United States Department of Agriculture

Natural Resources Conservation Service

In cooperation with the Forest Service and the Oregon Agricultural Experiment Station

Soil Survey of Lincoln County Area, Oregon

How To Use This Soil Survey

General Soil Map

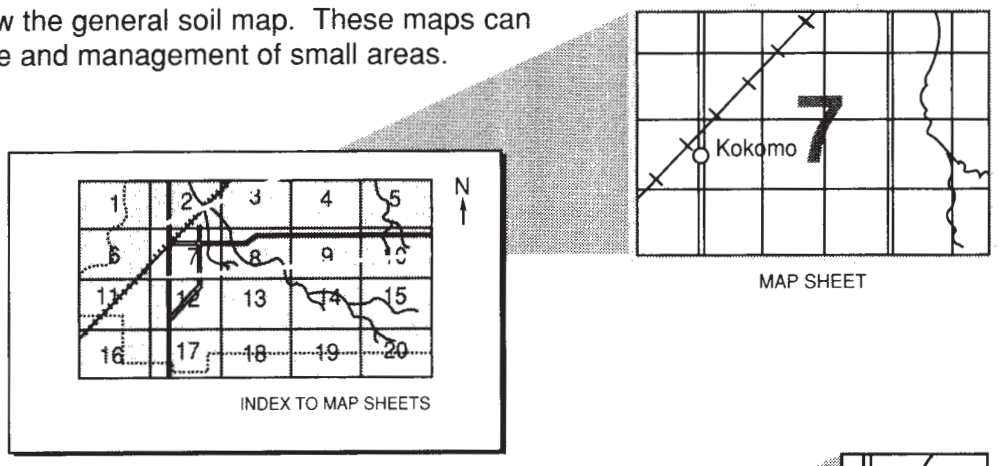
The general soil map, which is the color map preceding the detailed soil maps, shows the survey area divided into groups of associated soils called general soil map units. This map is useful in planning the use and management of large areas.

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

Detailed Soil Maps

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

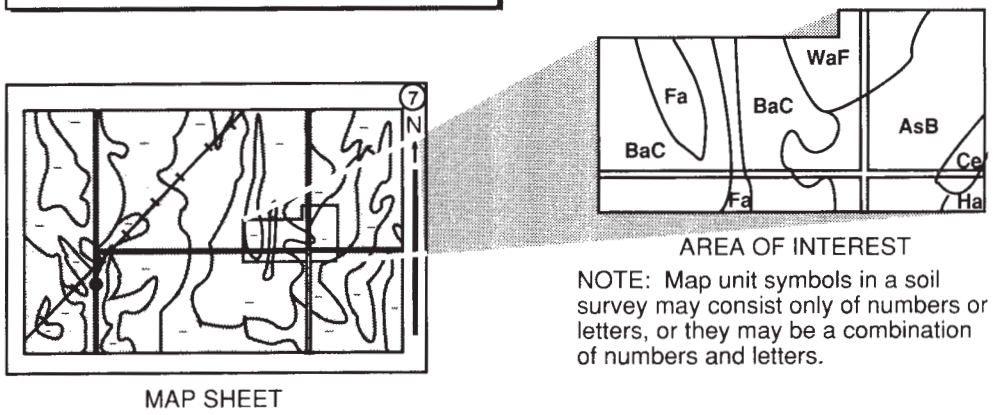
To find information about your area of interest, locate that area on the **Index to Map Sheets**, which precedes the soil maps. Note the number of the map sheet, and turn to that sheet.



INDEX TO MAP SHEETS

MAP SHEET

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



MAP SHEET

AREA OF INTEREST

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

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

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

Major fieldwork for this soil survey was completed in 1988. Soil names and descriptions were approved in 1990. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1988. This survey was made cooperatively by the Natural Resources Conservation Service, the U.S. Forest Service, and the Oregon Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Lincoln Soil and Water Conservation District.

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

Cover: A view of the survey area south from Otter Crest. Neskowin, Nelscott, Bandon, and Lint soils are dominant in this part of the area.

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Foreword

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

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

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

These and many other soil properties that affect land use are described in this soil survey. Broad areas of soils are shown on the general soil map. The location of each soil is shown on the detailed soil maps. Each soil in the survey area is described. Information on specific uses is given for each soil. Help in using this publication and additional information are available at the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Jack P. Kanalz
State Conservationist
Natural Resources Conservation Service

Soil Survey of
Lincoln County Area, Oregon

By John A. Shipman, Natural Resources Conservation Service

Fieldwork by William R. Patching and John A. Shipman

United States Department of Agriculture, Natural Resources Conservation Service
and Forest Service,
in cooperation with the
Oregon Agricultural Experiment Station

LINCOLN COUNTY AREA is along the Central Oregon Coast (fig. 1). The survey area includes most of Lincoln County and is about 493,340 acres. This survey does not include the Alsea drainage area in the southern part of the county, which was surveyed in 1973 (*15*).

The western part of the survey area has about 55 miles of coastline consisting of beaches, dunes, marine terraces, jutting headlands, and coastal bays and estuaries. The rest of the county consists of steep, forested mountainous areas drained to the west by the Salmon, Siletz, Yachats, and Yaquina Rivers and their tributaries.

Timber production takes place on about 90 percent of the area; the rest is of the land is used mainly for farming, urban and rural development, and recreation. Commercial fishing, lumber and forest products, recreation and tourism, and agricultural products provide the economic base for the survey area.

Soil scientists have determined that there are about 65 different kinds of soils in the survey area. The soils range widely in texture, natural drainage, and other characteristics.

The soils formed in the mountainous areas are steep, are mostly loamy, are moderately deep to deep over bedrock, and contain many rock fragments. Slope limits most of the mountainous area for uses other than timber production.

The soils formed along the alluvial valleys are deep, somewhat poorly drained to well drained, and loamy to fine textured. These areas are used mainly for hay and pasture but include limited development for homesites and small communities. Wetness and the hazard of flooding are limitations for some of the soils. The cool, moist summers in most years, as well as well as the demand, have resulted in hay and pasture being the dominant farm use of these soils.

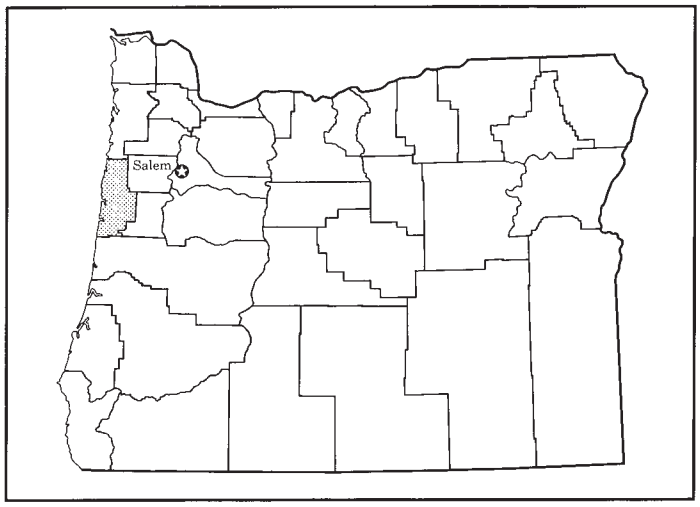

Figure 1.—Location of the Lincoln County Area in Oregon.

The soils formed along the marine terrace area adjacent to the Pacific Ocean are deep, excessively drained to poorly drained, and sandy to fine textured. These soils are used for development of homesites, other buildings, and small coastal communities. Other

uses include parks, campgrounds, beach access, picnic areas, and view points. Wetness, wind erosion, and erosion by sea waves are limitations for some of those soils. Timber production also occurs in this area, but wind blasting, brush competition, and wetness reduce productivity.

General Nature of the Survey Area

This section briefly describes the physiography and relief, farming, woodland, and climate of the survey area.

Physiography and Relief

The western edge of the survey area is characterized by dissected coastal marine terraces that extend nearly 2 miles inland in some areas. Elevation of the terraces and their soils ranges from 25 to 450 feet. Basaltic headlands interrupt the coastal terraces at Cascade Head, Cape Foulweather, Yaquina Head, and Cape Perpetua. Elevation of the headlands and their soils ranges from 50 to 1,100 feet. Tidal flood plains and their soils are along the mouths of the Yaquina, Siletz, and Salmon Rivers; elevation ranges from nearly sea level to 10 feet.

East of the marine terraces, the survey area is dominated by steep mountainous topography that has an elevation ranging from 25 to 3,350 feet. The soils in that area formed in sedimentary and volcanic rock. The northern part of the survey area is the site of most of the major peaks, including Bald, Cougar, Euchre, Saddleback, and Stott Mountains. Saddleback Mountain has an elevation of about 3,350 feet and is the highest point in the survey area.

The majority of the mountainous areas are drained by the Salmon, Siletz, Yaquina, and Yachats Rivers and their tributaries. Smaller streams that reach the Pacific Ocean include Schooner, Drift, and Beaver Creeks. The Salmon, Siletz, Yaquina, and Yachats Rivers are characterized by generally narrow stream valleys and active flood plains, stream terraces, and several levels of remnant older terraces. Their elevation ranges from 10 feet along the lower reaches of the valley flood plains to nearly 800 feet on the old high terrace remnants near the eastern edge of the county.

Farming

Farming in the survey area dominantly consists of livestock grazing and forage production. Hayland and pastures are on flood plains and terraces along major rivers and streams that drain the Coast Range Mountains. Soils on the flood plains are used dominantly for grazing land by beef and dairy cattle, sheep, and horses. Hay production also occurs on the better drained flood-plain soils. Soils on the terraces are used dominantly for hay and pasture, but the terraces also are the site of the production of strawberries, blueberries, caneberries, Christmas trees, vegetables, and nursery stock.

Woodland

The survey area is 90 percent commercial forest and is recognized as one of the major timber growing areas in North America. About 60 percent of the commercial forest is privately owned. The rest is publicly owned and is administered mainly by the federal Forest Service, Bureau of Land Management, and Bureau of Indian Affairs and by the State of Oregon.

Western hemlock, Sitka spruce, and Douglas fir dominate timber stands in the coastal areas. Douglas fir and western hemlock are dominant in inland areas. At the higher elevations western hemlock, Douglas fir, and noble fir are the dominant species.

Red alder and bigleaf maple are the major hardwood species in the survey area. Red alder contributes to improved soil structure and fertility through the rapid decay of leaves and woody material and because the roots aid the process by which nitrogen is fixed in the soil. Red alder is usually the first tree species to become established on disturbed or eroded sites. Bigleaf maple is mainly inland.

Climate

By Kelly T. Redmond, state climatologist, Oregon State University.

The climate of Lincoln County is greatly tempered by the nearby Pacific Ocean and has many characteristics of a maritime climate. Some differences in the climate of the county are apparent even a few miles inland, and the climate of the east side of the county, 24 miles from the coast, could be classified as a modified continental.

Because of the differences, the climate data for the survey area, shown in tables 1, 2, and 3, have been recorded at three sites: Newport and Tidewater in Lincoln County and Laurel Mountain in Polk County.

Most of the precipitation in the county falls in winter as the active storm belt moves to more southerly latitudes. At Newport, 16 percent of the annual precipitation falls in each of the months of December and January, and the three wettest months, November through January, contribute 46 percent of the annual total. In July the storm track retreats northward to the Gulf of Alaska and precipitation diminishes greatly in amount and frequency; July accounts for just 1 percent of the annual precipitation, and the three summer months of June through August for only 7 percent of the annual average. These percentages were generally

uniform over the entire region for the period 1951-86.

Annual precipitation along the shore ranges mainly from around 90 inches near Cape Perpetua to about 60 inches at Yaquina lighthouse, but the total is as much as 100 inches near Cascade Head. Annual precipitation is markedly less over the nearby ocean, mainly 30 to 50 inches. Amounts increase greatly near the beach and continue to increase toward the crest of the Coast Range. Along the eastern side of the county the annual totals range mainly from 100 to 120 inches in the south, are about 70 inches at Summit, and are well over 100 inches farther north, including as much as 200 inches in the rugged topography in the northeast part of the county, which has one of the wettest climates in the continental United States.

In winter, measurable rain falls about 2 out of every 3 days. The frequency of rainy days is about the same even in the wetter locations, but the amounts of rain on those days tends to be greater. In summer, fog and drizzle along the immediate coastline cause a higher number of rainy days there than in inland areas. Newport, for instance, averages 185 days of measurable rain per year, which is at least 20 days more than the wetter sites in the Coast Range. The Coast Range, however, has as many as 15 days more per year in which the total rainfall is at least 0.10 inch, reflecting the greater incidence of summer drizzle on the coast. Throughout the county the amount of precipitation on the wettest day of the year is typically 3.5 to 4 percent of the annual average.

A comparison between Newport, near the shoreline, and Tidewater, 9 miles inland from Waldport, shows the dominating effect of the ocean on temperatures. In winter, daily ranges and monthly means are similar at Newport and Tidewater. In summer, however, the average maximum at Tidewater is nearly 10 degrees higher than at Newport, a consequence of solar heating that occurs prior to the later arrival of the sea breeze at the more inland location. Further inland, maximums reach even higher. It is not uncommon in summer for temperatures in the Willamette Valley to reach the 80's and 90's while remaining near 60 degrees on the coast. The highest temperatures in the summer months are typically 10 to 15 degrees warmer at Tidewater than at Newport. At Newport in at least 1 year during the period of record the maximum temperature has not gone above 76 degrees, but at Tidewater the maximum during the period of record has annually reached at least 84 degrees. At the 3,600-foot elevation of Laurel Mountain, monthly maximum temperatures in summer are comparable to those at Newport; the cooling effect of altitude on daytime temperatures at Laurel Mountain approximately matches the cooling by the sea at the coastline.

As a result of the ocean's proximity the annual thermal cycle on the coast is slower than at the inland stations. Along the coast, for instance, the warmest, clearest days of the year often occur in autumn. The average monthly high in Newport is nearly 10 degrees higher in September than in August, and in October the average high is still 3 degrees warmer than in August.

Snow is uncommon at low elevations, occurring approximately once a year or every other year near sea level. Higher elevations in the Coast Range see more frequent snows, however. Valsetz, at 1,100 feet, averages about 6 days annually with an inch or more of fresh snow, and Laurel Mountain receives an inch or more on about 35 days. Valsetz averages a total annual snowfall of about 1 foot but has had as much as 4 feet in a season. Laurel Mountain has averaged about 8 feet per year over a 16-year period of record, and the maximum depth at any one time was 52 inches.

Thunderstorms in the survey area are uncommon, generally five to seven per year, and are usually less severe than those inland.

Winds are persistently from the north in summer and are from the south, but less constant, in winter. In summer, windspeeds frequently decrease at higher elevations and are seldom able to cause harm, except to create rough conditions on the ocean. In winter, the strongest gusts are nearly always from the south-to-west quadrant. Damaging winds are usually from large scale winter storms. At exposed locations on the coast and on ridgetops, speeds of 90 to 100 mph are nearly an annual occurrence, and speeds of at least 130 mph have been recorded at Mt. Hebo.

On the coast, the relative humidity at midday averages about 75 percent in winter and 70 percent in summer. Farther inland, in the Willamette Valley, midafternoon relative humidity in summer typically falls in the range of 30 to 40 percent, which is about the same as that on the coast on warm sunny days. At night a relative humidity of 90 to 100 percent is common at lower elevation during all months and at all distances from the sea. At the higher elevations, subsiding dry air in summertime likely causes lower levels of humidity during the day and night.

Table 1 gives data on temperature and precipitation as recorded in the periods 1951-86 at Newport and Tidewater in Lincoln County and 1987-93 at Laurel Mountain in Polk County. Table 2 shows probable dates of first freeze in fall and last freeze in spring. Table 3 provides data on length of the growing season.

How This Survey Was Made

This survey was made to provide information about the soils and miscellaneous areas in the survey area.

The information includes a description of the soils and miscellaneous areas and their location and a discussion of their suitability, limitations, and management for specified uses. Soil scientists observed the steepness, length, and shape of the slopes; the general pattern of drainage; the kinds of crops and native plants; and the kinds of bedrock. They dug many holes to study the soil profile, which is the sequence of natural layers, or horizons, in a soil. The profile extends from the surface down into the unconsolidated material in which the soil formed. The unconsolidated material is devoid of roots and other living organisms and has not been changed by other biologic activity.

