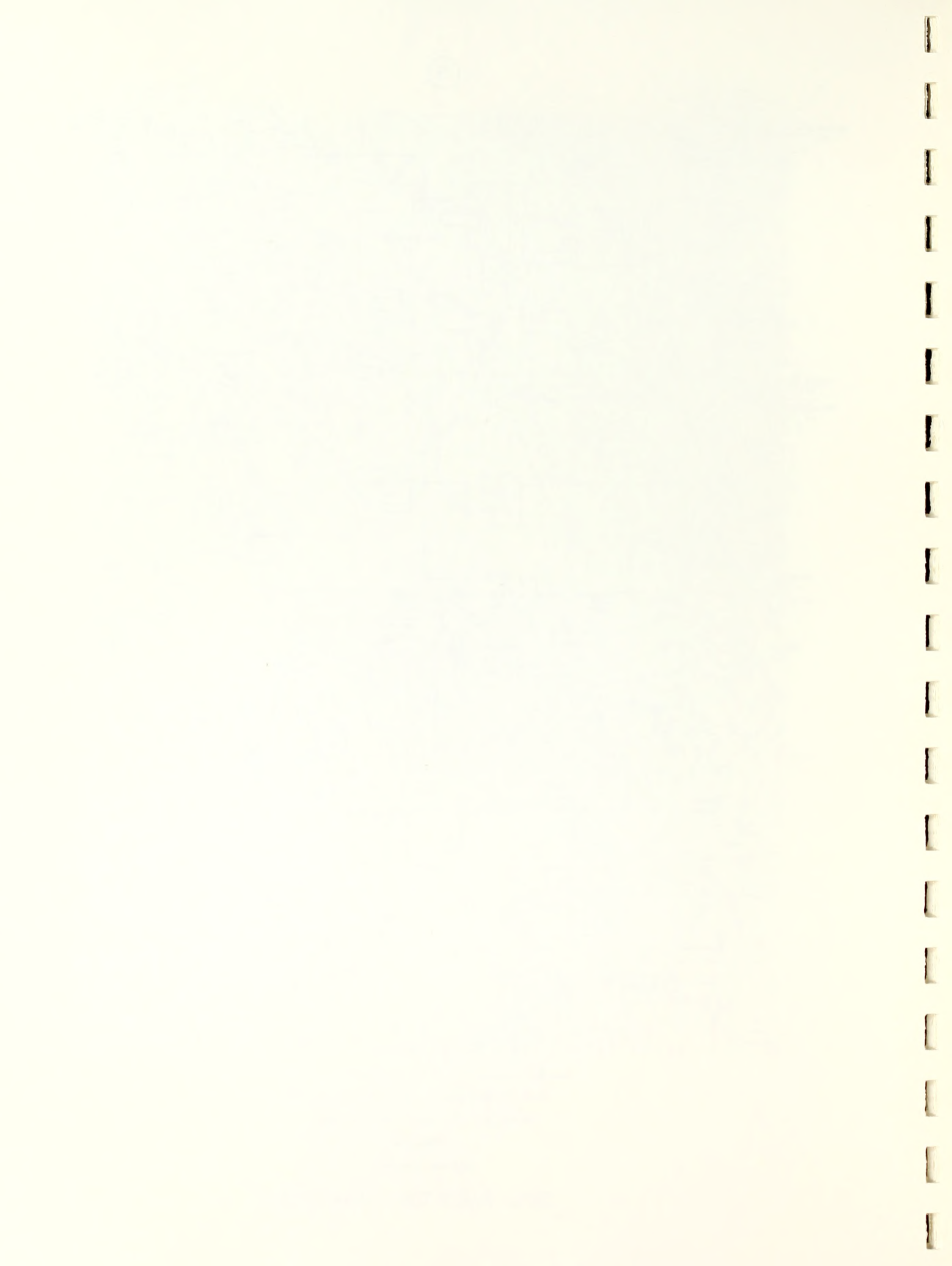
SOIL INVENTORY MAP 1973

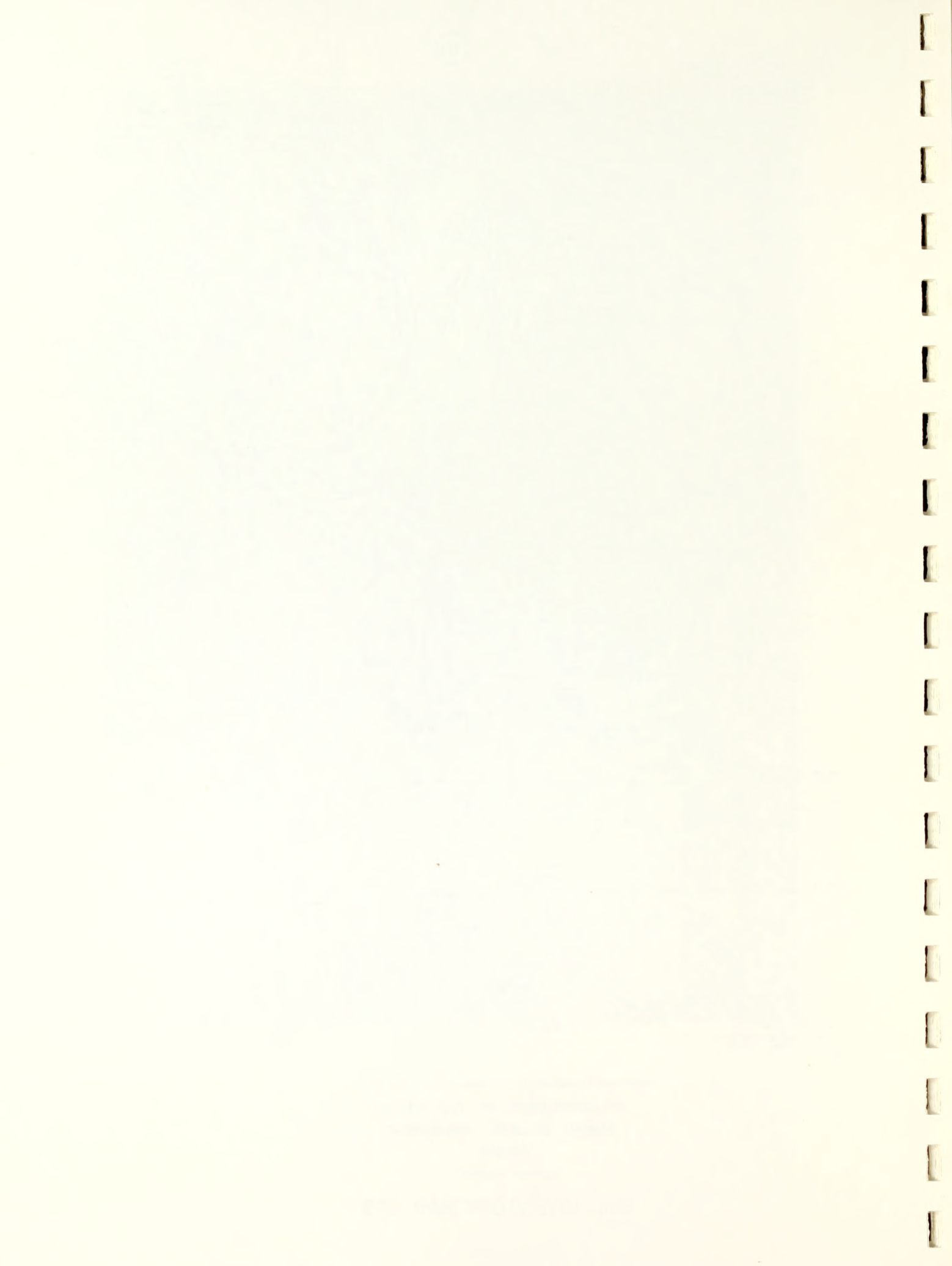




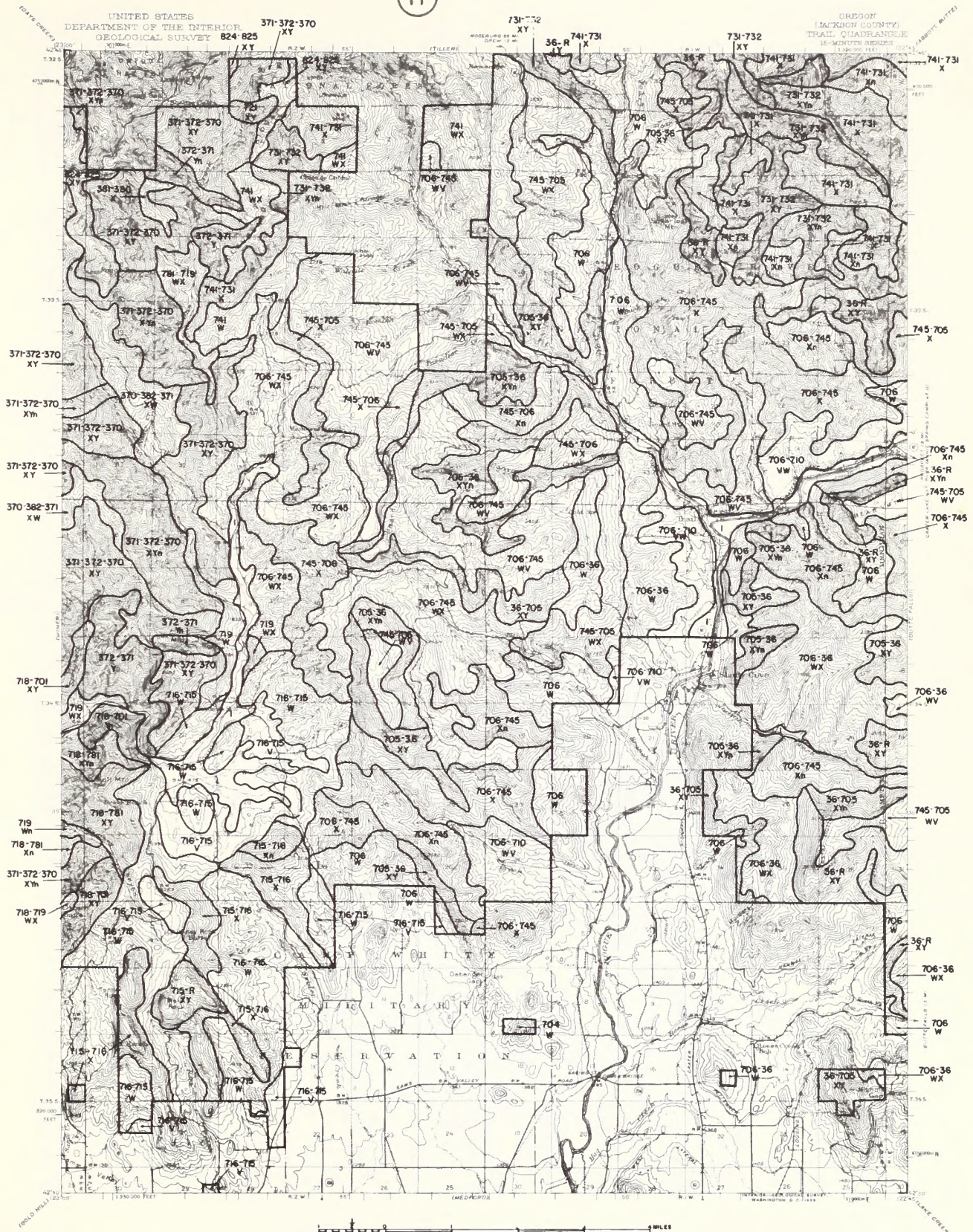
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MEDFORD DISTRICT