The soils and miscellaneous areas in the survey area are in an orderly pattern that is related to the geology, landforms, relief, climate, and natural vegetation of the area. Each kind of soil and miscellaneous area is associated with a particular kind or segment of the landscape. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landscape, a soil scientist develops a concept or model of how they were formed. Thus, during mapping, this model enables the soil scientist to predict with considerable accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Individual soils on the landscape commonly merge gradually onto one another as their characteristics gradually change. To construct an accurate map, however, soil scientists must determine the boundaries between the soils. They can observe only a limited number of soil profiles. Nevertheless, these observations, supplemented by an understanding of the soil-vegetation-landscape relationship, are sufficient to verify predictions of the kinds of soil in an area and to determine the boundaries.

Soil scientists recorded the characteristics of the soil profiles that they studied. They noted color, texture, size, and shape of soil aggregates, kind and amount of rock fragments, distribution of plant roots, reaction, and other features that enable them to identify soils. After describing the soils in the survey area and determining their properties, the soil scientists assigned the soils to taxonomic classes (units). Taxonomic classes are concepts. Each taxonomic class has a set of soil characteristics with precisely defined limits. The classes are used as a basis for comparison to classify soils systematically. Soil taxonomy, the system of taxonomic classification used in the United States, is based mainly on the kind and character of soil properties and the arrangement of horizons within the profile (*16*). After the soil scientists classified and named the soils in the survey area, they compared the individual soils with similar soils in the same taxonomic class in other areas so that they could confirm data and assemble additional data based on experience and research.

While the soil survey was in progress, samples of some of the soils in the area were collected for laboratory analyses and for engineering tests. Soil scientists interpreted the data from these analyses and tests as well as the field-observed characteristics and the soil properties to determine the expected behavior of the soils under different uses. Interpretations for all of the soils were field tested through observation of the soils in different uses and under different levels of management. Some interpretations were modified to fit local conditions, and some new interpretations were developed to meet local needs. Data were assembled from other sources, such as research information, production records, and field experience of specialists. For example, data on crop yields under defined levels of management were assembled from farm records and from field or plot experiments on the same kinds of soil.

Predictions about soil behavior are based not only on soil properties but also on such variables as climate and biological activity. Soil conditions are predictable over long periods of time, but they are not predictable from year to year. For example, soil scientists can state with a fairly high degree of probability that a given soil will have a high water table within certain depths in most years, but they cannot predict that a high water table will always be at a specific level in the soil on a specific date.

After soil scientists located and identified the significant natural bodies of soil in the survey area, they drew the boundaries of these bodies on aerial photographs and identified each as a specific map unit. Aerial photographs show trees, buildings, fields, roads, and rivers, all of which help in locating boundaries accurately.

General Soil Map Units

The general soil map at the back of this publication shows broad areas that have a distinctive pattern of soils, relief, and drainage. Each map unit on the general soil map is a unique natural landscape. Typically, a map unit consists of one or more major soils or miscellaneous areas and some minor soils or miscellaneous areas. It is named for the major soils or miscellaneous areas. The soils or miscellaneous areas making up one unit can occur in other units but in a different pattern.

The general soil map can be used to compare the suitability of large areas for general land uses. Areas of suitable soils or miscellaneous areas can be identified on the map. Likewise, areas that are not suitable can be identified.

Because of its small scale, the map is not suitable for planning the management of a farm or field or for selecting a site for a road or building or other structure. The soils in any one map unit differ from place to place in slope, depth, drainage, and other characteristics that affect management.

The general map units in this survey have been grouped into general kinds of landscape for broad interpretive purposes. Each of the broad groups and the map units in each group are described in the following pages.

Soil Descriptions

Soils on Coastal Flood Plains and Terraces

These soils make up about 10.5 percent of the survey area.

1. Coquille

Deep, very poorly drained silt loams that formed in recent alluvium; on tidal flood plains

This map unit consists of soils on broad tidal flood plains along the Salmon, Siletz, and Yaquina Rivers and along Beaver, Drift, Rock, and Schooner Creeks. The soils generally are frequently flooded during winter and during periods of extremely high tides. About 25 percent of the unit is protected by dikes and is subject to rare flooding. The native vegetation is mainly red alder, willows, sedges, rushes, skunkcabbage, grasses, and scattered Sitka spruce. Slopes are 0 to 1 percent. Elevation is 0 to 10 feet. The mean annual precipitation is 60 to 80 inches, the mean annual air temperature is 48 to 52 degrees F, and the frost-free period is 180 to 240 days.

This unit makes up about 1 percent of the survey area. It is about 85 percent Coquille soils. The rest is soils of minor extent.

In some areas of the Coquille soils, the frequency of flooding and the drainage have been altered by dikes and open ditches. Typically, the surface layer of the Coquille soils is very dark grayish brown silt loam. The upper part of the substratum is dark grayish brown, mottled silty clay loam. The lower part is dark gray silty clay loam and silt loam.

Of minor extent in this unit are the very poorly drained Brallier soils along backswamps and in slack-water areas on tidal flood plains, the well drained Nehalem and Yachats soils adjacent to the active stream channels, and the somewhat poorly drained Nestucca and poorly drained Brenner soils in depressional areas where the stream flood plains and tidal flood plains join.

Most areas are used for wetland wildlife habitat (fig. 2). This unit is limited mainly by frequent flooding and wetness. Areas that are protected by dikes are used for pasture. The main limitations in these areas are wetness and rare flooding. The wetness limits grazing in protected areas during the rainy season. A drainage system is needed if the maximum production of forage is to be achieved. The hazard of flooding can be minimized by maintaining dikes and tide gates. High humidity, fog, low clouds, and occasional summer rainfall limit the curing of high-quality hay crops in most years.

2. Nestucca-Nehalem

Deep, somewhat poorly drained and well drained silt loams that formed in recent alluvium; on valley flood plains

This map unit consists of soils on valley flood plains along the Salmon, Siletz, Yachats, and Yaquina Rivers

Figure 2.—An area of wetland wildlife habitat near Millport Slough in the Coquille general soil map unit.

and along Beaver, Drift, and Schooner Creeks. The soils are frequently flooded or occasionally flooded. The native vegetation is mainly Sitka spruce, western hemlock, red alder, vine maple, salal, salmonberry, western swordfern, willows, rushes, sedges, and grasses. Most areas have been cleared of trees and are used for pasture. Slopes are 0 to 3 percent. Elevation is 10 to 100 feet. The mean annual precipitation is 70 to 100 inches, the mean annual air temperature is 49 to 52 degrees F, and the frost-free period is 160 to 210 days.

This unit makes up about 1.5 percent of the survey area. It is about 40 percent Nestucca soils and 40 percent Nehalem soils. The rest is soils of minor extent.

Nestucca soils are somewhat poorly drained. Typically, the surface layer is dark brown and very dark grayish brown silt loam. The subsoil is dark grayish brown, mottled silty clay loam. The substratum is dark gray, mottled clay loam.

Nehalem soils are well drained. Typically, the surface layer is very dark grayish brown and dark brown silt loam. The subsoil is brown silt loam. The substratum is dark yellowish brown silt loam.

Of minor extent in this unit are the poorly drained Brenner soils in depressional areas and backswamps on flood plains, the well drained Yachats soils adjacent to streams, the well drained Logsden soils on stream terraces, the moderately well drained Grindbrook soils on terraces, and the very poorly drained Coquille and Brallier soils in areas where tidal flood plains and stream flood plains join.

Most areas are used for pasture. Frequent flooding on the Nestucca soils and occasional flooding on the Nehalem soils limit grazing during the rainy season. A drainage system is needed if the maximum production of forage is to be achieved on the Nestucca soils. Grazing when the soils are wet causes compaction of the surface layer and results in poor tilth and reduced forage production. High humidity, fog, low clouds, and occasional summer rainfall limit the curing of high-quality hay crops in most years.

3. Nelscott-Bandon-Lint

Moderately well drained and well drained loams, fine sandy loams, and silt loams that are moderately deep to a pan or are deep and that formed in eolian and alluvial material; on marine terraces

This map unit consists of soils on marine terraces adjacent to the Pacific Ocean. The native vegetation is mainly Sitka spruce, western hemlock, western redcedar, shore pine, red alder, vine maple, red huckleberry, evergreen huckleberry, salmonberry, salal, western swordfern, and rhododendron. Douglas-fir is in protected areas. Slopes are 3 to 50 percent. Elevation is 50 to 450 feet. The mean annual precipitation is 60 to 80 inches, the mean annual air temperature is 49 to 52 degrees F, and the frost-free period is 180 to 240 days.

This unit makes up about 5.5 percent of the survey area. It is about 35 percent Nelscott soils, 14 percent Bandon soils, and 10 percent Lint soils. The rest is soils of minor extent.

Nelscott soils are moderately well drained and are moderately deep to a cemented pan. Typically, the surface layer is very dark grayish brown and dark brown loam. The subsoil is brown, mottled silty clay loam. The next layer is light brownish gray, mottled loamy fine sand. Below this is variegated grayish brown, yellowish brown, and reddish brown, moderately cemented fine sand. The substratum is variegated light brownish gray, yellowish brown, and brown loose fine sand that has thin lenses of weakly cemented material.

Bandon soils are well drained and are moderately deep to a cemented pan. Typically, the surface layer is dark grayish brown fine sandy loam. The subsoil is dark brown and brown loam. The next layer is yellowish brown, moderately cemented bands of loamy fine sand. The substratum is dark yellowish brown loamy fine sand.

Lint soils are well drained and deep. Typically, the surface layer is dark brown silt loam. The subsoil is dark yellowish brown and brown silt loam. The substratum is yellowish brown, mottled silty clay loam.

Of minor extent in this unit are Beaches; the poorly drained Depoe and somewhat poorly drained Gleneden soils in depressional areas on marine terraces; the excessively drained Waldport soils on recently stabilized dunes; the well drained Netarts and somewhat poorly drained Yaquina soils in stabilized dune and interdune areas; Urban land; and Fendall, Templeton, Reedsport, and Tolovana soils on uplands, in mountainous areas, and on steep escarpments and side slopes along drainageways.

This unit is used for timber production, homesite development, woodlots, wildlife habitat, and recreational development. Onshore winds reduce the growth rate and quality of timber in exposed areas. Excessive disturbance of the surface of the Bandon soils when the trees are logged may expose soil material that is highly susceptible to wind erosion. Compaction is a hazard if wheeled and tracked equipment is used when the Nelscott and Lint soils are moist. Windthrow is a hazard because rooting is limited by the moderate depth to a cemented layer in the Nelscott and Bandon soils and the seasonal high water table in the Nelscott soils.

In some areas the slope limits the suitability of the Nelscott, Bandon, and Lint soils for building site development and for septic tank absorption fields. Deep cuts in the Bandon soils expose soil material that is highly susceptible to wind erosion. Cutbanks are unstable in areas of the Bandon and Nelscott soils. Establishing a plant cover and using a proper design help to control erosion and stabilize cutbanks. A drainage system at building sites reduces the wetness of the Nelscott soils. The depth to a cemented pan and slow permeability through the cemented layer limit the Bandon and Nelscott soils as sites for septic tank absorption fields. The wetness of the Nelscott soils also is a limitation for that use.

4. Logsden-Bentilla-Grindbrook

Deep, well drained and moderately well drained silt loams and silty clay loams that formed in alluvium; on valley terraces

This map unit consists of soils on valley terraces along the Salmon, Siletz, and Yachats Rivers. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salmonberry, salal, red huckleberry, and western swordfern. Slopes are 0 to 12 percent. Elevation is 40 to 400 feet. The mean annual precipitation is 70 to 100 inches, the mean annual air temperature is 49 to 52 degrees F, and the frost-free period is 160 to 210 days.

This unit makes up about 2.5 percent of the survey area. It is about 25 percent Logsden soils, 15 percent Bentilla soils, and 14 percent Grindbrook soils. The rest is soils of minor extent.

Logsden soils are well drained. They are on low stream terraces and are subject to rare, brief flooding during the rainy season. Typically, the surface layer is very dark grayish brown and dark brown silt loam. The subsoil is dark brown and dark yellowish brown silt loam and dark yellowish brown silty clay loam. The upper part of the substratum is dark yellowish brown fine sandy loam. The lower part is dark yellowish brown, stratified loamy sand and fine sandy loam.

Bentilla soils are moderately well drained. They are on high terraces along the major streams. Typically, the surface layer is very dark brown, very dark grayish

brown, and dark brown silty clay loam. The upper part of the subsoil is brown silty clay. The lower part is yellowish brown, mottled clay; light brownish gray, mottled silty clay; and gray, mottled clay.

Grindbrook soils are moderately well drained. They are on high terraces along the major streams. Typically, the surface layer is dark brown silt loam. The upper part of the subsoil is dark brown silty clay loam. The lower part is dark yellowish brown and pale brown, mottled silty clay loam.

Of minor extent in this unit are the poorly drained Hebo soils; the somewhat poorly drained Chitwood and Euchre soils; the moderately well drained Wadecreek soils; the well drained Quillamook, Knappa, and Siletz soils; and the somewhat excessively drained Wolfer soils. All of these soils are on terraces.

This unit is used for pasture, timber production, homesite development, and wildlife habitat. Grazing when the soils are wet causes compaction of the surface layer and results in poor tilth and reduced forage production. High humidity, fog, low clouds, and occasional summer rainfall limit the curing of high-quality hay crops in most years.

If this unit is used for timber production, using wheeled and tracked equipment when the soils are moist causes rutting and compaction of the surface layer. Careful management of reforestation is needed to minimize competition from undesirable plants. Windthrow is a hazard on the Bentilla and Grindbrook soils because the rooting is limited by the seasonal high water table.

If this unit is used for homesite development, the rare flooding on the Logsden soils, the wetness of the Bentilla and Grindbrook soils, and low soil strength in all three soils are limitations. The shrink-swell potential of the Bentilla soils also is a limitation for that use. The seasonal wetness and restricted permeability limit the Grindbrook and Bentilla soils as sites for septic tank absorption fields.

Soils on Interior Valley Terraces and Flood Plains

These soils make up about 2.5 percent of the survey area.

5. Eilertsen-Nekoma-Elsie

Deep, well drained silt loams formed in alluvium

This unit consists of soils on valley terraces and flood plains along the Rock Creek and Mill Creek tributaries to the Siletz River, along the Yaquina River and tributaries of the Big and Little Elk Creeks, and along the upper reaches of the Yachats River. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, western swordfern, and western brackenfern. Slopes are 0 to 12 percent. Elevation is 20 to 750 feet. The mean annual precipitation is 60 to 90 inches, the mean annual air temperature is 49 to 53 degrees F, and the frost-free period is 145 to 210 days.

This unit makes up about 2.5 percent of the survey area. It is about 45 percent Eilertsen soils, 13 percent Nekoma soils, and 9 percent Elsie soils. The rest is soils of minor extent.

Eilertsen soils are on stream terraces. Typically, the surface layer is very dark grayish brown and dark brown silt loam. The subsoil is dark yellowish brown and yellowish brown silty clay loam. The next layer is yellowish brown, mottled silt loam. The substratum also is yellowish brown, mottled silt loam.

Nekoma soils are on flood plains. Typically, the surface layer is very dark grayish brown and dark brown silt loam. The subsoil is dark yellowish brown fine sandy loam. The substratum is stratified brown, dark yellowish brown, and yellowish brown fine sandy loam and very fine sandy loam.

Elsie soils are on terraces. Typically, the surface layer is very dark brown silt loam. The upper part of the subsoil is dark brown and strong brown silty clay loam. The lower part is strong brown loam.

Of minor extent in this unit are the poorly drained Fluvaquents in depressional areas on flood plains, the well drained Kirkendall soils on convex areas on the higher flood plains, the well drained Meda soils on alluvial fans, the moderately well drained McCurdy soils on terraces, and the moderately well drained Treharne soils in depressional areas on stream terraces.