SOIL INVENTORY MAP 1973





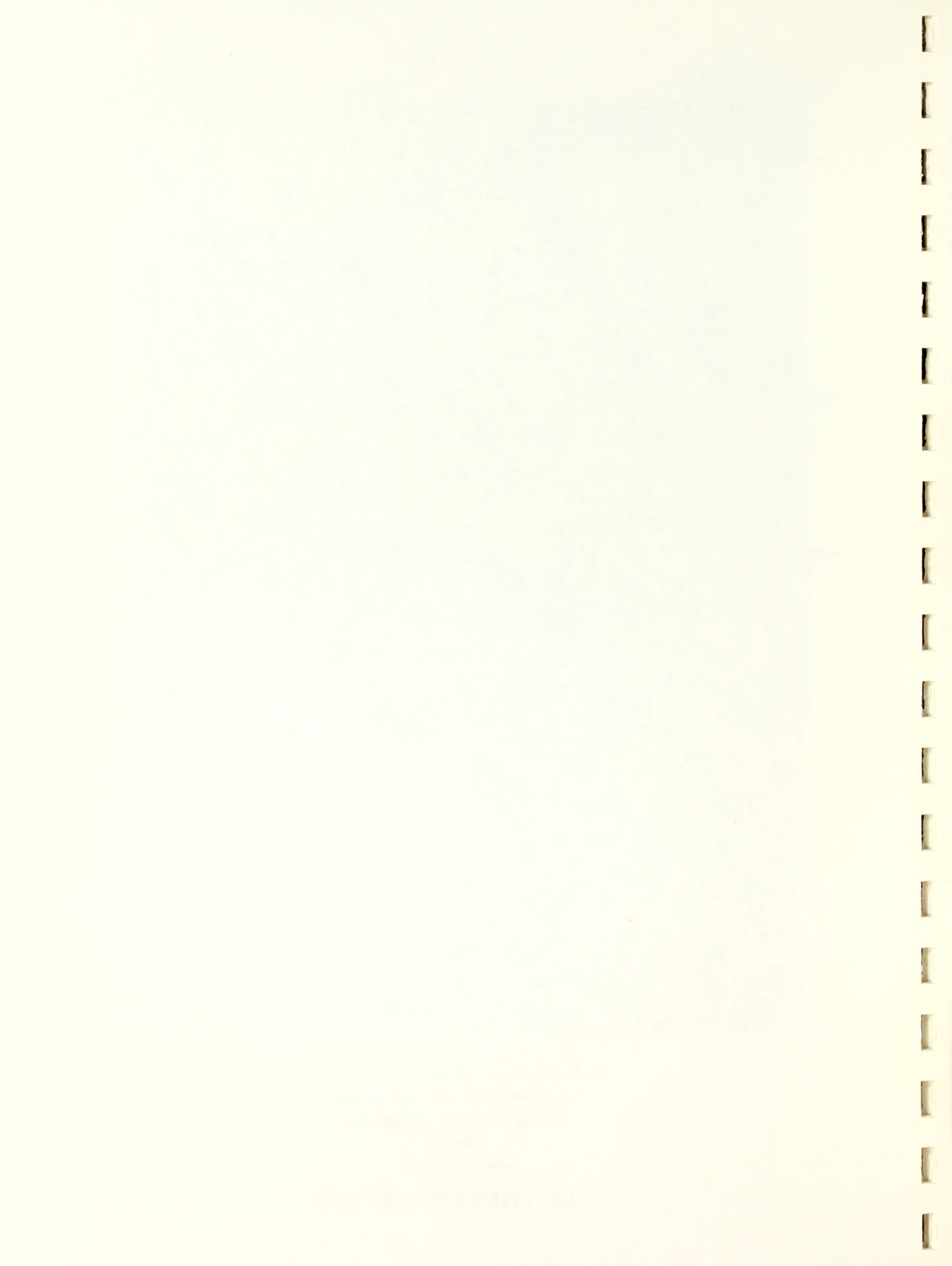
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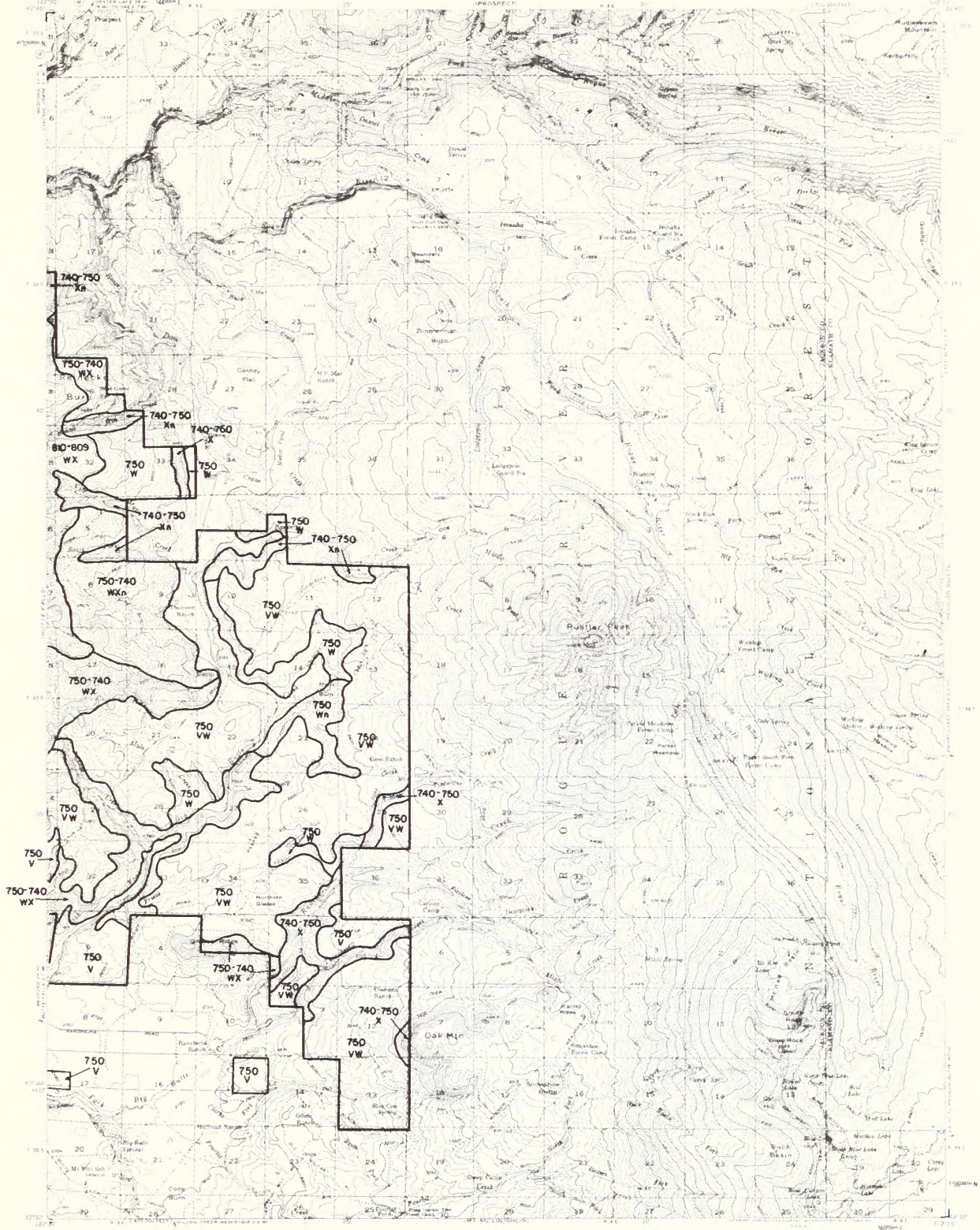


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BUREAU OF LAND MANAGEMENT
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SOIL INVENTORY MAP 1973

U.S. DEPARTMENT OF THE ARMY
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D.C.
ADJUTANT GENERAL
OFFICE OF THE ADJUTANT GENERAL
WASHINGTON, D.C.