The Eilertsen and Elsie soils are used for hay and pasture, timber production, wildlife habitat, and homesite development. The Nekoma soils are used for hay and pasture and wildlife habitat. Few limitations affect the use of the Eilertsen and Elsie soils for hay and pasture. Grazing when the soils are wet causes compaction of the surface layer and results in poor tilth and reduced forage production. In some years irrigation is needed if the maximum production of forage is to be achieved. Flooding during the rainy season is the main hazard in areas where the Nekoma soils are used for hay and pasture.

If the Eilertsen and Elsie soils are used for timber production, using wheeled and tracked equipment when the soils are moist causes rutting and compaction of the surface layer. Careful management of reforestation is needed to minimize competition from undesirable plants.

If the Eilertsen and Elsie soils are used for homesite development, the main limitations are low soil strength and the slope in some areas. Septic tank absorption fields are better suited to the more gently sloping areas

of the Elsie soils. The Nekoma soils are not suited to homesite development because of the hazard of flooding.

Soils on Coastal Hilly Uplands and Headlands and in Mountainous Areas

These soils make up about 36.5 percent of the survey area.

6. Templeton-Fendall

Deep and moderately deep, well drained silt loams that formed in colluvium weathered from sedimentary rock; on hilly uplands

This map unit consists of soils on the broad tops and side slopes of hilly uplands. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, western redcedar, red alder, salal, salmonberry, red huckleberry, evergreen huckleberry, and western swordfern. Slopes are 3 to 60 percent. Elevation is 50 to 800 feet. The mean annual precipitation is 70 to 100 inches, the mean annual air temperature is 49 to 52 degrees F, and the frost-free period is 160 to 210 days.

This unit makes up about 10 percent of the survey area. It is about 40 percent Templeton soils and 38 percent Fendall soils. The rest is soils of minor extent.

Templeton soils are deep. Typically, the surface layer is very dark brown and dark brown silt loam. The upper part of the subsoil is dark yellowish brown silt loam. The lower part is dark brown and brown silty clay loam.

Fendall soils are moderately deep. Typically, the surface layer is very dark brown and dark brown silt loam. The upper part of the subsoil is dark yellowish brown silty clay loam. The lower part is dark yellowish brown silty clay.

Of minor extent in this unit are the deep Winema soils on hilly uplands, the deep or moderately deep Tolovana and Reedsport soils in sedimentary mountainous areas, the deep or moderately deep Klootchie and Neotsu soils in volcanic mountainous areas, the moderately deep or deep Neskowin and Salander soils on volcanic headlands, and the deep, well drained Lint soils on marine terraces.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. In the areas used for timber, using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock adapt to the climate, tolerate shade, and outgrow competing vegetation. Windthrow is a hazard on the Fendall soils because of a moderate rooting depth.

7. Neskowin-Salander

Moderately deep and deep, well drained silt loams that formed in colluvium weathered from volcanic rock; on headlands

This map unit consists of soils on ridgetops and side slopes on volcanic headlands. The native vegetation is mainly Sitka spruce, western hemlock, red alder, salal, salmonberry, thimbleberry, red huckleberry, evergreen huckleberry, and western swordfern. Douglas-fir is in protected areas. Slopes are 5 to 99 percent. Elevation is 50 to 1,100 feet. The mean annual precipitation is 70 to 100 inches, the mean annual air temperature is 49 to 51 degrees F, and the frost-free period is 160 to 210 days.

This unit makes up about 2.5 percent of the survey area. It is about 49 percent Neskowin soils and 36 percent Salander soils. The rest is soils of minor extent.

Neskowin soils are moderately deep. Typically, the surface layer is black and dark reddish brown silt loam. The subsoil is dark brown silt loam.

Salander soils are deep. Typically, the surface layer is black, dark reddish brown, and dark brown silt loam. The upper part of the subsoil is dark brown silt loam. The lower part is dark brown silty clay loam.

Of minor extent in this unit are Rock outcrop; the deep or moderately deep Klootchie, Necanicum, and Neotsu soils in volcanic mountainous areas; the deep or moderately deep Templeton and Fendall soils on hilly uplands; and the deep or moderately deep Tolovana and Reedsport soils in sedimentary mountainous areas.

This unit is used mainly for timber production. It also is used for wildlife habitat, as a source of water, and for recreational development. In the areas used for timber, using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Sitka spruce and western hemlock are suitable for planting. Windthrow is a hazard on the Neskowin soils because of a moderate rooting depth.

The recreational uses of this unit include scenic viewpoints, paths, and trails. The slope is the main limitation affecting these uses.

8. Klootchie-Neotsu

Deep and moderately deep, well drained silt loams that formed in colluvium weathered from volcanic rock; in mountainous areas

This map unit consists of soils on ridgetops and side

slopes in volcanic mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, red huckleberry, evergreen huckleberry, cascade Oregongrape, and western swordfern. Slopes are 3 to 90 percent. Elevation is 50 to 1,800 feet. The mean annual precipitation is 70 to 100 inches, the mean annual air temperature is 48 to 52 degrees F, and the frost-free period is 145 to 210 days.

This unit makes up about 5.5 percent of the survey area. It is about 31 percent Klootchie soils and 29 percent Neotsu soils. The rest is soils of minor extent.

Klootchie soils are deep. Typically, the surface layer is dark reddish brown silt loam. The upper part of the subsoil is dark brown and brown silt loam. The lower part is strong brown gravelly silt loam.

Neotsu soils are moderately deep. Typically, the surface layer is very dark brown silt loam. The upper part of the subsoil is dark yellowish brown silt loam and loam. The lower part is dark yellowish brown gravelly loam.

Of minor extent in this unit are the deep Necanicum soils on the steeper side slopes, the moderately deep or deep Neskowin and Salander soils on volcanic headlands, the deep or moderately deep Tolovana and Reedsport soils in sedimentary mountainous areas, and the deep or moderately deep Templeton and Fendall soils on hilly uplands.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. In the areas used for timber, using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock adapt to the climate, tolerate shade, and outgrow competing vegetation. Windthrow is a hazard on the Neotsu soils because of a moderate rooting depth.

9. Tolovana-Reedsport

Deep and moderately deep, well drained silt loams and loams that formed in colluvium weathered from sedimentary rock; in mountainous areas

This map unit consists of soils on ridgetops and side slopes in sedimentary mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, cascade Oregongrape, red huckleberry, evergreen huckleberry, and western swordfern. Slopes are 3 to 85 percent. Elevation is 50 to 1,800 feet. The mean annual precipitation is 70 to 100 inches, the mean annual air temperature is 48 to 52 degrees F, and the frost-free period is 145 to 210 days.

This unit makes up about 18.5 percent of the survey area. It is about 45 percent Tolovana soils and 35 percent Reedsport soils. The rest is soils of minor extent.

Tolovana soils are deep. Typically, the surface layer is black and very dark grayish brown silt loam. The upper part of the subsoil is dark brown silt loam. The lower part is yellowish brown cobbly clay loam.

Reedsport soils are moderately deep. Typically, the surface layer is very dark brown and very dark grayish brown loam. The upper part of the subsoil is dark brown loam. The lower part is brown clay loam.

Of minor extent in this unit are the deep or moderately deep Templeton and Fendall soils on hilly uplands; the deep or moderately deep Klootchie, Neotsu, and Necanicum soils in volcanic mountainous areas; and the moderately deep or deep Neskowin and Salander soils on volcanic headlands.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. In the areas used for timber, using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock adapt to the climate, tolerate shade, and outgrow competing vegetation. Windthrow is a hazard on the Reedsport soils because of a moderate rooting depth.

Soils in Interior Mountainous Areas

These soils make up about 47 percent of the survey area.

10. Preacher-Bohannon-Slickrock

Deep and moderately deep, well drained loams and gravelly loams that formed in colluvium weathered from sedimentary rock

This map unit consists of soils on ridgetops, side slopes, and benches in sedimentary mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, salmonberry, cascade Oregongrape, and western swordfern. Slopes are 5 to 90 percent. Elevation is 25 to 1,800 feet. The mean annual precipitation is 60 to

Figure 3.—An area of the Preacher-Bohannon-Slickrock unit managed for Douglas-fir.

110 inches, the mean annual air temperature is 47 to 52 degrees F, and the frost-free period is 145 to 210 days.

This unit makes up about 25 percent of the survey area. It is about 36 percent Preacher soils, 28 percent Bohannon soils, and 10 percent Slickrock soils. The rest is soils of minor extent.

Preacher soils are deep. Typically, the surface layer is very dark grayish brown loam. The subsoil is dark yellowish brown clay loam. The substratum is yellowish brown loam.

Bohannon soils are moderately deep. Typically, the surface layer is very dark brown and dark brown gravelly loam. The subsoil is dark yellowish brown gravelly loam.

Slickrock soils are deep. Typically, the surface layer is very dark grayish brown gravelly loam. The upper part of the subsoil is dark brown gravelly loam. The lower part is dark brown and dark yellowish brown very cobbly loam.

Of minor extent in this unit are the moderately deep Kilowan, McDuff, and Peavine and deep Apt, Astoria, Blachly, and Honeygrove soils in sedimentary mountainous areas and the moderately deep Formader and Harslow and deep Hemcross, Klistan, and Hembre soils in volcanic mountainous areas.

This unit is used mainly for timber production (fig. 3). It also is used for wildlife habitat and as a source of water. It is suited to the production of Douglas-fir. Using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Windthrow is a hazard on the Bohannon soils because of a moderate rooting depth.

11. Preacher-Bohannon-Apt

Deep and moderately deep, well drained loams, gravelly loams, and silty clay loams that formed in colluvium weathered from sedimentary rock

This map unit consists of soils on broad ridgetops, benches, and side slopes in sedimentary mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, bigleaf maple, red alder, vine maple, salal, cascade Oregongrape, and western swordfern. Slopes are 5 to 90 percent. Elevation is 25 to 1,800 feet. The mean annual precipitation is 60 to 110 inches, the mean annual air temperature is 47 to 52 degrees F, and the frost-free period is 145 to 210 days.

This unit makes up about 12 percent of the survey area. It is about 25 percent Preacher soils, 20 percent Bohannon soils, and 19 percent Apt soils. The rest is soils of minor extent.

Preacher soils are deep. Typically, the surface layer is very dark grayish brown loam. The subsoil is dark yellowish brown clay loam. The substratum is yellowish brown loam.

Bohannon soils are moderately deep. Typically, the surface layer is very dark brown and dark brown gravelly loam. The subsoil is dark yellowish brown gravelly loam.

Apt soils are deep. Typically, the surface layer is very dark brown and dark brown silty clay loam. The upper part of the subsoil is dark brown and dark yellowish brown silty clay. The lower part is dark yellowish brown silty clay loam.

Of minor extent in this unit are the moderately deep McDuff, Kilowan, and Peavine and deep Slickrock, Honeygrove, and Blachly soils in sedimentary mountainous areas and the moderately deep Formader and deep Hembre, Hemcross, and Klistan soils in volcanic mountainous areas.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. It is suited to the production of Douglas-fir. If the unit is used for timber production, using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Windthrow is a hazard on the Bohannon soils because of a moderate rooting depth.

12. Formader-Hemcross-Klistan

Moderately deep and deep, well drained loams, silt loams, and very gravelly loams that formed in colluvium weathered from volcanic rock

This map unit consists of soils on ridgetops and side slopes in volcanic mountainous areas (fig. 4). The native vegetation is mainly Douglas-fir, western hemlock, western redcedar, red alder, vine maple, salal, cascade Oregongrape, salmonberry, and western swordfern. Slopes are 3 to 80 percent. Elevation is 200 to 1,800 feet. The mean annual precipitation is 80 to 120 inches, the mean annual air temperature is 46 to 52 degrees F, and the frost-free period is 145 to 210 days.

This unit makes up about 10 percent of the survey area. It is about 34 percent Formader soils, 25 percent Hemcross soils, and 12 percent Klistan soils. The rest is soils of minor extent.

Formader soils are moderately deep. Typically, the surface layer is dark brown loam. The subsoil also is dark brown loam.

Hemcross soils are deep. Typically, the surface layer is dark brown silt loam. The upper part of the subsoil is brown silt loam and strong brown gravelly silt loam. The lower part is strong brown very gravelly loam.

Klistan soils are deep. Typically, the surface layer is black, very dark brown, and dark brown very gravelly loam. The subsoil is dark brown and dark reddish brown very gravelly loam.

Of minor extent in this unit are the deep Hembre and moderately deep Harslow soils in volcanic mountainous areas, Rock outcrop in volcanic mountainous areas, and the deep Preacher and Astoria and moderately deep Bohannon soils in sedimentary mountainous areas.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. It is suited to the production of Douglas-fir. If the unit is used for timber production, using wheeled and tracked equipment when the soils are moist causes rutting and compaction. High-lead or other cable logging systems are needed in the steeper areas. Careful management of reforestation is needed to minimize competition from undesirable plants. Windthrow is a hazard on the Formader soils because of a moderate rooting depth.

Soils in the Higher Mountainous Areas

These soils make up about 3.5 percent of the survey area.

13. Valsetz-Yellowstone-Caterl

Shallow to deep, well drained and somewhat excessively drained cobbly loams, stony loams, and gravelly loams that formed in colluvium weathered from volcanic rock

This unit consists of soils on ridgetops and side slopes in volcanic mountainous areas. The native vegetation is mainly western hemlock, noble fir, Douglas-fir, red huckleberry, rhododendron, salal, salmonberry, and cascade Oregongrape. Slopes are 3

Figure 4.—A typical area of the Formader-Hemcross-Klistan general soil map unit.

to 90 percent. Elevation is 1,800 to 3,350 feet. The mean annual precipitation is 80 to 200 inches, the mean annual air temperature is 42 to 46 degrees F, and the frost-free period is 145 days to less than 60 days.

This unit makes up about 3.5 percent of the survey area. It is about 25 percent Valsetz soils, 13 percent Yellowstone soils, and 13 percent Caterl soils. The rest is soils of minor extent.

Valsetz soils are moderately deep and well drained. They are at elevations of 2,800 to 3,350 feet. Typically, the surface layer is dark reddish brown cobbly loam. The upper part of the subsoil is reddish brown very cobbly loam. The lower part is brown and strong brown extremely cobbly loam.

Yellowstone soils are shallow and somewhat excessively drained. They are at elevations of 2,800 to 3,350 feet. Typically, the surface layer is dark reddish brown stony loam. The substratum is dark reddish brown extremely cobbly loam.

Caterl soils are deep and well drained. They are at elevations of 1,800 to 2,800 feet. Typically, the surface layer is dark brown gravelly loam. The upper part of the subsoil is brown very gravelly loam. The lower part is brown extremely gravelly loam.

Of minor extent in this unit are the deep Murtip and moderately deep Laderly soils in volcanic mountainous areas and the moderately deep Sach soils in sedimentary mountainous areas. These soils are mainly at elevations of 1,800 to 2,800 feet. Also of minor extent are Histic Cryaquepts in wet mountain meadows and depressional areas.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. When timber is harvested, management that minimizes

erosion is essential. Rock fragments on the surface can interfere with the use of equipment. High-lead or other cable logging systems are needed. Snow may accumulate for short periods during winter, restricting access and the use of equipment. Windthrow is a hazard on the Valsetz and Yellowstone soils because of a moderate or shallow rooting depth. Climatically adapted seedlings should be selected for planting in areas that are to be reforested.

Broad Land Use Considerations

Most of the land and in the survey area, about 90 percent, is used for timber production. Other uses include hay and pasture, urban and community development, and recreation.

The potential for producing timber species such as Douglas fir and western hemlock varies widely but is generally good in general soil map units 6 to 12. The major management concerns for producing and harvesting timber are steepness of slope, the hazard of erosion, and competition from undesirable brushy plants. Steepness of slope limits the kinds of equipment that can be used in forest management. Controlling runoff and erosion helps to reduce siltation of streams and protects water quality and fish habitat. In units 6 to 9, overcoming brush competition requires extensive site preparation and use of well-rooted seedling stock for reforestation to Douglas-fir.

Areas that are subject to strong onshore winds have lower timber productivity because of wind damage and salt air. Templeton, Fendall, Neskowin, Salander, Klootchie, Neotsu, Tolovana, and Reedsport soils in units 6 to 9 and Nelscott, Bandon, and Lint soils in unit 3 are examples of soils that are subject to those hazards. Unit 3 is dominated by shore pine, western hemlock, and Sitka spruce in the unprotected areas and by western hemlock, Sitka spruce, and Douglas-fir in the protected areas.

Soils in units 10 to 12 have the best potential productivity for timber in the survey area. Preacher, Bohannon, Slickrock, Apt, Formader, Hemcross, and Klistansoils are dominanat in those units. Valsetz, Yellowstone, and Caterl soils are dominant at the higher elevations of unit 13 and are limited in their potential to produce timber because of cold temperatures and damage to trees by wind, snow, and ice.

Hay and pasture are the major agricultural land uses in the survey area. Most of the hayland and pasture is on small farms and ranches along narrow valleys of major streams. The main limitations of the soils in those areas are low fertility and acidity, and most of the soils require lime and mixed fertilizers to increase the production of forage. Grazing during wet periods causes compaction of the surface layer and poor pastures.

Units 1, 2, and 4 are in the cool, moist coastal valleys of the survey area. This climate limits the types of suitable crops, and most areas of those units used for hay and pasture. Also, unit 1, represented by Coquille soils, is limited by tidal flooding and wetness; unit 2, represented by Nestucca and Nehalem soils, is limited by stream flooding and wetness; and unit 4, represented by Logsden, Bentilla, and Grindbrook soils, is limited by wetness, slope, and flooding. Small areas of unit 4 are used for homesite development. The main limitations for that use are slope, wetness, and low soil strength. Units 1 and 2 are poorly suited to homesite development because of flooding.

Unit 5, represented by Eilertsen, Nekoma, and Elsie soils, is along narrow interior stream valleys of the survey area. The growing season is generally warm for those soils, and hay and pasture is the dominant agricultural land use. Elsie and Eilertsen soils are limited by slope in some areas. Nekoma soils are limited by the hazard of flooding. During drier periods, supplemental irrigation is needed to increase production of forage in this unit. Areas of unit 5 are used for homesites. The main limitations are low soil strength throughout the unit and flooding on the Nekoma soil.

Urban and community development in the survey area has occurred mainly in areas adjacent to the Pacific Ocean along U.S. Highway 101. Unit 3, represented by Nelscott, Bandon, and Lint soils, comprises the majority of the coastal urban areas and other community development. The hazards of wind and water erosion, limited depth to a cemented pan, steepness of slope, unstable cutbanks, low soil strength, and wetness are the main limitations.

Community development has also occurred in a few areas of units 4 and 5, particularly near major transportation routes in the survey area. Unit 4 is represented by Logsden, Bentilla, and Grindbrook soils. Unit 5 is represented by Eilertsen, Nekoma, and Elsie soils. Logsden and Nekoma soils are limited for urban development by the hazard of flooding. Bentilla, Grindbrook, and Elsie soils are limited by low soil strength, wetness, and steepness of slope.

Most land used for recreation in the survey area is near U.S. Highway 101 and consists mainly of parks, waysides, viewpoints, campgrounds, beaches, bays, and jetties in unit 3, represented by Nelscott, Bandon, and Lint soils. The hazard of wind erosion, wetness, steepness of slope, low soil strength, and unstable cutbanks are the main limitations. The other main recreational uses are hunting, fishing, picnicking, and hiking in the hilly to mountainous, limited-access areas of units 6 to 13.

Detailed Soil Map Units

The map units delineated on the detailed maps at the back of this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses. More information on each map unit is given under "Use and Management of the Soils."

A map unit delineation on a map represents an area dominated by one or more major kinds of soil or miscellaneous areas. A map unit is identified and named according to the taxonomic classification of the dominant soils or miscellaneous areas. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils and miscellaneous areas are natural phenomena, and they have the characteristic variability of all natural phenomena. Thus, the range of some observed properties may extend beyond the limits defined for a taxonomic class. Areas of soils of a single taxonomic class rarely, if ever, can be mapped without including areas of other taxonomic classes. Consequently, every map unit is made up of the soils or miscellaneous areas for which it is named and some "included" areas that belong to other taxonomic classes.

Most included soils have properties similar to those of the dominant soil or soils in the map unit, and thus they do not affect use and management. These are called noncontrasting, or similar, inclusions. They may or may not be mentioned in the map unit description. Other included soils and miscellaneous areas, however, have properties and behavior divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, inclusions. They generally are in small areas and could not be mapped separately because of the scale used. Some small areas of strongly contrasting soils or miscellaneous areas are identified by a special symbol on the maps. The included areas of contrasting soils or miscellaneous areas are mentioned in the map unit descriptions. A few included areas may not have been observed, and consequently they are not mentioned in the descriptions, especially where the pattern was so complex that it was impractical to make enough observations to identify all the soils and miscellaneous areas on the landscape.

The presence of included areas in a map unit in no way diminishes the usefulness or accuracy of the data. The objective of mapping is not to delineate pure taxonomic classes but rather to separate the landscape into segments that have similar use and management requirements. The delineation of such landscape segments on the map provides sufficient information for the development of resource plans, but if intensive use of small areas is planned, onsite investigation to precisely define and locate the soils and miscellaneous areas is needed.

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit and gives the principal hazards and limitations to be considered in planning for specific uses.

Soils that have profiles that are almost alike make up a *soil series*. Except for differences in texture of the surface layer or of the underlying layers, all the soils of a series have major horizons that are similar in composition, thickness, and arrangement.

Soils of one series can differ in texture of the surface layer or of the underlying layers. They also can differ in slope, stoniness, salinity, wetness, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase commonly indicates a feature that affects use or management. For example, Blachly silty clay loam, 5 to 35 percent slopes, is one of the phases in the Blachly series.

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

A *complex* consists of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately

on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Preacher-Bohannon-Slickrock complex, 35 to 60 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Beaches, 1 to 3 percent slopes, is an example.

Table 4 gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Map Unit Descriptions

1E—Apt-McDuff silty clay loams, 5 to 30 percent slopes. This map unit is on broad ridgetops and benches in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, cascade Oregongrape, and western swordfern. Elevation is 350 to 1,400 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 150 to 210 days.

This unit is about 55 percent Apt soil and 30 percent McDuff soil.

Included in this unit are small areas of Bohannon and Preacher soils, which formed in the coarser textured colluvium on narrow ridgetops and benches. Also included are small areas of Apt and McDuff soils that have slopes of more than 30 percent. Included areas make up about 15 percent of the total acreage.

The Apt soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is very dark brown and dark brown silty clay loam about 19 inches thick. The upper part of the subsoil is dark brown and dark yellowish brown silty clay about 20 inches thick. The lower part is dark yellowish brown silty clay loam about 21 inches thick. The depth to weathered bedrock is more than 60 inches.

Permeability is moderately slow in the Apt soil. Available water capacity is 9 to 11 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The McDuff soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of moss, needles, leaves, and twigs about 0.5 inch thick. The surface layer is very dark grayish brown and dark brown silty clay loam about 12 inches thick. The subsoil is brown and strong brown clay about 24 inches thick. Fractured, highly weathered siltstone and sandstone bedrock is at a depth of about 36 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately slow in the McDuff soil. Available water capacity is 3 to 7 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the McDuff soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the McDuff soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

1F—Apt-McDuff silty clay loams, 30 to 50 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, bigleaf maple, red alder, vine maple, salal, cascade Oregongrape, and western swordfern. Elevation is 350 to 1,400 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 150 to 210 days.

This unit is about 50 percent Apt soil and 30 percent McDuff soil.

Included in this unit are small areas of Bohannon, Preacher, and Slickrock soils, which formed in the coarser textured colluvium on side slopes. Also included are small areas of Apt and McDuff soils that have slopes of less than 30 percent. Included areas make up about 20 percent of the total acreage.

The Apt soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is very dark brown and dark brown silty clay loam about 19 inches thick. The upper part of the subsoil is dark brown and dark yellowish brown silty clay about 20 inches thick. The lower part is dark yellowish brown silty clay loam about 21 inches thick. The depth to weathered bedrock is more than 60 inches.

Permeability is moderately slow in the Apt soil. Available water capacity is 9 to 11 inches. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

The McDuff soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of moss, needles, leaves, and twigs about 0.5 inch thick. The surface layer is very dark grayish brown and dark brown silty clay loam about 12 inches thick. The subsoil is brown and strong brown clay about 24 inches thick. Fractured, highly weathered siltstone and sandstone bedrock is at a depth of about 36 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately slow in the McDuff soil. Available water capacity is 3 to 7 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the McDuff soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the McDuff soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

2E—Astoria silt loam, 5 to 30 percent slopes. This deep, well drained soil is on benches and broad ridges in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, red alder, vine maple, salmonberry, thimbleberry, red huckleberry, salal, and western swordfern. Elevation is 400 to 1,600 feet. The average annual precipitation is 80 to 100 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 150 to 210 days.

Typically, the surface is covered with a mat of moss, needles, leaves, and twigs about 2 inches thick. The surface layer is very dark grayish brown silt loam about 15 inches thick. The next layer is dark yellowish brown silt loam about 13 inches thick. The upper part of the subsoil is dark yellowish brown and brown silty clay about 22 inches thick. The lower part is brown silty clay loam about 10 inches thick. The depth to weathered bedrock is more than 60 inches.

Included in this unit are small areas of Preacher and Bohannon soils, which formed in the coarser textured colluvium weathered from sedimentary rock on ridgetops and benches, and Formader, Hemcross, and Hembre soils, which formed in colluvium weathered from volcanic rock on ridgetops. Also included are Astoria soils that have slopes of more than 30 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Astoria soil. Available water capacity is 11 to 14 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir and western hemlock. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, and plant competition. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads and landings can be protected from erosion by constructing water bars

and by seeding areas that have been cut and filled. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Douglas-fir and western hemlock.

3C—Bandon fine sandy loam, 3 to 12 percent slopes. This well drained soil is on old stable dunes of incised marine terraces. It is moderately deep to an ortstein pan. It formed in sandy marine and eolian material derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, shore pine, red alder, evergreen huckleberry, salal, and rhododendron. It also includes Douglas-fir on protected sites. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsoil is dark brown and brown loam about 25 inches thick. The next 17 inches occurs as bands of yellowish brown, moderately cemented loamy fine sand. The substratum to a depth of 60 inches or more is dark yellowish brown loamy fine sand.

Included in this unit are small areas of Depoe soils in depressions, Gleneden and Nelscott soils on the more nearly level slopes, and soils that are similar to the Bandon soil but have a cemented layer at a depth of more than 40 inches. Also included are Bandon soils that have slopes of more than 12 percent. Included areas make up about 25 percent of the total acreage.

Permeability is moderate above the pan in the Bandon soil, slow through the pan, and moderately rapid below the pan. Available water capacity is 2 to 6 inches. The effective rooting depth is limited by the cemented layer at a depth of 20 to 36 inches. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. The hazard of wind erosion is severe in areas where the plant cover is removed.

This unit is used mainly for timber production, homesite development, recreational development, and wildlife habitat.

Areas of this unit that are sheltered from the growth-retarding effects of strong onshore winds and salt air are better suited to timber production than other areas. This unit is suited to Sitka spruce and western hemlock. The main concerns in producing and harvesting timber are the hazard of wind erosion, plant competition, and the limited rooting depth. Excessive surface disturbance during harvesting, road construction, or site preparation can expose material that is highly susceptible to wind erosion. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable palnts, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Sitka spruce and western hemlock.

If this unit is used for homesite development, the main limitations are the slope, the slow permeability through the cemented layer, the hazard of wind erosion, and the instability of cutbanks. Excavation for houses and access roads in places exposes material that is highly susceptible to wind erosion. Only the part of the site that is used for construction should be disturbed. Preservation of as many trees as possible helps to provide a natural windbreak around construction sites. Revegetating disturbed areas as soon as possible helps to control wind erosion. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens. Mulch, fertilizer, and irrigation are needed to establish lawn grasses and other small-seeded plants. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

Because of the slow permeability through the cemented layer, onsite sewage disposal systems can fail or do not function properly during periods of heavy rainfall. The slope limits the installation of septic tank absorption fields. The absorption lines should be installed in the less sloping areas. The effluent from the absorption fields can surface in downslope areas, creating a health hazard.

If this unit is used for recreational development, the main limitations are the hazard of wind erosion, the slow permeability through the cemented pan, and the instability of cutbanks. Areas that have been cut and filled should be seeded or mulched. Recreational areas can be protected from wind erosion and dust by a good plant cover. The plant cover can be maintained by limiting traffic.

3E—Bandon fine sandy loam, 12 to 50 percent slopes. This well drained soil is along the incised fronts and drainageways of marine terraces. It is moderately deep to an ortstein pan. It formed in sandy marine and eolian material derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, shore pine, red alder, evergreen huckleberry, salal, and rhododendron. It also includes Douglas-fir on protected sites. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsoil is dark brown and brown loam about 25 inches thick. The next 17 inches occurs as bands of yellowish brown, moderately cemented loamy fine sand. The substratum to a depth of 60 inches or more is dark yellowish brown loamy fine sand.

Included in this unit are small areas of Nelscott soils on the less sloping parts of the landscape and soils that are similar to the Bandon soil but have a cemented layer at a depth of more than 40 inches. Also included are small areas of Bandon soils that have slopes of less than 12 percent or more than 50 percent and small areas of Fendall, Templeton, Reedsport, and Tolovana soils and Rock outcrop on the steeper slopes along terrace fronts and drainageways. Included areas make up about 25 percent of the total acreage.

Permeability is moderate above the pan in the Bandon soil, slow through the pan, and moderately rapid below the pan. Available water capacity is 2 to 6 inches. The effective rooting depth is limited by the cemented layer at a depth of 20 to 36 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high. The hazard of wind erosion is severe in areas where the plant cover is removed.

This unit is used mainly for timber production, homesite development, recreational development, and wildlife habitat.

Areas of this unit that are sheltered from the growth-retarding effects of strong onshore winds and salt air are better suited to timber production than other areas. This unit is suited to Sitka spruce and western hemlock. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth. Excessive surface disturbance during harvesting, road construction, or site preparation can expose material that is highly susceptible to wind erosion. Minimal disturbance of the understory vegetation helps to control wind erosion. Properly designed road drainage systems and carefully located culverts help to control water erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. In some areas the slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Using low-pressure ground equipment in the less sloping areas minimizes damage to the soil and helps to maintain productivity. Trees are subject to windthrow.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Sitka spruce and western hemlock.

If this unit is used for homesite development, the main limitations are the slope, the hazards of wind erosion and water erosion, the slow permeability through the cemented layer, and the instability of cutbanks. Building sites should be located in the less sloping areas. Excavation for houses and access roads in places exposes material that is highly susceptible to wind erosion. Only the part of the site that is used for construction should be disturbed. Preservation of as many trees as possible helps to provide a natural windbreak around construction sites. Revegetating disturbed areas as soon as possible helps to control

wind erosion. Cutbanks are not stable and are subject to slumping. Landsliding and sloughing can occur when the soil is saturated and has been disturbed by road construction or building site development, especially along the ocean front. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens. Mulch, fertilizer, and irrigation are needed to establish lawn grasses and other small-seeded plants. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

Because of the slow permeability through the cemented layer, onsite sewage disposal systems often fail or do not function properly during periods of heavy rainfall. The slope limits the installation of septic tank absorption fields. The absorption lines should be installed in the less sloping areas. The effluent from the absorption fields can surface in downslope areas, creating a health hazard.

If this unit is used for recreational development, the main limitations are the slope, the hazards of wind erosion and water erosion, and the instability of cutbanks. The slope limits recreational uses mainly to a few paths and trails, which should extend across the slope. Areas that have been cut and filled should be seeded or mulched. Recreational areas can be protected from wind erosion by a good plant cover.

4A—Beaches, 1 to 3 percent slopes. This map unit consists of recent ocean deposits of sandy material along most of the coastline in the survey area. The deposits are derived from mixed sources and have been reworked by the wind and the sea. Slope is 1 to 3 percent. The beaches are subject to minor changes in size and shape during major storms but remain relatively constant overall year after year. Elevation is 0 to 10 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Beaches consist of gray fine sand to a depth of 60 inches or more. The fine sand is underlain by stratified, consolidated marine sediments or bedrock.