U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON
MEDFORD DISTRICT

SOIL INVENTORY MAP 1973



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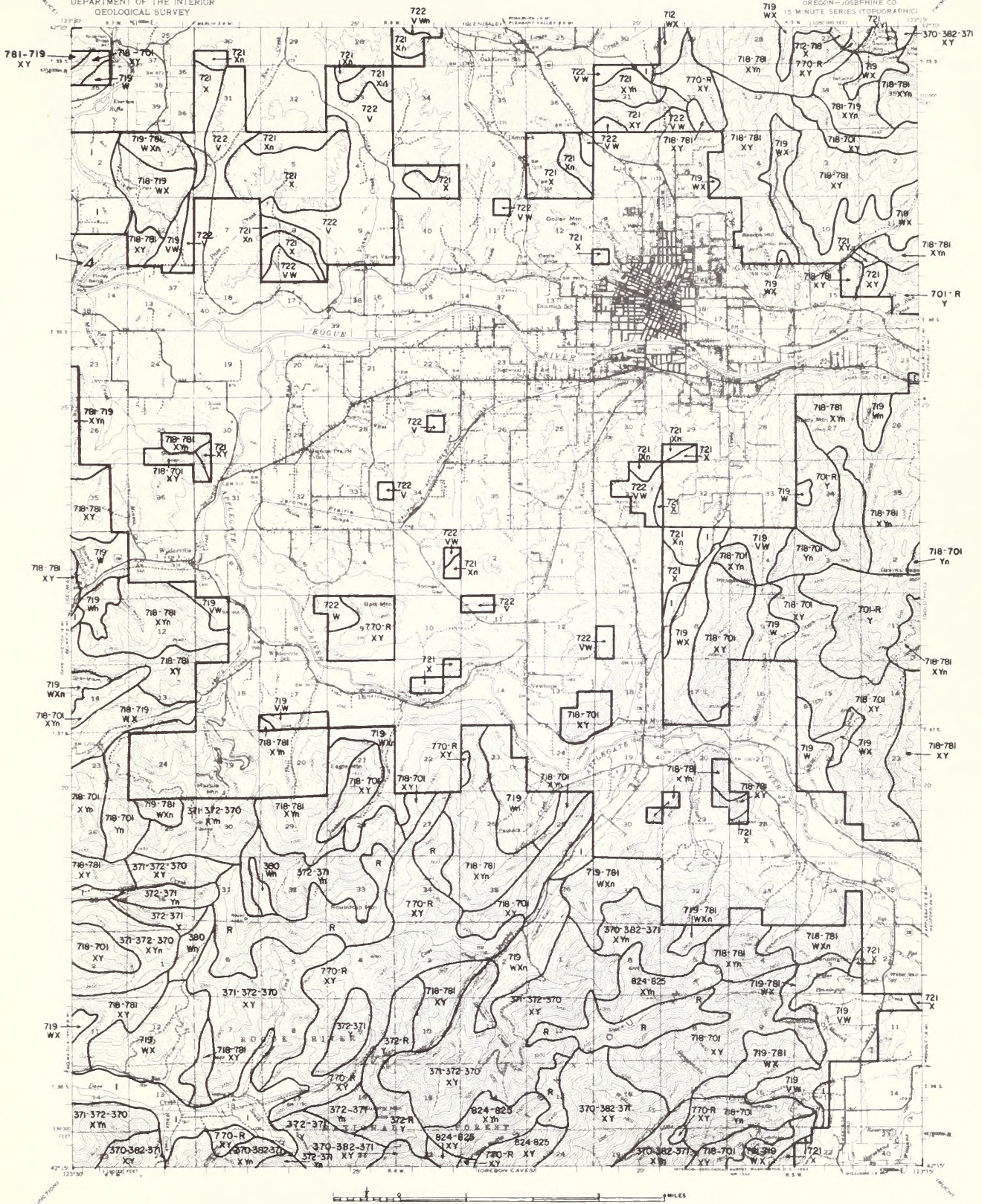
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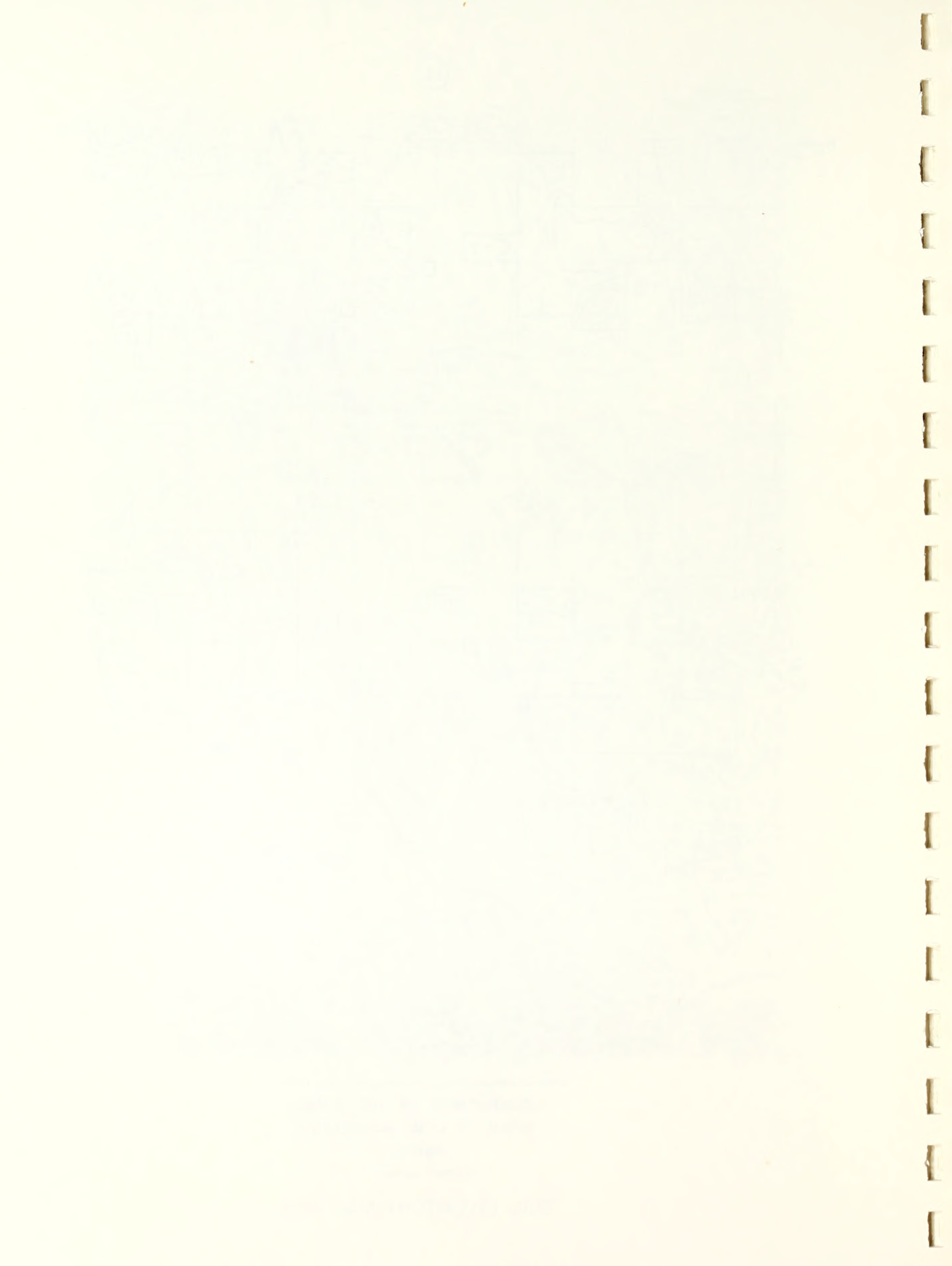
UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

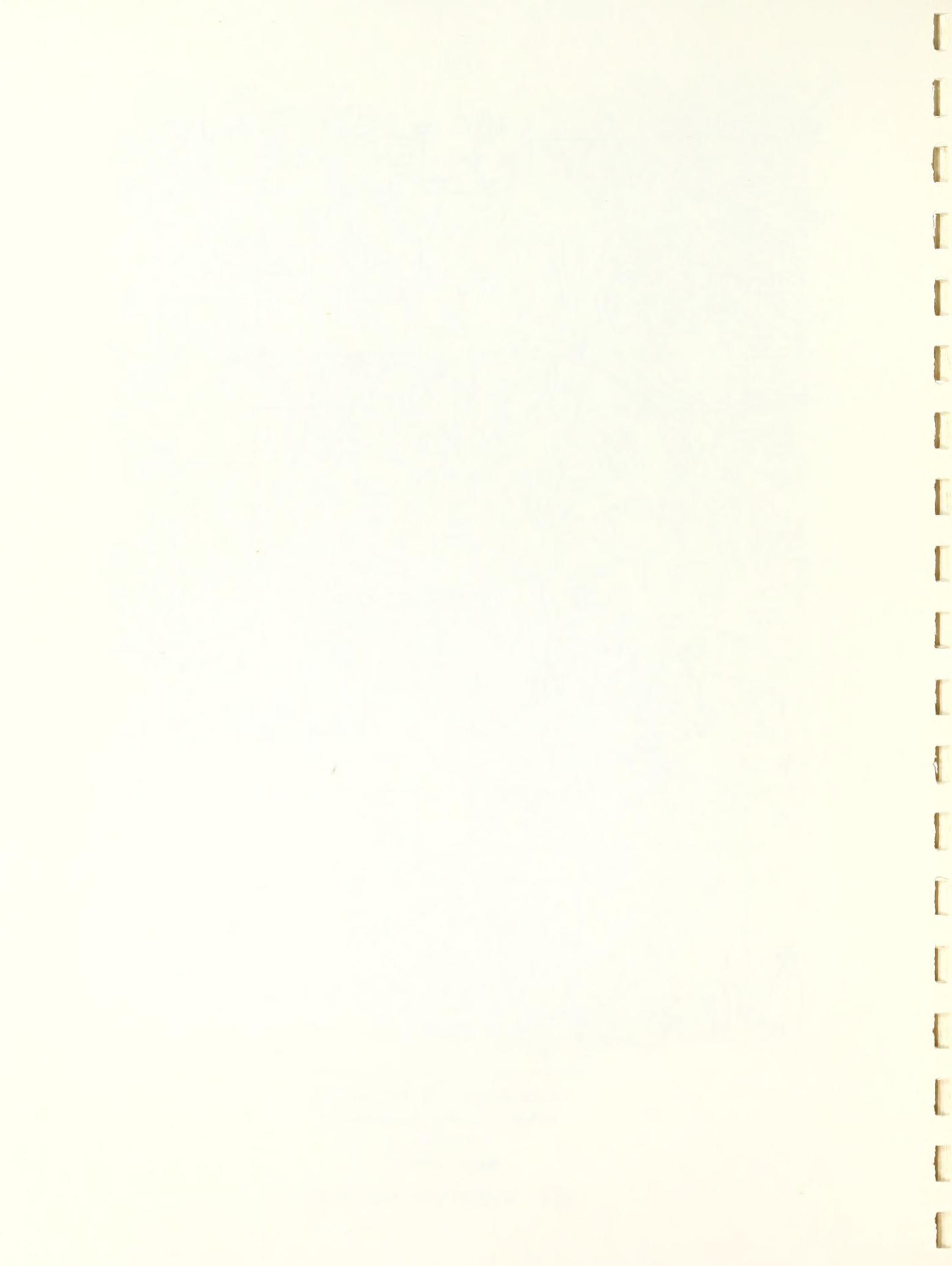
GRANTS PASS QUADRANGLE
OREGON—JOSEPHINE CO.
15 MINUTE SERIES (TOPOGRAPHIC)