Included in this unit are small areas of sandy material having varying amounts of gravel, cobbles, and stones. This material is near the mouth of small streams and near areas of volcanic rock outcrop. Also included are small areas where the fine sand is underlain by stratified marine sediments or sedimentary bedrock within a depth of 60 inches and small areas of sedimentary or basaltic rock outcrop. Included areas make up about 25 percent of the total acreage.

Most areas of this unit are flooded by the daily tides. Very high tides accompanied by large waves wash over the entire unit. Winter storms remove much of the sand and in some years expose the underlying bedrock and stratified marine sediments. During the summer northwest winds help to rebuild the beaches.

This unit is used for recreational development. It is limited mainly by prolonged cool, foggy, and rainy weather, chilling winds, and windblown sandy material. Also, large waves wash over the entire beach and deposit woody debris.

5C—Bentilla silty clay loam, 3 to 12 percent slopes. This deep, moderately well drained soil is on terraces. It formed in clayey alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salal, red huckleberry, salmonberry, western swordfern, and trailing blackberry. Elevation is 100 to 400 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 2 inches thick. The surface layer is very dark brown, very dark grayish brown, and dark brown silty clay loam about 16 inches thick. The upper part of the subsoil is brown silty clay about 12 inches thick. The lower part to a depth of 60 inches or more is yellowish brown, mottled clay; light brownish gray, mottled silty clay; and gray, mottled clay.

Included in this unit are small areas of Hebo soils in depressions. Also included are small areas of deep, well drained, silty soils where terraces and mountain foot slopes join and highly diverse soils that are dominantly well drained, are nongravelly to very cobbly, have weathered bedrock at a depth of 20 to more than 60 inches, and are on the steeper terrace escarpments. Included areas make up about 15 percent of the total acreage.

Permeability is very slow in the Bentilla soil. Available water capacity is 9 to 11 inches. The effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from November through May. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used for pasture, timber production, wildlife habitat, and homesite development.

If this unit is used for pasture, the main limitations are the slope, the hazard of erosion, the seasonal high water table, the susceptibility of the surface layer to compaction, and low fertility. A seedbed should be prepared on the contour or across the slope where practical. A drainage system accelerates early growth, extends the grazing season, and increases the variety of forage plants that can be grown. Grazing during wet

periods results in compaction of the surface layer, poor tilth, and excessive runoff. Applying lime and mixed fertilizer improves the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Properly designed road drainage systems and carefully located culverts help to control erosion. Because the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped when the soil is dry. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees have a limited rooting depth as a result of the seasonal high water table and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include western hemlock and Douglas-fir.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, the seasonal high water table, the very slow permeability, low soil strength, and the shrink-swell potential. Erosion is a hazard in the steeper areas. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. A drainage system is needed if roads or building foundations are constructed. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The damage caused by shrinking and swelling can be minimized by using a proper engineering design and by backfilling with material that has a low shrink-swell potential. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

The very slow permeability and the seasonal high water table increase the likelihood that septic tank absorption fields will fail. The slope limits installation of the absorption fields. The effluent from the absorption fields can surface in downslope areas, creating a health hazard. The absorption lines should be installed in the less sloping areas. The very slow permeability can be overcome by increasing the size of the absorption field.

6E—Blachly silty clay loam, 5 to 35 percent slopes. This deep, well drained soil is on broad ridgetops and benches in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, cascade Oregongrape, and western swordfern. Elevation is 250 to 1,800 feet. The average annual precipitation is 70 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 1 inch thick. The surface layer is dark reddish brown silty clay loam about 21 inches thick. The subsoil is about 39 inches of reddish brown silty clay and yellowish red and strong brown clay. The depth to weathered bedrock is more than 60 inches.

Included in this unit are small areas of Bohannon and Preacher soils, which formed in the coarser textured colluvium weathered from sedimentary rock on the steeper narrow ridges and benches; Kilowan soils, which formed in fine textured colluvium weathered from sedimentary rock on ridgetops and benches; and Formader, Hemcross, and Hembre soils, which formed in colluvium weathered from volcanic rock on ridgetops. Also included are small areas of Blachly soils that have slopes of more than 35 percent. Included areas make up about 25 percent of the total acreage.

Permeability is moderately slow in the Blachly soil. Available water capacity is 8 to 10 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, and plant competition. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

6F—Blachly silty clay loam, 35 to 50 percent slopes. This deep, well drained soil is on side slopes in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, cascade Oregongrape, and western swordfern. Elevation is 250 to 1,800 feet. The average annual precipitation is 70 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 1 inch thick. The surface layer is dark reddish brown silty clay loam about 21 inches thick. The subsoil is about 39 inches of reddish brown silty clay and yellowish red and strong brown clay. The depth to weathered bedrock is more than 60 inches.

Included in this unit are small areas of Bohannon, Preacher, and Slickrock soils, which formed in the coarser textured colluvium weathered from sedimentary rock on side slopes; Kilowan soils, which formed in fine textured colluvium weathered from sedimentary rock on side slopes; and Formader, Hemcross, Klistan, and Hembre soils, which formed in colluvium weathered from volcanic rock on side slopes. Also included are small areas of Blachly soils that have slopes of less than 35 percent or more than 50 percent. Included areas make up about 25 percent of the total acreage.

Permeability is moderately slow in the Blachly soil. Available water capacity is 8 to 10 inches. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, and plant competition. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

7H—Bohannon-Preacher complex, 60 to 90 percent slopes. This map unit is on steep side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, cascade Oregongrape, salmonberry, salal, and western swordfern. Elevation is 25 to 1,800 feet. The average annual precipitation is 60 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 50 percent Bohannon soil and 30 percent Preacher soil.

Included in this unit are small areas of Slickrock soils, which formed in colluvium weathered from sedimentary rock, mainly on foot slopes, and Formader, Hemcross, Klistan, and Harslow soils, which formed in colluvium weathered from volcanic rock on side slopes. Also included are small areas of Bohannon and Preacher soils that have slopes of less than 60 percent or more than 90 percent; small areas of Rock outcrop; and small areas of soils that are less than 20 inches deep over bedrock and are on the steeper slopes. Included areas make up about 20 percent of the total acreage.

The Bohannon soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, twigs, and moss about 1 inch thick. The surface layer is very dark brown and dark brown gravelly loam about 16 inches thick. The subsoil is dark yellowish brown gravelly loam about 15 inches thick. Fractured, partially weathered sandstone bedrock is at a depth of about 31 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately rapid in the Bohannon soil. Available water capacity is 2 to 7 inches. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Preacher soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 3 inches thick. The surface layer is very dark grayish brown loam about 15 inches thick. The subsoil is dark yellowish brown clay loam about 30 inches thick. The substratum is yellowish brown loam about 9 inches thick. Fractured, partially weathered, stratified sandstone and siltstone bedrock is at a depth of about 54 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Preacher soil. Available water capacity is 7 to 15 inches. The effective rooting depth is 40 to 60 inches. Runoff is very rapid, and the hazard of water erosion is very high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Bohannon soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Landsliding and slumping can occur when the soils are saturated and have been disturbed by road construction or timber harvesting. Trees on the Bohannon soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Because plant competition retards the growth of desirable palnts, the larger, vigorous Douglas-fir seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. The trees that are suitable for planting include Douglas-fir.

8A—Brallier mucky peat, 0 to 1 percent slopes. This deep, very poorly drained soil is on tide-influenced flood plains. It formed in partially decomposed herbaceous material derived from water-tolerant plants. The native vegetation is mainly willows, red alder, Douglas spirea, cattails, rushes, and sedges. Elevation is 0 to 10 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface layer is dark brown mucky peat about 10 inches thick. The next layer is dark brown mucky peat about 32 inches thick. Below this to a depth of 60 inches or more is dark brown muck.

Included in this unit are small areas of Coquille soils near stream channels and in other areas influenced by alluvial deposits of mineral material on tidal flood plains. Also included are small areas of very poorly drained soils that have an organic surface layer over a sandy or silty substratum. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Brallier soil. Available water capacity is 18 to 24 inches. The effective rooting depth is more than 60 inches but is limited by a water table 2 feet above to 1 foot below the surface throughout the year. Runoff is very slow or ponded, and the hazard of water erosion is slight. This soil is frequently flooded for brief periods throughout the year.

This unit is used for wildlife habitat.

9A—Brenner silt loam, 0 to 2 percent slopes. This deep, poorly drained soil is in depressions and backswamps on flood plains. It formed in silty and clayey recent alluvium derived from mixed sources. The native vegetation is mainly red alder, willows, rushes, sedges, skunkcabbage, and scattered Sitka spruce. Elevation is 10 to 100 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is very dark grayish brown, mottled silt loam about 14 inches thick. The upper part of the subsoil is dark grayish brown, mottled silty clay loam about 20 inches thick. The lower part to a depth of 60 inches or more is gray and grayish brown, mottled silty clay.

Included in this unit are small areas of Nehalem soils

on the higher convex slopes, Nestucca soils on the slightly higher nearly level slopes, and Yachats soils near stream channels. Included areas make up about 20 percent of the total acreage.

Permeability is slow in the Brenner soil. Available water capacity is 10 to 12 inches. The effective rooting depth is more than 60 inches but is limited by a seasonal high water table 0.5 foot above to 1.0 foot below the surface from December through April. Runoff is slow to ponded, and the hazard of water erosion is slight. This soil is frequently flooded for brief periods from December through April.

This unit is used for wildlife habitat and pasture. The main limitations are the seasonal high water table, the hazard of flooding, and the susceptibility of the surface layer to compaction. The wetness limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. Only those pasture species that can tolerate periodic inundation and a seasonal high water table are suitable for planting in undrained areas. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Protecting the soil from flooding and installing a drainage system extend the grazing season, accelerate early growth, and increase the variety of forage plants that can be grown. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is not suited to homesite development. It is limited mainly by the hazard of flooding and the wetness resulting from the seasonal high water table.

10G—Caterl-Laderly gravelly loams, 30 to 65 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, noble fir, scattered Pacific silver fir, salal, salmonberry, red huckleberry, cascade Oregongrape, and western swordfern. Elevation is 1,800 to 2,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 90 to 145 days.

This unit is about 55 percent Caterl soil and 30 percent Laderly soil.

Included in this unit are small areas of Murtip soils, which formed in colluvium weathered from volcanic rock on side slopes, and Sach soils, which formed in colluvium weathered from sedimentary rock on side slopes. Also included are small areas of Caterl and Laderly soils that have slopes of more than 65 percent or less than 30 percent. Included areas make up about 15 percent of the total acreage.

The Caterl soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown gravelly loam about 19 inches thick. The upper part of the subsoil is brown very gravelly loam about 24 inches thick. The lower part is brown extremely gravelly loam about 15 inches thick. Fractured basalt bedrock is at a depth of about 58 inches. The depth to bedrock is 40 to 60 inches.

Permeability is moderate in the Caterl soil. Available water capacity is 6 to 13 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

The Laderly soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is very dark brown and dark brown gravelly loam about 18 inches thick. The subsoil is dark brown extremely gravelly loam about 12 inches thick. Fractured basalt bedrock is at a depth of about 30 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Laderly soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir and western hemlock. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Laderly soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Laderly soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of climatically adapted seedlings is necessary to ensure seedling

survival. The trees that are suitable for planting include Douglas-fir, western hemlock, and noble fir.

11B—Chitwood silt loam, 0 to 7 percent slopes. This deep, somewhat poorly drained soil is on terraces. It formed in clayey alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, vine maple, salmonberry, red elderberry, western swordfern, sedges, and grasses. Elevation is 50 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of moss, needles, leaves, roots, and twigs about 3 inches thick. The surface layer is very dark brown and very dark grayish brown silt loam about 19 inches thick. The upper part of the subsoil is dark yellowish brown, mottled silty clay loam about 6 inches thick. The lower part is brown and light yellowish brown, mottled silty clay about 20 inches thick. The substratum to a depth of 60 inches or more is light brownish gray, mottled silty clay loam.

Included in this unit are small areas of Hebo soils in depressions and the well drained Knappa soils on convex slopes. Also included are small areas of deep, somewhat poorly drained or moderately well drained, loamy soils on terraces and small areas of moderately deep or deep soils that formed in nongravelly to very cobbly alluvium on the steeper terrace escarpments. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Chitwood soil. Available water capacity is 9 to 11 inches. The effective rooting depth is limited by a seasonal high water table at a depth of 1 to 3 feet from November through May. Runoff is slow or medium, and the hazard of water erosion is slight.

This unit is used for timber production, wildlife habitat, pasture, and homesite development.

If this unit is used for pasture, the main limitations are the seasonal high water table, the susceptibility of the surface layer to compaction, and low fertility. The wetness limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. A drainage system accelerates early growth, extends the grazing season, and increases the variety of pasture plants that can be grown. An adequate system of drainage ditches and vegetated outlets is needed to remove excess water on or near the surface. Applying lime and mixed fertilizer improves the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing.

This unit is suited to the production of western hemlock and Sitka spruce. The main concerns in producing and harvesting timber are the wetness, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Because the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees have a limited rooting depth as a result of the seasonal high water table and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include western hemlock and Sitka spruce.

If this unit is used for homesite development, the main limitations are the wetness, the slow permeability in the subsoil, low soil strength, and the high shrink-swell potential. A drainage system is needed if roads or building foundations are constructed. Excess water can be removed by suitably designed drainage ditches. Preserving the existing plant cover during construction helps to control erosion. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The damage caused by shrinking and swelling can be minimized by using a proper engineering design and by backfilling with material that has a low shrink-swell potential. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

This unit is poorly suited to septic tank absorption fields. The slow permeability and the seasonal high

water table increase the likelihood that septic tank absorption fields will fail.

12A—Coquille silt loam, 0 to 1 percent slopes. This deep, very poorly drained soil is on tide-influenced flood plains. It formed in silty recent alluvium derived from mixed sources. The native vegetation is mainly willows, sedges, rushes, and grasses. Elevation is 0 to 10 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The upper part of the substratum is dark grayish brown, mottled silty clay loam about 17 inches thick. The lower part to a depth of 60 inches or more is dark gray silty clay loam and silt loam.

Included in this unit are small areas of Brallier soils, small areas of very poorly drained soils that are sandy below the surface layer, and small areas of very poorly drained soils that have a thick organic surface layer over mineral material and are on the slightly lower parts of tidal flood plains. Included areas make up about 20 percent of the total acreage.

Permeability is slow in the Coquille soil. Available water capacity is 11 to 13 inches. The effective rooting depth is more than 60 inches but is limited by a seasonal high water table 2 feet above to 2 feet below the surface throughout the year. This soil is frequently flooded for brief periods throughout the year.

This unit is used mainly for wildlife habitat.

13A—Coquille silt loam, 0 to 1 percent slopes, protected. This deep, very poorly drained soil is on diked flood plains. It formed in silty recent alluvium derived from mixed sources. The native vegetation is mainly willows, red alder, rushes, sedges, skunkcabbage, grasses, and scattered Sitka spruce. Elevation is 0 to 10 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface layer is very dark grayish brown silt loam about 7 inches thick. The upper part of the substratum is dark grayish brown, mottled silty clay loam about 17 inches thick. The lower part to a depth of 60 inches or more is dark gray silty clay loam and silt loam.

Included in this unit are small areas of Brallier soils on the slightly lower parts of tidal flood plains and Coquille soils that are frequently flooded for brief periods during the rainy season, mainly by small tributary streams. Also included are small areas of very poorly drained soils that are sandy below the surface layer and very poorly drained soils that have a thick organic surface layer over mineral material. Included areas make up about 20 percent of the total acreage.

Permeability is slow in the Coquille soil. Available water capacity is 11 to 13 inches. The effective rooting depth is more than 60 inches but is limited by a seasonal high water table. The water table is 0.5 foot above to 2.0 feet below the surface from October through June unless the soil is drained. Runoff is slow to ponded, and the hazard of water erosion is slight. This soil is subject to rare flooding of brief duration. Unless dikes and floodgates are maintained, it is subject to flooding during periods of extremely high tides throughout the year.

This unit is suited to pasture. The main limitations are the wetness, the susceptibility of the surface layer to compaction, and the hazard of flooding. Measures that maintain the dikes are necessary to protect the soil from flooding during periods of extremely high tides. Protected areas are subject to flooding and long periods of ponding unless drainage ditches, outlets, and tide gates are maintained. The wetness limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. Excessive water on the surface can be removed by open ditches if suitable outlets are available. A drainage system accelerates early growth, extends the grazing season, and increases the variety of pasture plants that can be grown. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Fertilizer is needed to ensure the optimum growth of grasses and legumes.