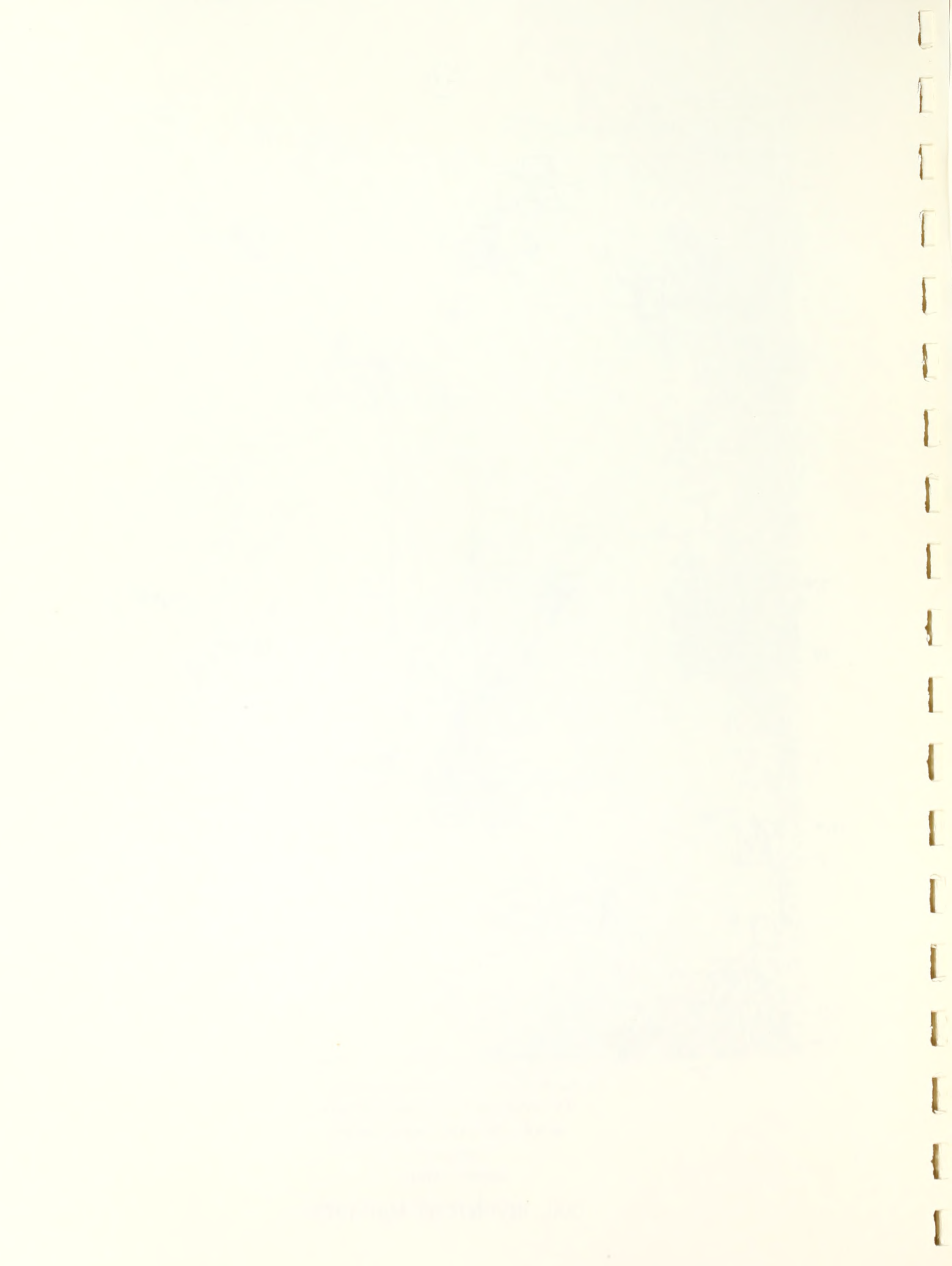


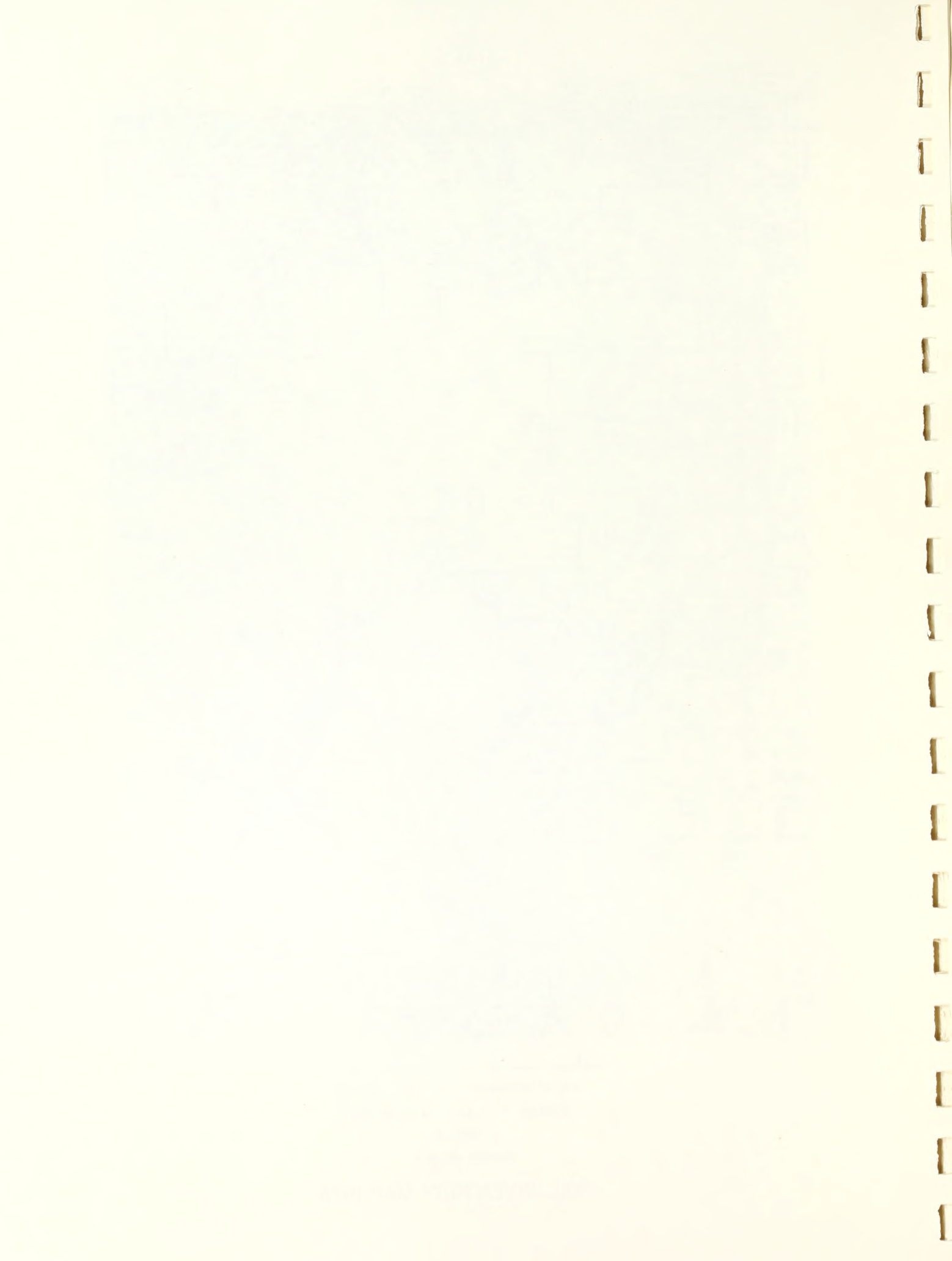
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON
MEDFORD DISTRICT

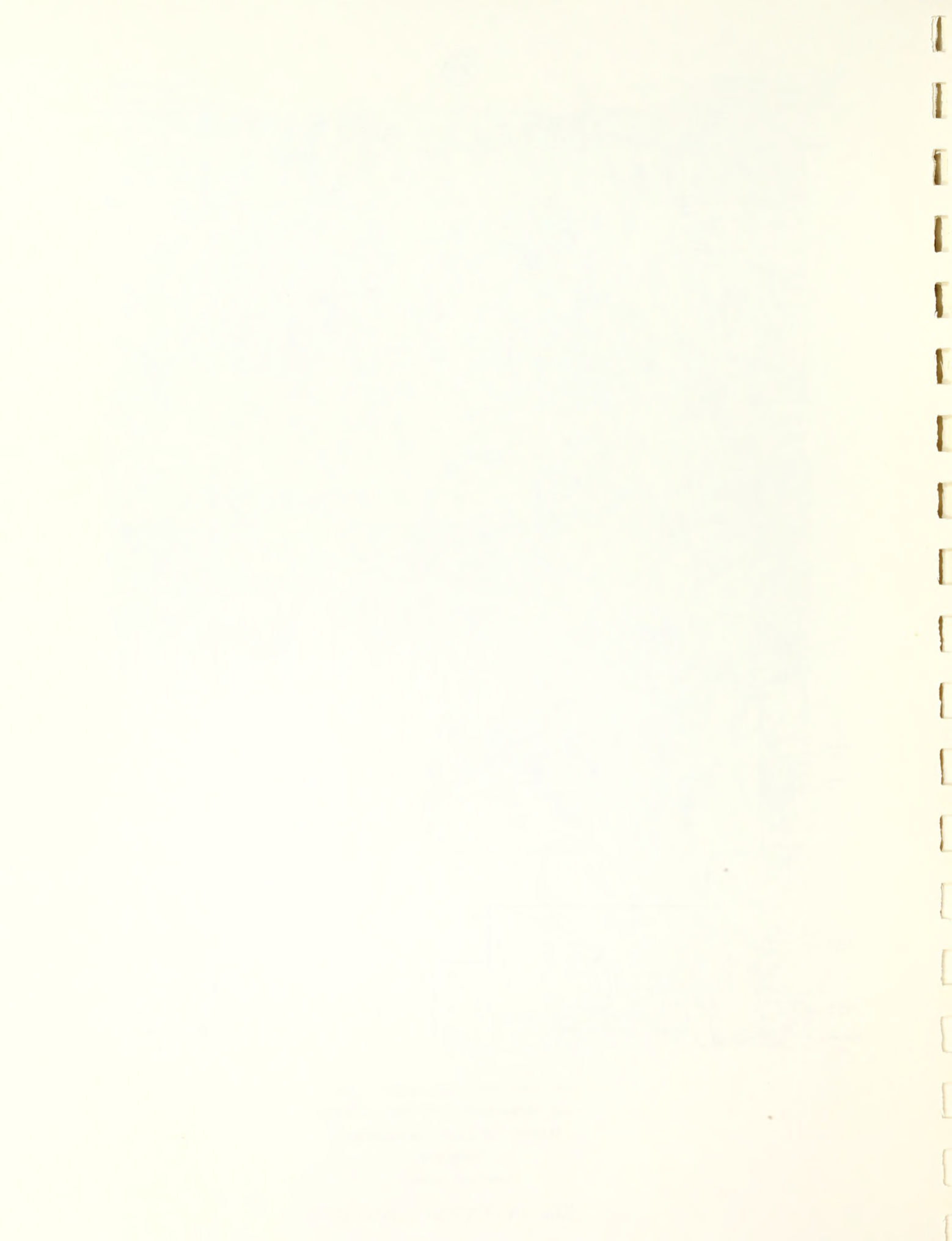
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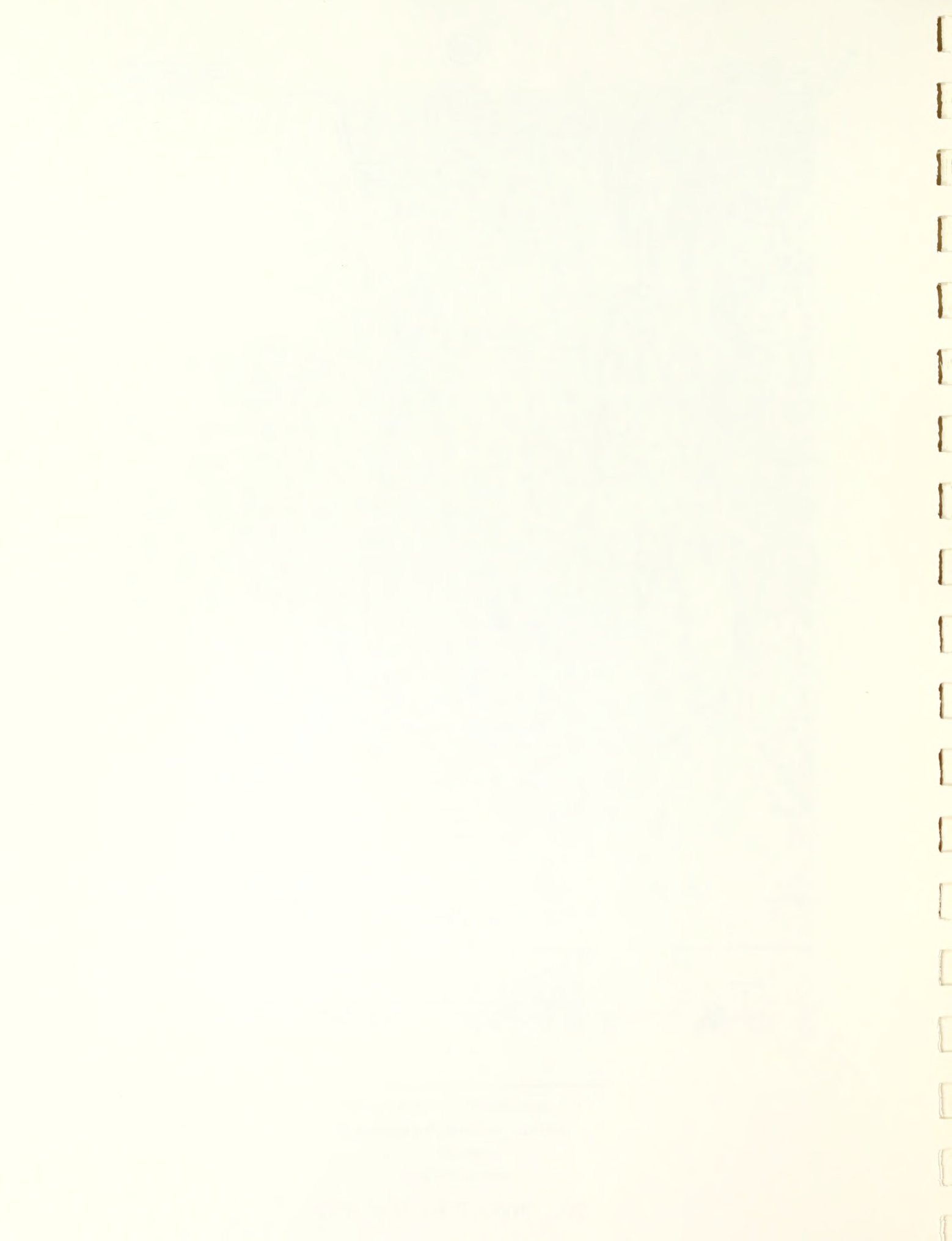


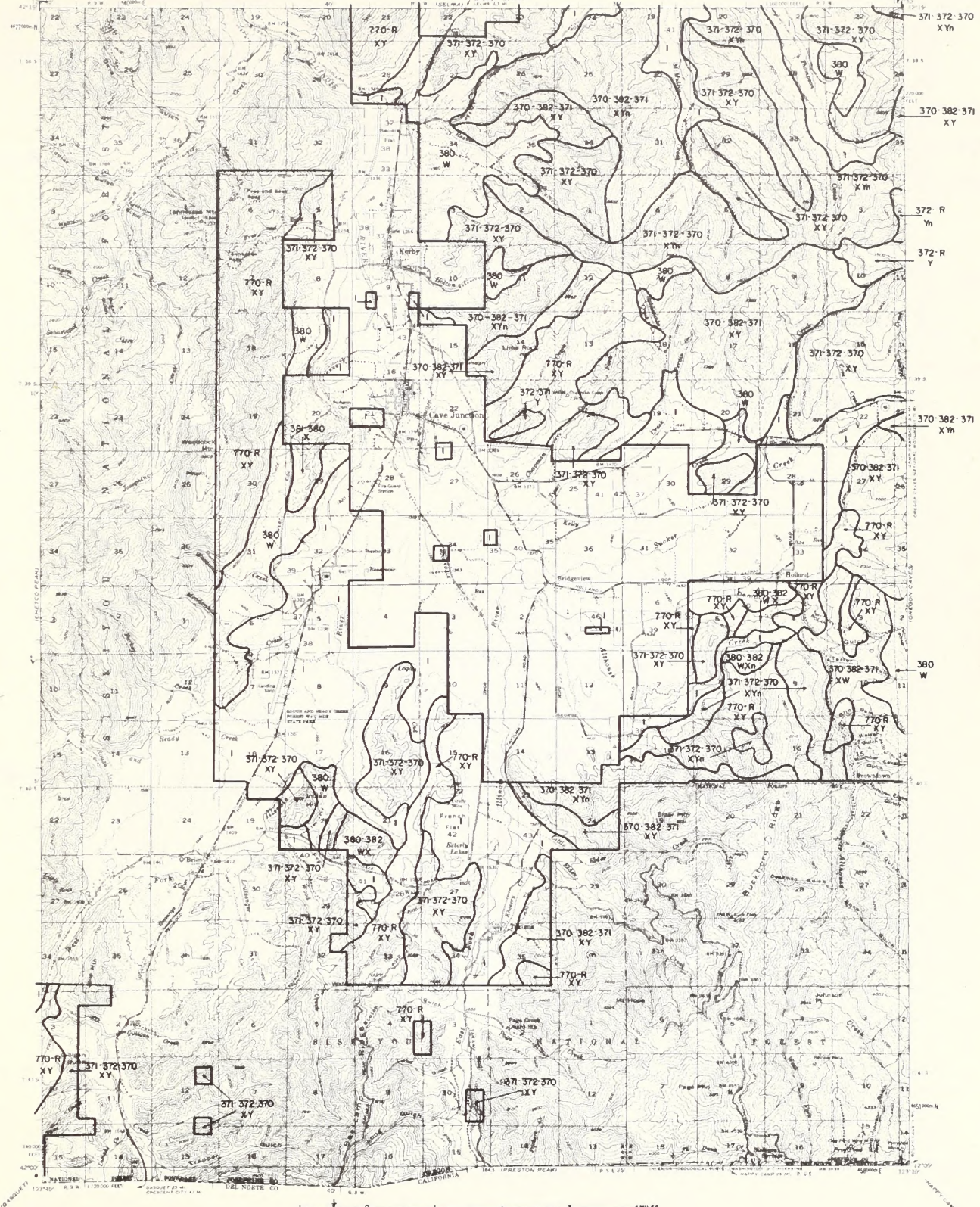












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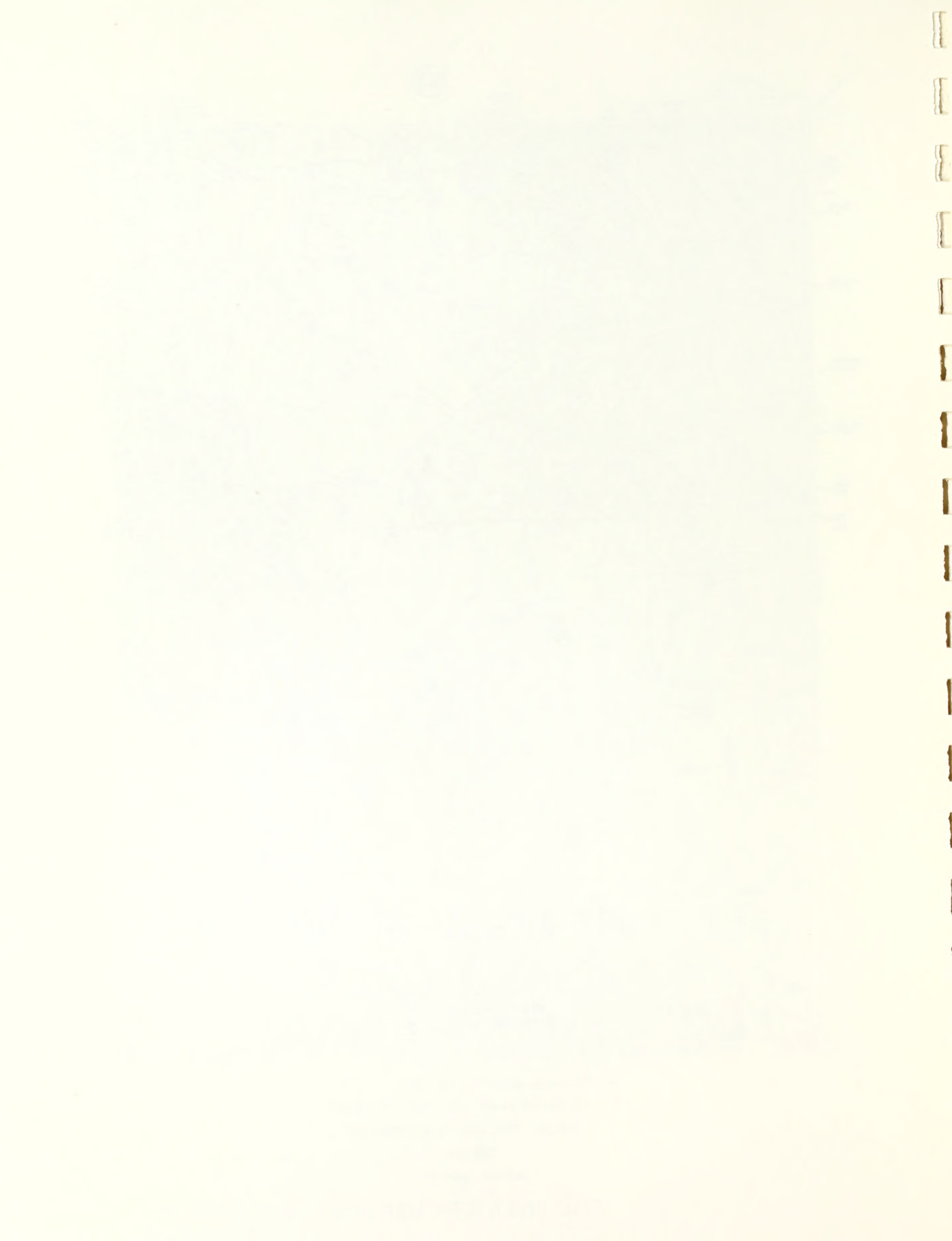
SOIL INVENTORY MAP 1973