This soil is not suited to homesite development. It is limited mainly by the hazard of flooding and the wetness resulting from the seasonal high water table.

14B—Depoe loam, 0 to 7 percent slopes. This poorly drained soil is in depressions on marine terraces. It is shallow to an ortstein pan. It formed in stratified marine sediments derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, western redcedar, shore pine, rhododendron, salal, evergreen huckleberry, false azalea, rushes, and sedges. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a layer of partially decomposed leaves, needles, twigs, cones, and moss about 4 inches thick. The surface layer is very dark grayish brown loam about 4 inches thick. The subsurface layer is about 12 inches of dark gray sandy

loam and grayish brown, mottled loam. The subsoil is about 32 inches of banded brownish yellow to dark red fine sand that is moderately cemented or strongly cemented by iron. The substratum to a depth of 60 inches or more is light gray fine sand that has intermittent, weakly cemented bands or nodules.

Included in this unit are small areas of Bandon soils on terrace escarpments and the higher convex slopes on marine terraces and Nelscott and Gleneden soils in the slightly higher, more nearly level positions on marine terraces. Also included are small areas of Depoe soils that have finer textured layers over the iron-cemented layer. Included areas make up about 20 percent of the total acreage.

Permeability is moderate above the iron-cemented layer in the Depoe soil, very slow through the iron-cemented layer, and moderately rapid below the iron-cemented layer. Available water capacity is 2 to 4 inches. The effective rooting depth is 12 to 20 inches. Runoff is slow to ponded, and the hazard of water erosion is slight. A seasonal high water table is 0.5 foot above to 2.0 feet below the surface from October through May.

This unit is used mainly for wildlife habitat and limited timber production. A few areas have been used for homesite development.

This unit is suited to Sitka spruce, western hemlock, and western redcedar. Information about timber production is limited because there are few stands. The main concerns in producing and harvesting timber are the wetness and the limited rooting depth. Because of wetness, the use of equipment is limited to dry periods. Properly designed road drainage systems and carefully located culverts help to control erosion. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Because of the shallowness to a cemented layer, trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

Only the trees that can tolerate seasonal wetness should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Sitka spruce, western hemlock, and western redcedar.

This soil is poorly suited to homesite development. It is limited mainly by the shallowness to a cemented layer, the wetness, and the very slow permeability through the cemented layer. A drainage system is needed if roads or building foundations are constructed. The wetness can be reduced by installing drainage tile around footings. The wetness and the very slow permeability increase the likelihood that septic tank absorption fields will fail.

15B—Eilertsen silt loam, 0 to 5 percent slopes. This deep, well drained soil is on stream terraces. It formed in silty alluvium derived from mixed sources. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salmonberry, western swordfern, and trailing blackberry. Elevation is 50 to 750 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 49 to 53 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 13 inches thick. The subsoil is dark yellowish brown and yellowish brown silty clay loam about 31 inches thick. The next layer is yellowish brown, mottled silt loam about 7 inches thick. The substratum to a depth of 60 inches or more also is yellowish brown, mottled silt loam.

Included in this unit are small areas of Kirkendall and Nekoma soils and Fluvaquents on flood plains, Treharne soils in the more nearly level or concave positions on stream terraces, and Meda soils on fans. Also included are small areas of Bohannon, Preacher, and Slickrock soils where mountain foot slopes join stream terraces. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Eilertsen soil. Available water capacity is 11 to 13 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for hay and pasture. It also is used for homesite development, limited timber production, Christmas tree production, and wildlife habitat.

This unit is well suited to hay and pasture. It has few limitations. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed (fig. 5).

This unit is suited to Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction and plant competition. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes

Figure 5.—Sprinkler irrigation on Eilertsen silt loam, 0 to 5 percent slopes.

damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. The trees that are suitable for planting include Douglas-fir and western hemlock.

Few limitations affect the use of this unit for homesite development. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

This unit is suitable as a site for septic tank absorption fields. It has few limitations. The absorption fields may function poorly during the rainy season because of the moderate permeability. The moderate permeability can be overcome by increasing the size of the absorption field.

16C—Elsie silt loam, 3 to 12 percent slopes. This deep, well drained soil is on terraces. It formed in silty alluvium derived from mixed sources. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, western swordfern, and western brackenfern. Elevation is 80 to 500 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 49 to 53

degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface layer is very dark brown silt loam about 21 inches thick. The upper part of the subsoil is dark brown and strong brown silty clay loam about 26 inches thick. The lower part to a depth of 60 inches or more is strong brown loam.

Included in this unit are small areas of Bohannon, Preacher, and Slickrock soils; Apt and McDuff soils; and Honeygrove and Peavine soils where the more gently sloping mountain foot slopes and ridges join terraces. Also included are small areas of soils that are moderately well drained. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Elsie soil. Available water capacity is 11 to 12 inches. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used for hay and pasture, timber production, wildlife habitat, and homesite development.

This unit is suited to hay and pasture. The main limitations are the slope, the hazard of erosion, and the susceptibility of the surface layer to compaction. All of the climatically adapted pasture plants can be grown, but bunch-type species that are planted alone generally are not suitable because of the hazard of erosion. A seedbed should be prepared on the contour or across the slope where practical. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed.

This unit is suited to Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction and plant competition. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, and low soil strength. Erosion and sedimentation can be controlled and the beauty of the area enhanced by a good plant cover. Areas that have been cut and filled should be seeded or mulched. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

If this unit is used for septic tank absorption fields, the main limitations are the slope in some areas and the moderate permeability. The absorption lines should be installed in the less sloping areas. Because of the moderate permeability, the absorption fields may function poorly during the rainy season. The moderate permeability can be overcome by increasing the size of the absorption field.

17A—Euchre silt loam, 0 to 3 percent slopes. This deep, somewhat poorly drained soil is in depressions on stream terraces. It formed in silty and loamy alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Sitka spruce, scattered Douglas-fir, red alder, vine maple, Douglas spirea, salmonberry, rushes, sedges, and grasses. Elevation is 50 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is black silt loam about 15 inches thick. The subsoil is dark yellowish brown, mottled clay loam about 10 inches thick. The upper part of the substratum is about 11 inches of brown and dark yellowish brown, mottled fine sandy loam and yellowish brown, mottled clay loam. The lower part to a depth of 60 inches or more is dark brown sandy loam.

Included in this unit are small areas of Hebo soils in depressions and Siletz, Quillamook, and Wolfer soils on the slightly higher parts of stream terraces. Also included are small areas of somewhat poorly drained soils that are very gravelly to very cobbly throughout and are in depressions. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the upper part of the Euchre soil and moderately rapid in the lower part. Available water capacity is 10 to 14 inches. The effective rooting depth is more than 60 inches but is limited by a seasonal high water table at a depth of 1 to

3 feet from November through May. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for pasture and wildlife habitat. It also is used for woodlots and for homesite development in a few areas.

If this unit is used for pasture, the main limitations are the seasonal wetness, the susceptibility of the surface layer to compaction, and low fertility. The wetness resulting from the seasonal high water table limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. An adequate system of drainage ditches and vegetated outlets is needed to remove excess water on or near the surface. Applying lime and mixed fertilizer improves the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing.

If this unit is used for homesite development, the main limitations are the wetness and the moderately slow permeability. A drainage system is needed if roads or building foundations are constructed. Excess water can be removed by suitably designed drainage ditches. The wetness can be reduced by installing drainage tile around footings. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

This unit is poorly suited to septic tank absorption fields. It is limited by the seasonal high water table and the moderately slow permeeability, which increase the likelihood that the absorption fields will fail. The effluent from the absorption fields can seep into ground water.

18G—Fendall-Templeton silt loams, 35 to 60 percent slopes. This map unit is on the side slopes of hilly uplands. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, salal, salmonberry, thimbleberry, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

This unit is about 45 percent Fendall soil and 35 percent Templeton soil.

Included in this unit are small areas of Tolovana and Reedsport soils, which formed in the coarser textured colluvium weathered from sedimentary rock on side slopes; Klootchie and Neotsu soils, which formed in colluvium weathered from volcanic rock on side slopes; and soils that are similar to the Fendall soil but are less clayey. Also included are Fendall and Templeton soils that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

The Fendall soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is very dark brown and dark brown silt loam about 16 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam about 11 inches thick. The lower part is dark yellowish brown silty clay about 11 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 38 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately slow in the Fendall soil. Available water capacity is 4 to 10 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

The Templeton soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, twigs, cones, leaves, moss, and roots about 3 inches thick. The surface layer is very dark brown and dark brown silt loam about 17 inches thick. The upper part of the subsoil is dark yellowish brown silt loam about 14 inches thick. The lower part is dark brown and brown silty clay loam about 24 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 55 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Templeton soil. Available water capacity is 8 to 16 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock, Douglas-fir, and Sitka spruce. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Fendall soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Landsliding or slumping can occur when the soils are saturated and have been disturbed by road construction or timber harvesting. Roads, landings, and steep yarding paths can be protected from erosion by

constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Fendall soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable palnts, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Among the trees suitable for planting are western hemlock, Douglas-fir, and Sitka spruce. Along coastal areas stands of spruce and hemlock may produce a greater volume of wood than stands of Douglas-fir because the spruce and hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

19E—Fendall-Winema silt loams, 15 to 35 percent slopes. This map unit is on the side slopes of hilly uplands. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, salal, salmonberry, thimbleberry, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 500 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 210 days.

This unit is about 50 percent Fendall soil and 30 percent Winema soil.

Included in this unit are small areas of Templeton soils, which formed in the less clayey material weathered from sedimentary rock on the side slopes of hilly uplands; small areas of Tolovana and Reedsport soils, which formed in loamy colluvium weathered from sedimentary rock on ridges and side slopes where mountainous areas join hilly uplands; small areas of Klootchie, Neotsu, Neskowin, and Salander soils, which formed in colluvium weathered from volcanic rock on ridges and side slopes where mountainous areas join hilly uplands; and, in the Lincoln City area, small areas of soils that are similar to the Fendall soil but are less clayey and darker and soils that have been influenced by eolian material, are moderately deep or deep to bedrock, are loamy and sandy, and have less than 35 percent clay. Also included are Fendall and Winema soils that have slopes of more than 35 percent or less than 15 percent. Included areas make up about 20 percent of the total acreage.

The Fendall soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is very dark brown and dark brown silt loam about 16 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam about 11 inches thick. The lower part is dark yellowish brown silty clay about 11 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 38 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately slow in the Fendall soil. Available water capacity is 4 to 10 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Winema soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface layer is black silt loam about 18 inches thick. The next layer is very dark brown silty clay loam about 7 inches thick. The subsoil is dark yellowish brown silty clay and silty clay loam about 29 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 54 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderately slow in the Winema soil. Available water capacity is 9 to 16 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used for pasture, homesite development, recreational development, timber production, and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the slope, the hazard of erosion, the susceptibility of the surface layer to compaction, and low fertility. Where practical, a seedbed should be prepared on the contour or across the slope. All of the suitable pasture plants can be grown, but planting bunch-type species alone increases the hazard of erosion. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of western hemlock, Douglas-fir, and Sitka spruce. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Fendall soil. Properly designed road drainage systems and

carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Fendall soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. If the site is not adequately prepared, competition from undesirable plants can prevent or delay establishment of volunteer or planted seedlings. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include western hemlock, Douglas-fir, and Sitka spruce. Along coastal areas, stands of spruce and hemlock may produce a greater volume of wood than stands of Douglas-fir because the spruce and hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of erosion, the moderately slow permeability, low soil strength, the moderate shrink-swell potential, and the moderate depth to soft bedrock in the Fendall soil. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Preserving the existing plant cover during construction and revegetating disturbed areas as soon as possible help to control erosion. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Cuts needed to provide essentially level building sites can expose the soft bedrock in the Fendall soil. The damage caused by shrinking and swelling can be minimized by using a proper design and by backfilling with material that has a low shrink-swell potential. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load.

If this unit is used for septic tank absorption fields, the main limitations are the slope, the moderately slow permeability, and the depth to bedrock in the Fendall soil. The effluent from the absorption fields can surface in downslope areas, creating a health hazard. The absorption lines should be installed in the less sloping areas. Because of the limited depth to soft rock on the Fendall soil, sites for septic systems should be located on areas that are deeper to bedrock. The moderately slow permeability can be overcome by increasing the size of the absorption field.

20E—Formader-Hemcross complex, 3 to 35 percent slopes. This map unit is on the tops of ridges in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, red alder, vine maple, salal, cascade Oregongrape, salmonberry, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 145 to 200 days.

This unit is about 50 percent Formader soil and 35 percent Hemcross soil.

Included in this unit are small areas of Harslow, Klistan, and Hembre soils, which formed in colluvium weathered from volcanic rock on ridgetops, and Bohannon and Preacher soils, which formed in colluvium weathered from sedimentary rock on ridgetops. Also included are soils that formed in colluvium weathered from volcanic rock over sedimentary bedrock in recent or old slump areas and Formader and Hemcross soils that have slopes of more than 35 percent. Included areas make up about 15 percent of the total acreage.

The Formader soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown loam about 19 inches thick. The subsoil is dark brown loam about 11 inches thick. Fractured, weathered basic igneous bedrock is at a depth of about 30 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Formader soil. Available water capacity is 7 to 14 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Hemcross soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown silt loam about 15 inches thick. The

upper part of the subsoil is brown silt loam and strong brown gravelly silt loam about 33 inches thick. The lower part is strong brown very gravelly loam about 12 inches thick. The depth to bedrock is more than 60 inches.

Permeability is moderate in the Hemcross soil. Available water capacity is 12 to 16 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Formader soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Formader soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

20G—Formader-Hemcross complex, 35 to 60 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, western redcedar, red alder, vine maple, salal, cascade Oregongrape, salmonberry, red huckleberry, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 145 to 200 days.

This unit is about 50 percent Formader soil and 30 percent Hemcross soil.

Included in this unit are small areas of Klistan and Harslow soils, which formed in colluvium weathered from volcanic rock on side slopes, and Bohannon and Preacher soils, which formed in colluvium weathered from sedimentary rock on side slopes. Also included are small areas of soils that have bedrock within a depth of 20 inches and are on side slopes and Formader and Hemcross soils that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

The Formader soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown loam about 19 inches thick. The subsoil is dark brown loam about 11 inches thick. Fractured, weathered basic igneous bedrock is at a depth of about 30 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Formader soil. Available water capacity is 7 to 14 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

The Hemcross soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown silt loam about 15 inches thick. The upper part of the subsoil is brown silt loam and strong brown gravelly silt loam about 33 inches thick. The lower part is strong brown very gravelly loam about 12 inches thick. The depth to bedrock is more than 60 inches.

Permeability is moderate in the Hemcross soil. Available water capacity is 12 to 16 inches. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Formader soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and

to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Formader soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

21H—Formader-Klistan-Hemcross complex, 60 to 80 percent slopes. This map unit is on steep side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, western redcedar, red alder, vine maple, salmonberry, salal, cascade Oregongrape, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 145 to 200 days.

This unit is about 35 percent Formader soil, 30 percent Klistan soil, and 20 percent Hemcross soil.

Included in this unit are small areas of Harslow soils, which formed in colluvium weathered from volcanic rock, and soils that are similar to the Harslow soils but are less than 20 inches deep to bedrock. These soils are on side slopes. Also included are small areas of Rock outcrop and Formader, Klistan, and Hemcross soils that have slopes of less than 60 percent or more than 80 percent. Included areas make up about 15 percent of the total acreage.

The Formader soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark brown loam about 19 inches thick. The subsoil is dark brown loam about 11 inches thick. Fractured, weathered basic igneous bedrock is at a depth of about 30 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Formader soil. Available water capacity is 7 to 14 inches. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Klistan soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 0.5 inch thick. The surface layer is black, very dark brown, and dark brown very gravelly loam about 19 inches thick. The subsoil is dark brown and dark reddish brown very gravelly loam about 28 inches thick. Fractured basalt bedrock is at a depth of about 47 inches. The depth to bedrock is 40 to 60 inches.

Permeability is moderate in the Klistan soil. Available water capacity is 4 to 8 inches. The effective rooting depth is 40 to 60 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Hemcross soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown silt loam about 15 inches thick. The upper part of the subsoil is brown silt loam and strong brown gravelly silt loam about 33 inches thick. The lower part is strong brown very gravelly loam about 12 inches thick. The depth to bedrock is more than 60 inches.

Permeability is moderate in the Hemcross soil. Available water capacity is 12 to 16 inches. The effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is very high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Formader soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Landsliding or slumping can occur when the soils are saturated and have been disturbed by road construction or timber harvesting. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Formader soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly

preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

22C—Gleneden silty clay loam, 2 to 12 percent slopes. This deep, somewhat poorly drained soil is on marine terraces. It formed in clayey alluvium derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, western redcedar, shore pine, red alder, vine maple, salal, salmonberry, evergreen huckleberry, and western swordfern. Elevation is 35 to 100 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with needles, twigs, small branches, leaves, and cones about 1 inch thick. Typically, the surface layer is very dark grayish brown silty clay loam about 11 inches thick. The upper part of the subsoil is dark brown, mottled silty clay and brown, mottled clay about 14 inches thick. The lower part is grayish brown, mottled clay about 11 inches thick. The substratum to a depth of 60 inches or more is brownish gray, mottled clay.

Included in this unit are small areas of Bandon and Nelscott soils on the slightly higher parts of terraces, Bandon soils on the steeper terrace escarpments, Depoe soils in depressions, and well drained soils that are loamy and sandy, have sedimentary bedrock at a depth of 20 to more than 60 inches, and are on the steeper terrace escarpments. Also included are soils that are similar to the Gleneden soil but have a sandy substratum and small areas of soils that are moderately well drained. Included areas make up about 15 percent of the total acreage.

Permeability is very slow in the Gleneden soil. Available water capacity is 8 to 10 inches. The effective rooting depth is limited by a seasonal high water table at a depth of 1.5 to 2.0 feet from December through April. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used for timber production, wildlife habitat, and homesite development.

This unit is suited to the production of Sitka spruce and western hemlock. The main concerns in producing and harvesting timber are the wetness, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Because the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees have a limited rooting depth as a result of the seasonal high water table and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. If the site is not adequately prepared, competition from undesirable plants can prevent or delay establishment of volunteer or planted seedlings. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Only the trees that can tolerate seasonal wetness should be selected for planting. The trees that are suitable for planting include western hemlock and Sitka spruce.

If this unit is used for homesite development, the main limitations are the hazard of erosion in steeper areas, the very slow permeability, the wetness, low soil strength, and the shrink-swell potential. Erosion is a hazard in the steeper areas. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. A drainage system is needed if roads or building foundations are constructed. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The damage caused by shrinking and swelling can be minimized by using a proper design and by backfilling with material that has a low shrink-swell potential. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

This soil is poorly suited to septic tank absorption fields. The very slow permeability and the seasonal high water table increase the likelihood that septic tank absorption fields will fail.

23C—Grindbrook silt loam, 2 to 12 percent slopes. This deep, moderately well drained soil is on terraces. It formed in silty alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salal,

salmonberry, red huckleberry, and western swordfern. Elevation is 100 to 400 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown silt loam about 21 inches thick. The upper part of the subsoil is dark brown silty clay loam about 10 inches thick. The lower part to a depth of 60 inches or more is dark yellowish brown and pale brown, mottled silty clay loam.

Included in this unit are small areas of Bentilla and Hebo soils in depressions. Also included are small areas of highly diverse soils that are dominantly well drained, are nongravelly to very cobbly, have weathered bedrock at a depth of 20 to more than 60 inches, and are on the steeper terrace escarpments. In a few areas are soils that are similar to the Grindbrook soil but are well drained and are near terrace escarpments and where hilly uplands and mountain foot slopes join terraces. Included areas make up an average of about 15 percent of the total acreage, but the percentage varies from one map unit to another.

Permeability is slow in the Grindbrook soil. Available water capacity is 9 to 11 inches. The effective rooting depth is 60 inches or more, but the seasonal high water table may limit the depth for plants that do not tolerate water. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. The seasonal high water table is at a depth of 2 to 3 feet from November through May.

This unit is used for pasture, timber production, wildlife habitat, and homesite development.

If this unit is used for pasture, the main limitations are the slope, the hazard of erosion, the seasonal high water table, the susceptibility of the surface layer to compaction, and low fertility. Where practical, a seedbed should be prepared on the contour or across the slope. A drainage system accelerates early growth, extends the grazing season, and increases the variety of forage plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Because the soil is sticky when wet, most planting and harvesting equipment can be used only during dry periods. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Logging roads require heavy base rock for year-round use. Trees have a limited rooting depth as a result of the seasonal high water table and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include western hemlock and Douglas-fir.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, the wetness, the slow permeability, and low soil strength. Erosion is a hazard in the steeper areas. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. A drainage system is needed if roads or building foundations are constructed. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

If this unit is used as a site for septic tank absorption fields, it is limited mainly by slope in some areas, the slow permeability, and the seasonal high water table. The slow permeability and the seasonal high water table increase the likelihood that septic tank absorption fields will fail. The slow permeability can be overcome by increasing the size of the absorption field. The slope limits the installation of septic tank absorption fields.

The absorption lines should be installed in the less sloping areas. The effluent from the absorption fields can surface in downslope areas, creating a health hazard.

24H—Harslow-Rock outcrop complex, 60 to 90 percent slopes. This map unit is on steep side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, western redcedar, red alder, vine maple, salal, salmonberry, cascade Oregongrape, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 145 to 200 days.

This unit is about 50 percent Harslow soil and 25 percent Rock outcrop.

Included in this unit are small areas of Formader, Hemcross, and Klistan soils, which formed in colluvium weathered from volcanic rock on side slopes. Also included are small areas of soils that are similar to the Harslow soil but are less than 20 inches deep over bedrock and small areas of Harslow soils and Rock outcrop that have slopes of less than 60 percent or more than 90 percent. Included areas make up about 25 percent of the total acreage.

The Harslow soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, twigs, cones, roots, and moss about 1 inch thick. The surface layer is dark reddish brown very gravelly loam about 10 inches thick. The upper part of the subsoil is reddish brown very gravelly loam about 15 inches thick. The lower part is dark brown extremely gravelly loam about 11 inches thick. Fractured basalt bedrock is at a depth of about 36 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Harslow soil. Available water capacity is 2 to 5 inches. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

Rock outcrop consists mainly of exposures of hard basalt breccia, basalt dikes, or sills. Areas of deeply weathered volcanic material are in some of the exposures.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water. Rock quarries are in some areas.

This unit is suited to the production of Douglas-fir. The total yield is reduced by the percentage of Rock outcrop. The quality of the timber surrounding the open areas is poor because of an increase in the number of limbs and the wind damage. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, the Rock outcrop, and the limited rooting depth. Minimizing the risk of erosion is essential in harvesting timber. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Because of the Rock outcrop, felling and yarding the trees is difficult and breakage of the trees is a hazard. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Landsliding and slumping can occur when the soil is saturated and has been disturbed by road construction or timber harvesting. Trees on the Harslow soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

25A—Hebo silty clay loam, 0 to 3 percent slopes. This deep, poorly drained soil is in depressions on terraces. It formed in clayey alluvium derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, red alder, willows, Douglas spirea, skunkcabbage, and sedges. Elevation is 40 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of roots, leaves, and woody material about 5 inches thick. The surface layer is black, mottled silty clay loam about 3 inches thick. The upper part of the subsoil is very dark gray, mottled silty clay about 7 inches thick. The lower part is gray, mottled silty clay and clay about 38 inches thick. The substratum to a depth of 60 inches or more is light gray and light brownish gray, mottled clay loam.

Included in this unit are small areas of Bentilla and Grindbrook soils on high terraces, Chitwood and Knappa soils on the slightly lower terraces, and Euchre soils on stream terraces. Included areas make up about 15 percent of the total acreage.

Permeability is very slow in the Hebo soil. Available water capacity is 8 to 11 inches. The effective rooting

depth is limited by a seasonal high water table 0.5 foot above to 1.0 foot below the surface from November through June. Runoff is slow to ponded.

This unit is used mainly for pasture and wildlife habitat. It also is used for limited timber production.

If this soil is used for pasture, the main limitations are the wetness, the susceptibility of the surface layer to compaction, and low fertility. The wetness limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. An adequate system of drainage ditches and vegetated outlets is needed to remove excess water on or near the surface. A drainage system accelerates early growth, extends the grazing season, and increases the variety of pasture plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Applying lime and mixed fertilizer improves the growth of forage plants. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing.

This soil is poorly suited to homesite development. It is limited mainly by wetness, high shrink-swell potential, low soil strength, and the very slow permeability.

26E—Hembre silt loam, 3 to 35 percent slopes. This deep, well drained soil is on ridgetops and benches in mountainous areas. It formed in colluvium derived from volcanic material. The native vegetation is mainly Douglas-fir, western hemlock, red alder, vine maple, salal, cascade Oregongrape, salmonberry, red huckleberry, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 70 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark reddish brown silt loam about 19 inches thick. The subsoil is dark reddish brown and strong brown silty clay loam about 41 inches thick. The depth to bedrock is more than 60 inches.

Included in this unit are small areas of Formader and Hemcross soils, which formed in colluvium weathered from volcanic rock on ridgetops, and Preacher, Bohannon, Astoria, and Blachly soils, which formed in colluvium weathered from sedimentary rock on ridgetops and benches. Also included are small areas of Hembre soils that have slopes of more than 35 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Hembre soil. Available water capacity is 12 to 15 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, and plant competition. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

26G—Hembre silt loam, 35 to 60 percent slopes. This deep, well drained soil is on side slopes in mountainous areas. It formed in colluvium derived from volcanic material. The native vegetation is mainly Douglas-fir, western hemlock, red alder, vine maple, salal, salmonberry, cascade Oregongrape, red huckleberry, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 70 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark reddish brown silt loam about 19 inches thick. The subsoil is dark reddish brown and strong brown silty clay loam about 41 inches thick. The depth to bedrock is more than 60 inches.

Included in this unit are small areas of Formader, Hemcross, Klistan, and Harslow soils, which formed in colluvium weathered from volcanic rock on side slopes,

and Bohannon, Preacher, Slickrock, Blachly, and Kilowan soils, which formed in colluvium weathered from sedimentary rock on side slopes. Also included are small areas of Hembre soils that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Hembre soil. Available water capacity is 12 to 15 inches. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, and plant competition. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

27A—Histic cryaquepts, 0 to 3 percent slopes. These moderately deep or deep, somewhat poorly drained to very poorly drained soils are in wet mountain meadows and depressions along drainageways in high mountainous areas. The soils formed in mixed colluvium and alluvium derived dominantly from igneous rocks and siltstone and a buildup of partially decomposed organic matter in the surface layer. The native vegetation is mainly scattered western redcedar, western hemlock, noble fir, alder, willow, huckleberry, salal, rhododendron, sedges, and rushes. Elevation is 2,300 to 2,900 feet. The average annual precipitation is 100 to 200 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 60 days or less.

The surface layer is very dark grayish brown, moderately decomposed woody material, sphagnum, and sedge peat about 8 inches thick. The next layer is very dark gray muck about 4 inches thick. The upper part of the substratum is variegated strong brown and grayish brown silty clay loam and dark grayish brown, brown, dark yellowish brown, and strong brown loam about 12 inches thick. The lower part is variegated pale brown, gray, brown, and yellowish red gravelly loam and variegated gray and pale brown cobbly loam about 36 inches thick. The depth to bedrock is more than 60 inches.

Included in this unit are small areas of Caterl, Laderly, and Murtip soils, which formed in colluvium weathered from volcanic rock at the slightly lower elevations, and Valsetz and Yellowstone soils, which formed in colluvium weathered from volcanic rock at the higher elevations. Also included are small areas of deep organic soils on concave slopes. Included areas make up about 10 percent of the total acreage.

Permeability is moderately slow in the Histic cryaquepts. Available water capacity is 8 to 14 inches. The effective rooting depth is limited by a seasonal high water table 2 feet above to 1 foot below the surface throughout the year.

This unit is used mainly for wildlife habitat and as a source of water. The main limitations are the wetness resulting from the high water table and the short growing season.

28E—Honeygrove silty clay loam, 3 to 30 percent slopes. This deep, well drained soil is on broad ridgetops and benches in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, bigleaf maple, red alder, vine maple, cascade Oregongrape, salal, and western swordfern. Elevation is 200 to 1,100 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark reddish brown silty clay loam about 7 inches thick. The subsoil is reddish brown and yellowish red silty clay about 53 inches thick. The depth to weathered bedrock is more than 60 inches.

Included in this unit are small areas of Peavine soils, which formed in fine textured colluvium weathered from sedimentary rock on ridgetops, and Bohannon and Preacher soils, which formed in the coarser textured colluvium weathered from sedimentary rock on narrow ridgetops and benches. Also included are small areas of Honeygrove soils that have slopes of more than 30 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Honeygrove soil. Available water capacity is 8 to 10 inches. The

effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, and plant competition. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

29E—Kilowan clay loam, 5 to 35 percent slopes. This moderately deep, well drained soil is on ridgetops and benches in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, red huckleberry, salmonberry, cascade Oregongrape, and western swordfern. Elevation is 250 to 1,800 feet. The average annual precipitation is 70 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark brown clay loam about 8 inches thick. The upper part of the subsoil is reddish brown and yellowish red clay about 19 inches thick. The lower part is yellowish red silty clay about 10 inches thick. Fractured, weathered sandstone bedrock is at a depth of about 37 inches. The depth to weathered bedrock is 20 to 40 inches.

Included in this unit are small areas of Blachly soils, which formed in fine textured colluvium weathered from sedimentary rock on ridgetops and benches; Preacher and Bohannon soils, which formed in the coarser textured colluvium weathered from sedimentary rock on ridgetops and benches; and Formader, Hemcross, and Hembre soils, which formed in colluvium weathered from volcanic rock on ridgetops. Also included are small areas of Kilowan soils that have slopes of more than 35 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderately slow in the Kilowan soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

29G—Kilowan clay loam, 35 to 60 percent slopes. This moderately deep, well drained soil is on side slopes in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, salmonberry, red

huckleberry, cascade Oregongrape, and western swordfern. Elevation is 250 to 1,800 feet. The average annual precipitation is 70 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark brown clay loam about 8 inches thick. The upper part of the subsoil is reddish brown and yellowish red clay about 19 inches thick. The lower part is yellowish red silty clay loam about 10 inches thick. Fractured, weathered sandstone bedrock is at a depth of about 37 inches. The depth to weathered bedrock is 20 to 40 inches.

Included in this unit are small areas of Blachly soils, which formed in fine textured colluvium weathered from sedimentary rock on side slopes; Preacher, Bohannon, and Slickrock soils, which formed in the coarser textured colluvium weathered from sedimentary rock on side slopes; and Formader, Hemcross, and Klistan soils, which formed in colluvium weathered from volcanic rock on side slopes. Also included are small areas of Kilowan soils that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderately slow in the Kilowan soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

30A—Kirkendall silt loam, 0 to 3 percent slopes. This deep, well drained soil is on convex bars of flood plains. It formed in silty recent alluvium derived dominantly from mixed sources. The native vegetation is mainly scattered Douglas-fir, western hemlock, red alder, bigleaf maple, red elderberry, vine maple, salmonberry, and western swordfern. Elevation is 20 to 750 feet. The average annual precipitation is about 60 to 90 inches, the average annual air temperature is 49 to 53 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 17 inches thick. The subsoil is brown silt loam about 19 inches thick. The substratum to a depth of 60 inches or more is dark yellowish brown silt loam.

Included in this unit are small areas of Nekoma soils near stream channels, Fluvaquents in depressions, and Eilertsen soils on terraces. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Kirkendall soil. Available water capacity is 11 to 13 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight unless the soil is flooded. This soil is occasionally flooded for brief periods from November through April. A seasonal high water table is at a depth of 2.5 to 6.0 feet from November through April.