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2020



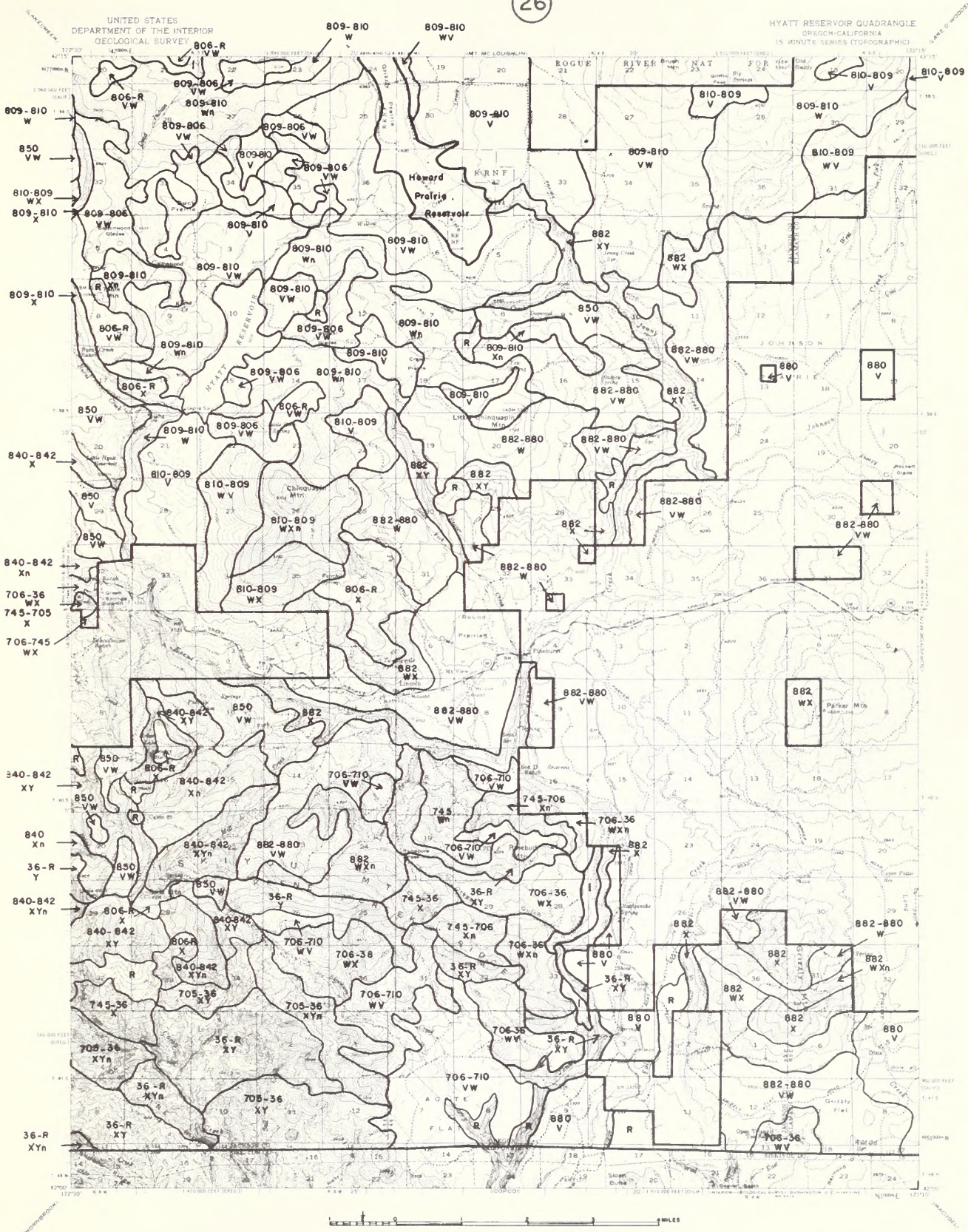
PLANNING DEPARTMENT
CITY OF BOSTON
COMMUNITY DEVELOPMENT
DIVISION
100 STATE STREET
BOSTON, MASSACHUSETTS 02109
TEL: 617-552-3000
FAX: 617-552-3001
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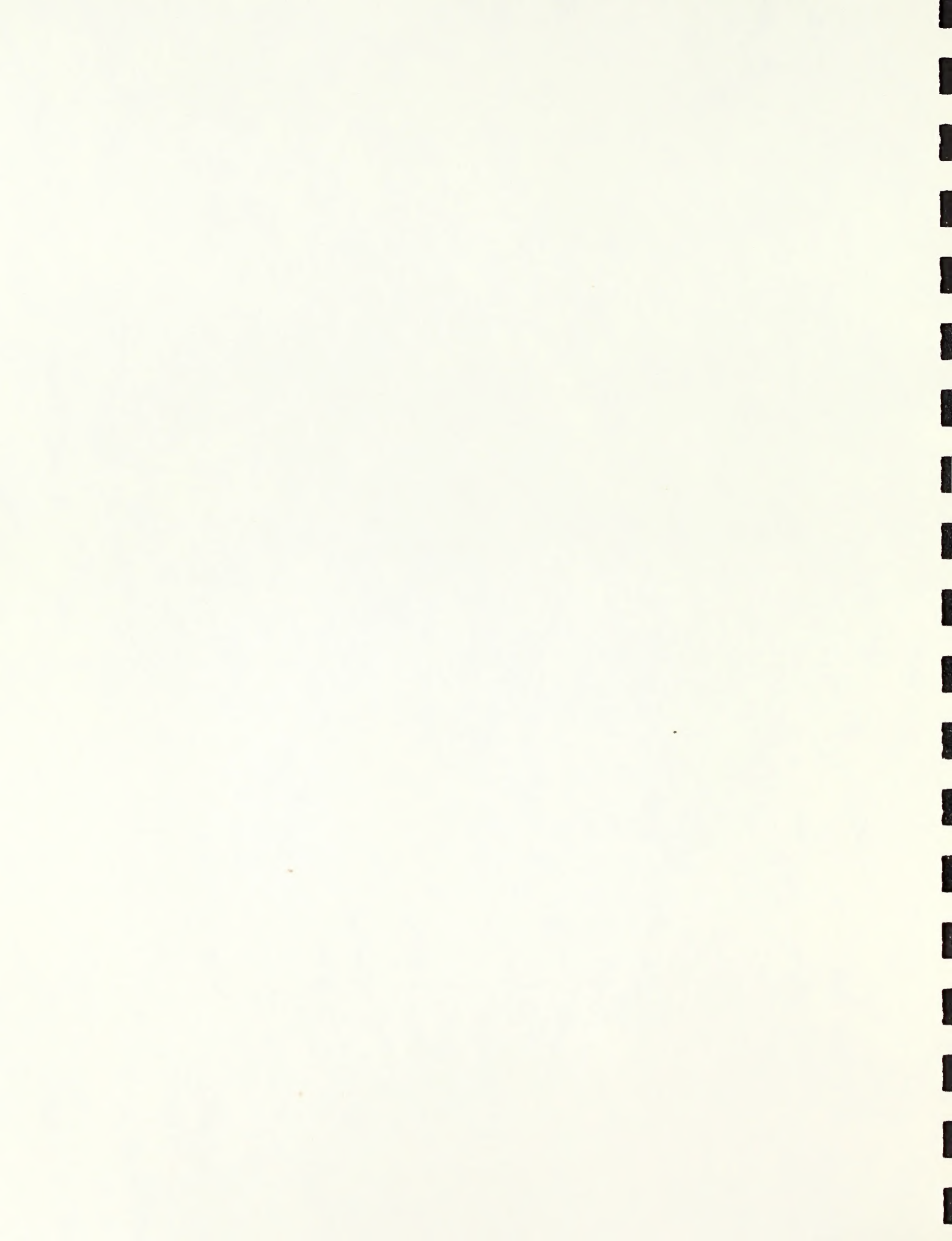
UNITED STATES DEPARTMENT OF THE INTERIOR ECOLOGICAL SURVEY

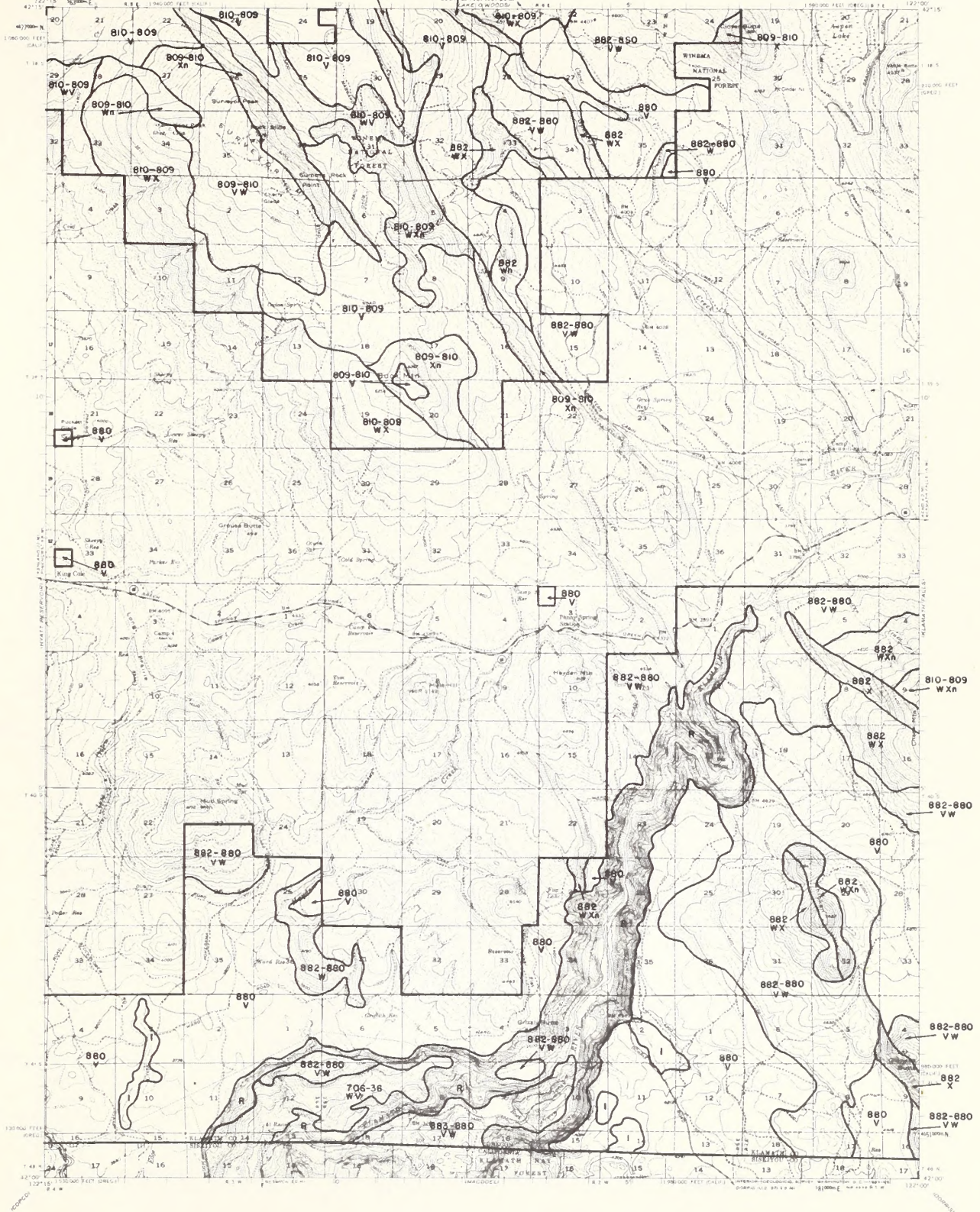
HYATT RESERVOIR QUADRANGLE OREGON-CALIFORNIA 15 MINUTE SERIES (TOPOGRAPHIC)



U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
 OREGON
 MEDFORD DISTRICT

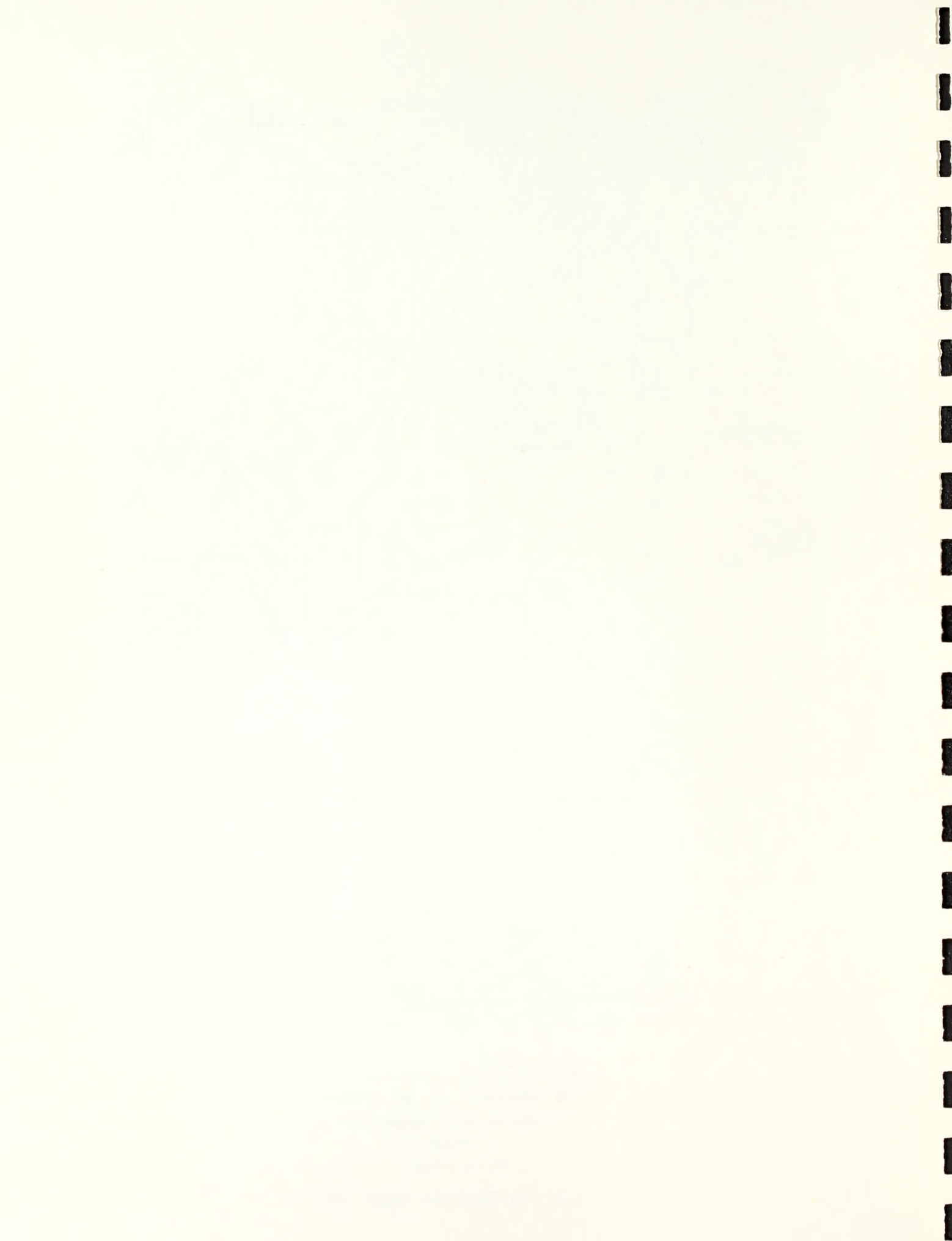
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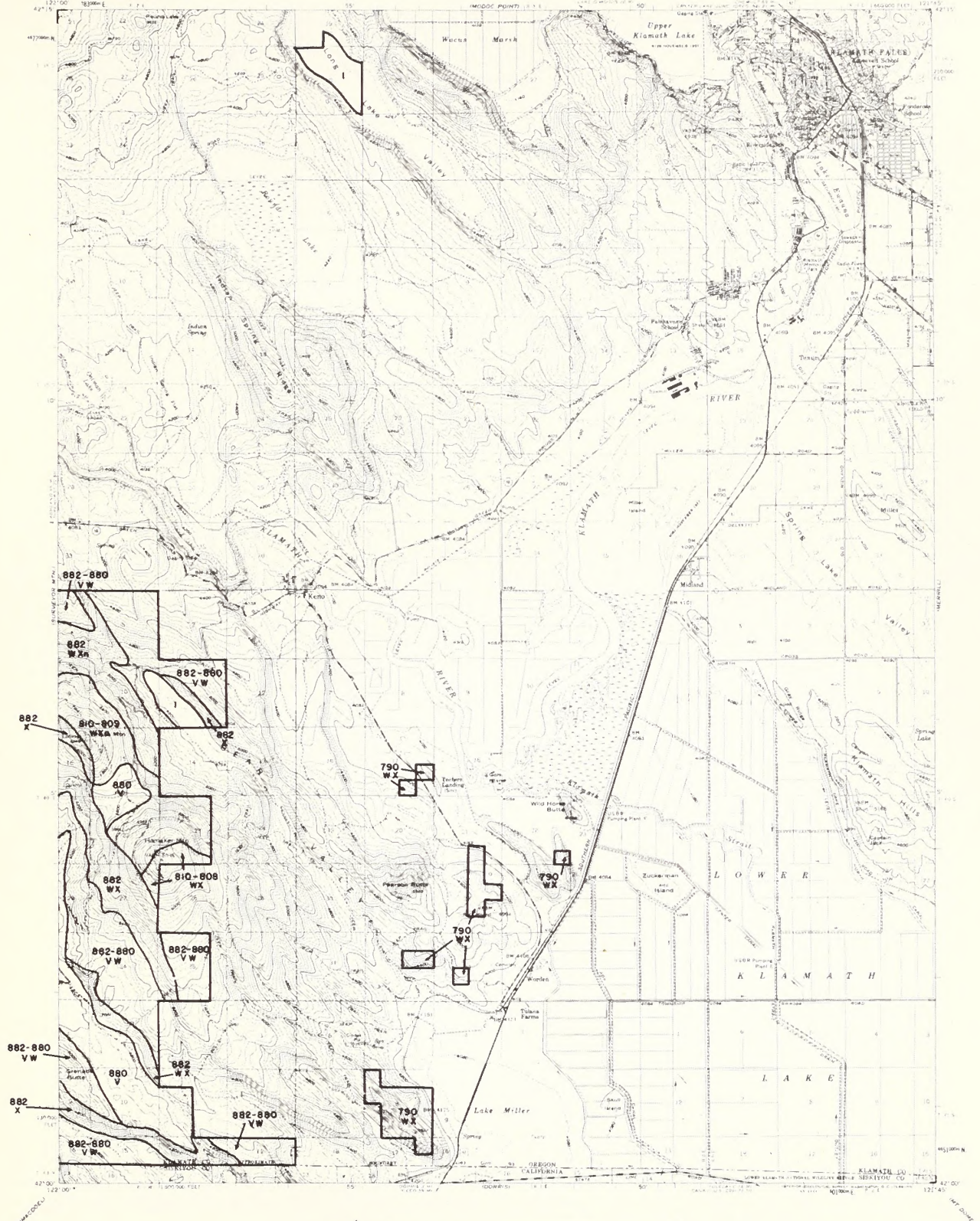




U.S. DEPARTMENT OF THE INTERIOR
 BUREAU OF LAND MANAGEMENT
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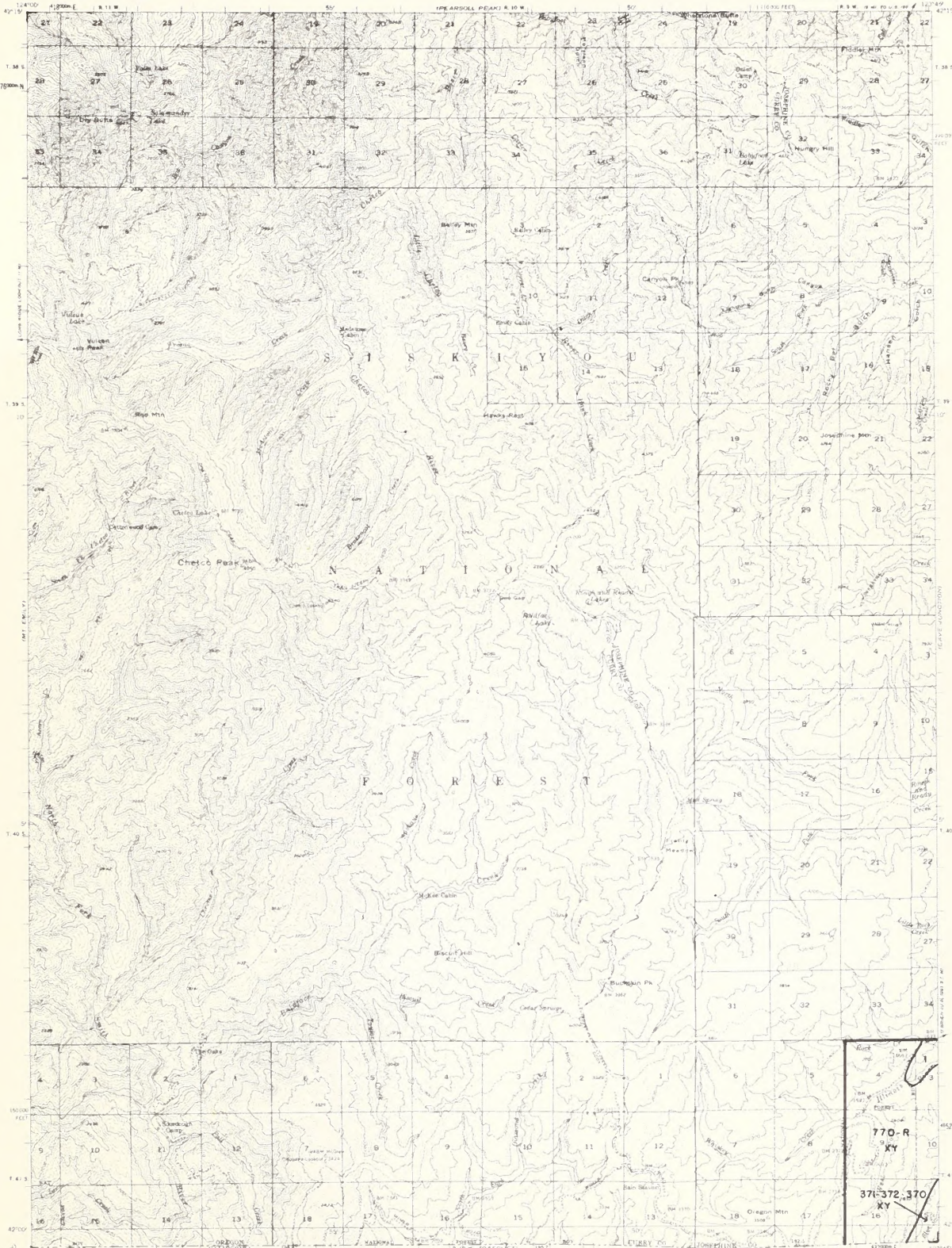
SOIL INVENTORY MAP 1973





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SOIL INVENTORY MAP 1973

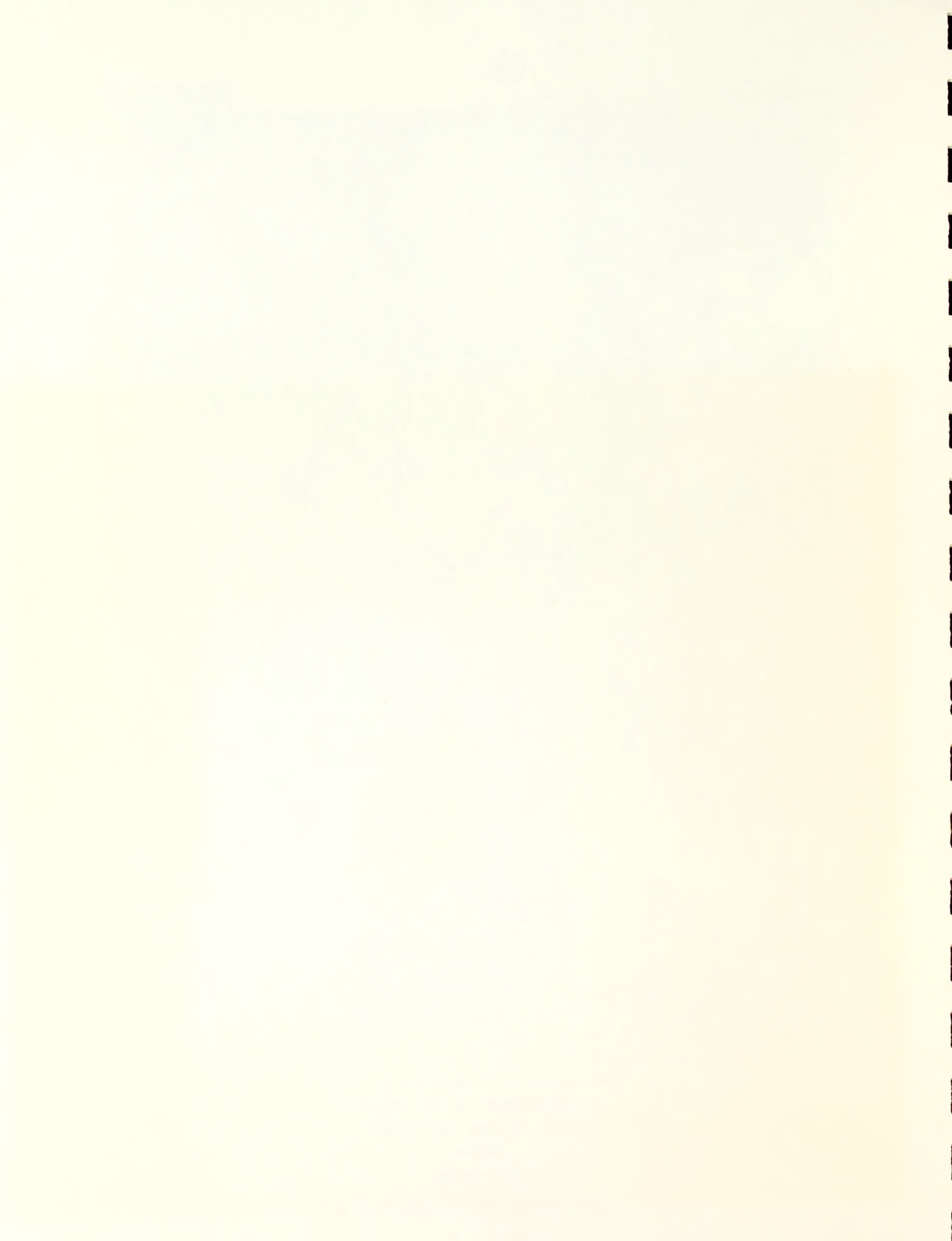


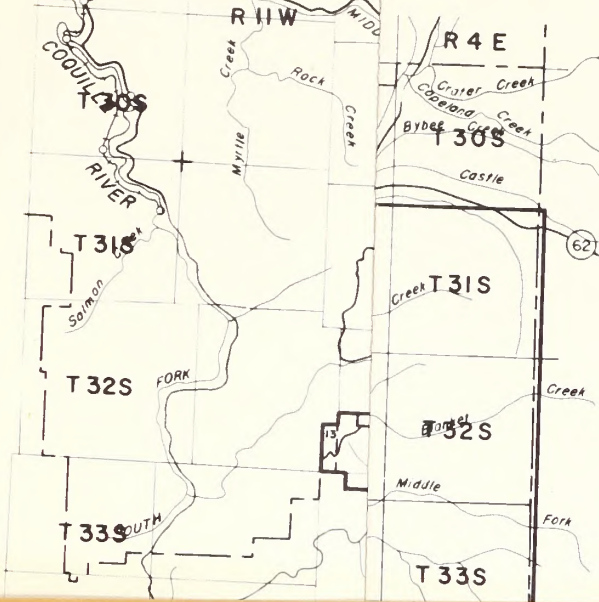
U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
OREGON

MEDFORD DISTRICT

SOIL INVENTORY MAP 1973

770-R
XY
371-372,370
XY





LEGEND

Soils on Floodplains and Terraces

1. Alluvial Land (I) General Unit

Predominantly Shallow Soils

2. Witzel-Rock land (36-R) General Unit
3. Unnamed 790 General Unit
4. Pearsoll-Rock land (770-R) General Unit
5. Unnamed 372 - Unnamed 372 - Rock land (R) General Unit

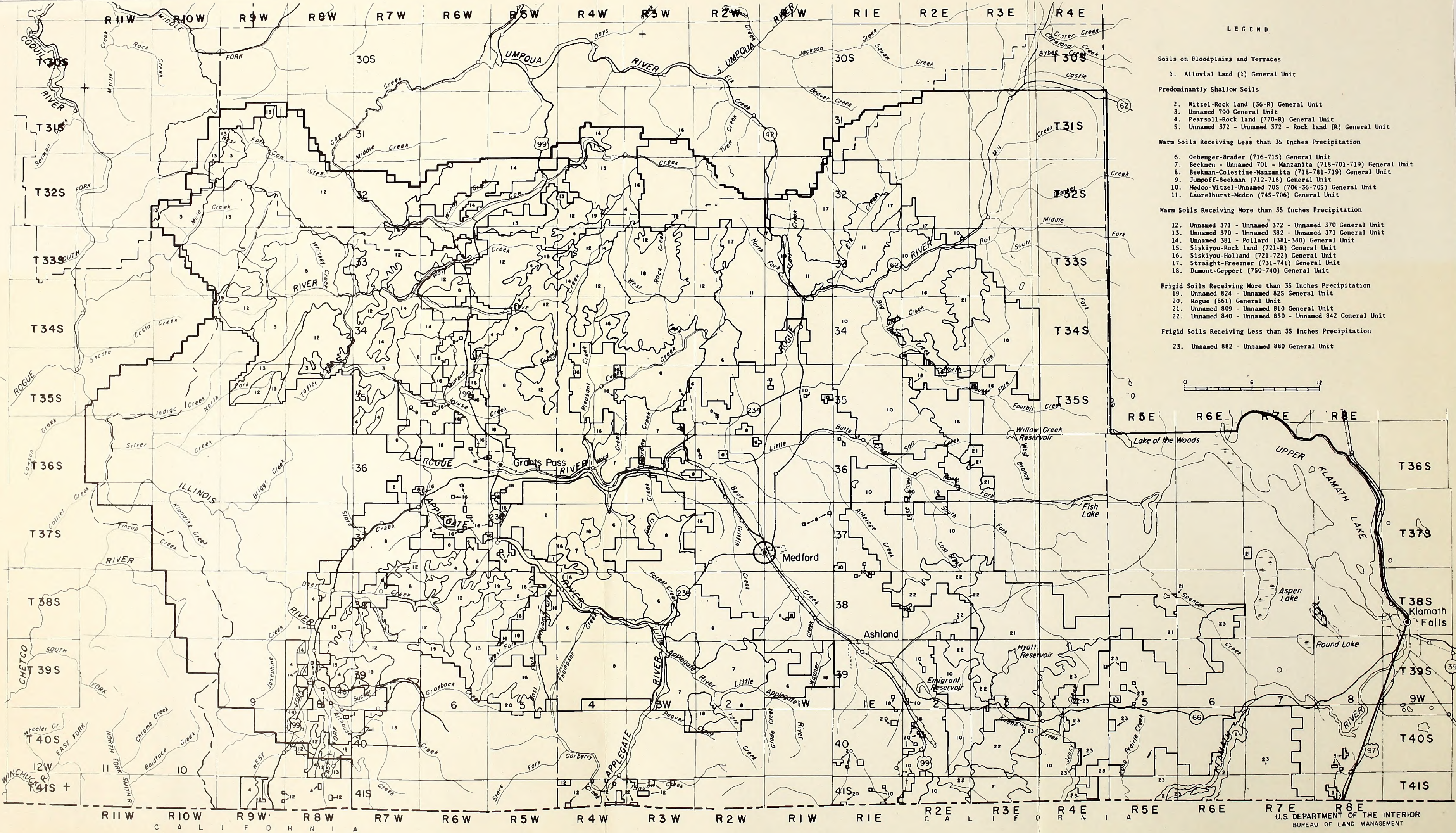
Warm Soils Receiving Less than 35 Inches Precipitation

6. Debenger-Brader (716-715) General Unit
7. Beekmen - Unnamed 701 - Manzanita (718-701-719) General Unit
8. Beekman-Colestine-Manzanita (718-781-719) General Unit
9. Jumpoff-Beekman (712-718) General Unit
10. Medco-Witzel-Unnamed 705 (706-36-705) General Unit
11. Laurelhurst-Medco (745-706) General Unit

Warm Soils Receiving More than 35 Inches Precipitation

12. Unnamed 371 - Unnamed 372 - Unnamed 370 General Unit
13. Unnamed 370 - Unnamed 382 - Unnamed 371 General Unit
14. Unnamed 381 - Pollard (381-380) General Unit
15. Siskiyou-Rock land (721-R) General Unit
16. Siskiyou-Holland (721-722) General Unit
17. Straight-Freezner (731-741) General Unit
18. Unnamed 371 - Unnamed 372 - Unnamed 370 General Unit

Form 1279-3 June 1984		BORROWER
S 599 .07 M42 197		
Soil Inventory of Medford District		
DATE LOANED	BORROWER	
USDI - ELM		



- LEGEND
- Soils on Floodplains and Terraces
1. Alluvial Land (1) General Unit
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 16. Siskiyou-Holland (721-722) General Unit
 17. Straight-Freezer (731-741) General Unit
 18. Dumont-Geppert (750-740) General Unit
- Frigid Soils Receiving More than 35 Inches Precipitation
19. Unnamed 824 - Unnamed 825 General Unit
 20. Rogue (861) General Unit
 21. Unnamed 809 - Unnamed 810 General Unit
 22. Unnamed 840 - Unnamed 850 - Unnamed 842 General Unit
- Frigid Soils Receiving Less than 35 Inches Precipitation
23. Unnamed 882 - Unnamed 880 General Unit

GENERAL SOIL MAP

1975

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF LAND MANAGEMENT
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