This unit is used mainly for hay and pasture and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the hazard of flooding and the susceptibility of the surface layer to compaction. The pasture species that tolerate the occasional, brief periods of flooding should be selected for planting. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Grasses and legumes grow well if adequate fertilizer is used. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed.

This unit is poorly suited to homesite development. It is limited mainly by the hazard of flooding and low soil strength.

31G—Klistan-Harslow very gravelly loams, 20 to 60 percent slopes. This map unit is on undulating ridges and side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, western red cedar, red alder, vine maple, salmonberry, salal, red huckleberry, cascade Oregongrape, and western swordfern. Elevation is 200 to 1,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 46 to 52 degrees F, and the average frost-free period is 150 to 210 days.

This unit is about 50 percent Klistan soil and 30 percent Harslow soil.

Included in this unit are small areas of Formader and Hemcross soils, which formed in colluvium weathered from volcanic rock on ridges and side slopes. Also included are small areas of Klistan and Harslow soils that have slopes of more than 60 percent or less than 20 percent. Included areas make up about 20 percent of the total acreage.

The Klistan soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 0.5 inch thick. The surface layer is black, very dark brown, and dark brown very gravelly loam about 19 inches thick. The upper part of the subsoil is dark brown and dark reddish brown very gravelly loam about 20 inches thick. The lower part is dark brown very gravelly loam about 8 inches thick. Fractured basalt bedrock is at a depth of about 47 inches. The depth to bedrock is 40 to 60 inches.

Permeability is moderate in the Klistan soil. Available water capacity is 4 to 8 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

The Harslow soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, twigs, cones, roots, and moss about 1 inch thick. The surface layer is dark reddish brown very gravelly loam about 10 inches thick. The upper part of the subsoil is reddish brown very gravelly loam about 15 inches thick. The lower part is dark brown extremely gravelly loam about 11 inches thick. Fractured basalt bedrock is at a depth of about 36 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Harslow soil. Available water capacity is 2 to 5 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Harslow soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Harslow soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir.

32E—Klootchie-Neotsu silt loams, 3 to 30 percent slopes. This map unit is on the tops of ridges in mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, cascade Oregongrape, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 1,800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 45 percent Klootchie soil and 35 percent Neotsu soil.

Included in this unit are small areas of Tolovana and Reedsport soils, which formed in colluvium weathered from sedimentary rock on ridgetops. Also included are small areas of deep soils that are light colored, are finer textured throughout than the Klootchie and Neotsu soils, and are on ridges. In a few small areas are Klootchie and Neotsu soils that have slopes of more than 30 percent. Included areas make up about 20 percent of the total acreage.

The Klootchie soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark reddish brown silt loam about 14 inches thick. The upper part of the subsoil is dark brown and brown silt loam about 30 inches thick. The lower part is strong brown gravelly silt loam about 9 inches thick.

Fractured, partially weathered basic igneous bedrock is at a depth of about 53 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Klootchie soil. Available water capacity is 10 to 21 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Neotsu soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is very dark brown silt loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silt loam and loam about 14 inches thick. The lower part is dark yellowish brown gravelly loam about 7 inches thick. Weathered, highly fractured igneous bedrock is at a depth of about 33 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Neotsu soil. Available water capacity is 5 to 14 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Neotsu soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Neotsu soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. Among the trees suitable for planting are western hemlock and Douglas-fir. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

32G—Klootchie-Neotsu silt loams, 30 to 60 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, cascade Oregongrape, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 1,800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 50 percent Klootchie soil and 30 percent Neotsu soil.

Included in this unit are small areas of Necanicum soils, which formed in colluvium weathered from volcanic rock on side slopes; small areas of Reedsport and Tolovana soils, which formed in colluvium weathered from sedimentary rock on side slopes; and small areas of soils on side slopes that are very gravelly throughout and are less than 20 inches deep over bedrock. Also included are small areas of deep soils that are light colored and finer textured throughout than the Klootchie and Neotsu soils and are on side slopes. In a few small areas are Klootchie and Neotsu soils that have slopes of less than 30 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

The Klootchie soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark reddish brown silt loam about 14 inches thick. The upper part of the subsoil is dark brown and brown silt loam about 30 inches thick. The lower part is strong brown gravelly silt loam about 9 inches thick. Fractured, partially weathered basic igneous bedrock is at a depth of about 53 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Klootchie soil. Available water capacity is 10 to 21 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

The Neotsu soil is moderately deep and well drained. It formed in colluvium derived from volcanic material.

Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is very dark brown silt loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silt loam and loam about 14 inches thick. The lower part is dark yellowish brown gravelly loam about 7 inches thick. Weathered, highly fractured igneous bedrock is at a depth of about 33 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Neotsu soil. Available water capacity is 5 to 14 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Neotsu soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Neotsu soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir and western hemlock. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

33B—Knappa silt loam, 2 to 7 percent slopes. This deep, well drained soil is on terraces. It formed in silty alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, vine maple, salmonberry, red huckleberry, and western swordfern. Elevation is 50 to 350 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is very dark brown and very dark grayish brown silt loam about 23 inches thick. The upper part of the subsoil is brown and dark yellowish brown silty clay loam about 31 inches thick. The lower part to a depth of 60 inches or more is yellowish brown silty clay loam.

Included in this unit are small areas of Chitwood and Hebo soils in depressions. Also included are small areas on terraces of deep, well drained soils that have a subsoil and substratum of loam to sandy loam and small areas on steeper terrace escarpments of highly variable, well drained soils that are nongravelly to very gravelly and have weathered bedrock at a depth of 20 to more than 60 inches. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Knappa soil. Available water capacity is 11 to 13 inches. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight.

This unit is used for hay and pasture, limited timber production, homesite development, and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the susceptibility of the surface layer to compaction, the low fertility, and the cool, moist summers that inhibit proper curing of hay crops during most years. All of the suitable pasture plants can be grown, but planting bunch-type species alone increases the hazard of erosion. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction and plant competition. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and

landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include western hemlock and Douglas-fir.

This unit is suited to homesite development. It has few limitations. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

If this unit is used as a site for septic tank absorption fields, the main limitation is the moderate permeability of the soil. The absorption fields may function poorly during the rainy season. The moderate permeability can be overcome by increasing the size of the absorption field.

34E—Laderly-Murtip complex, 3 to 30 percent slopes. This map unit is on the tops of ridges in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, noble fir, scattered Pacific silver fir, red huckleberry, salal, cascade Oregongrape, salmonberry, and western swordfern. Elevation is 1,800 to 2,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 60 to 100 days.

This unit is about 45 percent Laderly soil and 35 percent Murtip soil.

Included in this unit are small areas of Caterl soils, which formed in colluvium weathered from volcanic rock on ridgetops; Sach soils, which formed in colluvium weathered from sedimentary rock on ridgetops; and soils that are less than 20 inches deep over bedrock and Rock outcrop on narrow ridges. Also included are small areas of Laderly and Murtip soils that have stones or boulders on the surface and small areas that have slopes of more than 30 percent. Included areas make up about 20 percent of the total acreage.

The Laderly soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is very dark brown and dark brown gravelly loam about 18 inches thick. The subsoil is dark brown extremely gravelly loam about 12 inches thick. Fractured basalt bedrock is at a depth of about 30 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Laderly soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Murtip soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and bark 2 inches thick. The surface layer is dark reddish brown loam about 11 inches thick. The upper part of the subsoil is dark brown and reddish brown loam about 31 inches thick. The lower part is brown gravelly loam about 8 inches thick. Fractured, weathered basalt breccia bedrock is at a depth of about 50 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Murtip soil. Available water capacity is 9 to 17 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir and western hemlock. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Laderly soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Laderly soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds,

brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. Among the trees suitable for planting are Douglas-fir, western hemlock, and noble fir.

35E—Lint silt loam, 5 to 25 percent slopes. This deep, well drained soil is on high, dissected marine terraces. It formed in silty eolian and alluvial material derived from mixed sources. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, vine maple, salal, salmonberry, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 250 to 450 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a 5-inch-thick mat of moss, needles, leaves, and twigs and moderately decomposed organic matter with many fine and very fine roots. The surface layer is dark brown silt loam about 19 inches thick. The subsoil is dark yellowish brown and brown silt loam about 32 inches thick. The substratum to a depth of 60 inches or more is yellowish brown, mottled silty clay loam.

Included in this unit are small, gently sloping areas of Fendall, Templeton, Tolovana, and Reedsport soils where hilly uplands and mountainous areas join terraces and areas of Bandon, Nelscott, and Depoe soils on the less sloping terrace escarpments. Also included are small areas of Lint soils that have slopes of more than 25 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Lint soil. Available water capacity is 16 to 21 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat, homesite development, limited pasture, and as a source of water.

If this unit is used for pasture, the main limitations are the hazard of erosion, the susceptibility of the surface layer to compaction, and low fertility. Where practical, a seedbed should be prepared on the contour or across the slope. Maintaining a permanent plant cover helps to control erosion, especially during the rainy season. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of western hemlock, Sitka spruce, and Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, plant competition, and the susceptibility of the surface layer to compaction. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable palnts, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Sitka spruce, western hemlock, and Douglas-fir. Along coastal areas, stands of spruce and hemlock may produce a greater volume of wood than stands of Douglas-fir because the spruce and hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, and low soil strength. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Maintaining the plant cover helps to control erosion. Vegetative cover should be established at building sites as soon as possible to control erosion. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slope and the moderate permeability. The effluent from the absorption fields may surface in downslope areas. The absorption

lines should be installed in the less sloping areas. Because of the moderate permeability, the absorption fields may function poorly during the rainy season. The moderate permeability can be overcome by increasing the size of the absorption field.

36A—Logsden silt loam, 0 to 3 percent slopes. This deep, well drained soil is on low stream terraces. It formed in silty and stratified, loamy alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, vine maple, salmonberry, red huckleberry, and western swordfern. Elevation is 40 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is covered with a mat of leaves, twigs, needles, and moss about 1 inch thick. The surface layer is very dark grayish brown and dark brown silt loam about 19 inches thick. The subsoil is dark brown and dark yellowish brown silt loam and dark yellowish brown silty clay loam about 23 inches thick. The upper part of the substratum is dark yellowish brown fine sandy loam about 6 inches thick. The lower part to a depth of 60 inches or more is dark yellowish brown, stratified loamy sand and fine sandy loam.

Included in this unit are small areas of Quillamook, Siletz, and Euchre soils on the slightly higher terraces and Nehalem and Yachats soils on flood plains. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Logsden soil. Available water capacity is 9 to 13 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. This soil is subject to rare flooding of brief duration.

This unit is used mainly for hay and pasture. It also is used for homesite development, wildlife habitat, and limited timber production.

If this unit is used for hay and pasture, the main limitations are the susceptibility of the surface layer to compaction, low fertility, and the cool, moist summers that inhibit proper curing of hay crops during most years. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

If this unit is used for homesite development, the main limitations are low soil strength and the rare hazard of flooding. Building sites should be carefully selected and protected from the rare hazard of flooding. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

If this unit is used as a site for septic tank absorption fields, the main limitations are the hazard of rare flooding and the moderate permeability. Because of the moderate permeability, the absorption fields may not function properly during the rainy season. The moderate permeability can be overcome by increasing the size of the absorption field.

37C—McCurdy silt loam, 3 to 12 percent slopes. This deep, moderately well drained soil is on high terraces. It formed in clayey alluvium derived from mixed sources. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salmonberry, salal, western swordfern, and western brackenfern. Elevation is 100 to 800 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 49 to 53 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 16 inches thick. The upper part of the subsoil is yellowish brown silty clay loam about 16 inches thick. The lower part is yellowish brown, mottled silty clay about 14 inches thick. The substratum to a depth of 60 inches or more is strong brown, mottled silty clay loam.

Included in this unit are small areas of soils that are similar to the McCurdy soil but are well drained and small areas of deep, clayey soils that are somewhat poorly drained. Also included are small areas of Preacher, Bohannon, Apt, and McDuff soils where mountain foot slopes and ridges join terraces and small areas of McCurdy soils that have slopes of more than 12 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderately slow in the McCurdy soil. Available water capacity is 10 to 12 inches. The effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from November through April. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used for pasture, limited timber production, homesite development, and wildlife habitat.

If this unit is used for pasture, the main limitations are the slope, the hazard of erosion, the seasonal perched water table, and the susceptibility of the surface layer to compaction. Where practical, a seedbed should be prepared on the contour or across

the slope. A drainage system accelerates early growth, extends the grazing season, and increases the variety of pasture plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees have a limited rooting depth as a result of the seasonal high water table and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Douglas-fir.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, the moderately slow permeability, the wetness, low soil strength, and the moderate shrink-swell potential. Erosion is a hazard in the steeper areas. Preserving the existing plant cover during construction helps to control erosion. Only the part of the site that is used for construction should be disturbed. A drainage system is needed if roads or building foundations are constructed. Access roads should be designed to control surface runoff and help stabilize cut slopes. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The damage caused by shrinking and swelling can be minimized by using a proper design and by backfilling with material that has a low shrink-swell potential.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slope, the seasonal high water table, and the moderately slow permeability. The moderately slow permeability and the seasonal high water table increase the likelihood that septic tank absorption fields will fail. The effluent from the absorption fields can surface in downslope areas, creating a health hazard. The absorption lines should be installed in the less sloping areas. The moderately slow permeability can be overcome by increasing the size of the absorption field.

38C—Meda loam, 3 to 12 percent slopes. This deep, well drained soil is on alluvial fans. It formed in loamy alluvium derived from mixed sources. The native vegetation is mainly Douglas-fir, western hemlock, red alder, vine maple, western swordfern, salal, salmonberry, red huckleberry, and trailing blackberry. Elevation is 40 to 500 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 49 to 53 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface layer is very dark brown and very dark grayish brown loam about 11 inches thick. The subsoil is brown gravelly loam about 19 inches thick. The substratum to a depth of 60 inches or more is brown very gravelly loam.

Included in this unit are small areas of more nearly level Eilertsen soils where fans join terraces, Nekoma and Fluvaquents on flood plains, and Bohannon and Preacher soils where mountain foot slopes join fans. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the upper part of the Meda soil and rapid in the lower part. Available water capacity is 5 to 8 inches. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used mainly for hay and pasture and wildlife habitat. It also is used for homesite development.

If this unit is used for hay and pasture, the main limitations are the slope, the hazard of erosion, and the susceptibility of the surface layer to compaction. Where practical, a seedbed should be prepared on the contour or across the slope in steeper areas. All of the suitable pasture plants can be grown, but planting bunch-type species alone increases the hazard of erosion. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and

control erosion. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, and the rapid permeability. Homesites should be carefully selected to avoid areas that are within the path of debris that can wash out of the adjacent mountain areas. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Revegetating disturbed areas as soon as possible helps to control erosion. Excavation for roads and buildings may bring gravel and cobbles to the surface. Removal of gravel and cobbles in disturbed areas is required for best results when landscaping, particularly in areas used for lawns. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slope in some areas and the rapid permeability. The absorption lines should be installed in the less sloping areas. Because of the rapid permeability, seepage of the effluent from septic tank absorption fields can contaminate ground water and streams.

39E—Murtip-Caterl complex, 5 to 35 percent slopes. This map unit is on ridgetops and slump benches in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, noble fir, scattered Pacific silver fir, red huckleberry, salal, salmonberry, cascade Oregongrape, and western swordfern. Elevation is 1,800 to 2,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 60 to 100 days.

This unit is about 50 percent Murtip soil and 30 percent Caterl soil.

Included in this unit are small areas of Laderly soils on narrow ridges; moderately deep or deep, gravelly to stony soils that formed in colluvium weathered from volcanic rock over sedimentary rock on ridges and slump benches; and Sach soils, which formed in colluvium weathered from sedimentary rock on ridges. Also included are small areas of soils that are similar to the Murtip and Caterl soils but have a light colored surface layer, have boulders or stones on the surface, or have slopes of more than 35 percent. Included areas make up about 20 percent of the total acreage.

The Murtip soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and bark 2 inches thick. The surface layer is dark reddish brown loam about 11 inches thick. The upper part of the subsoil is dark brown and reddish brown loam about 31 inches thick. The lower part is brown gravelly loam about 8 inches thick. Fractured, weathered basalt breccia bedrock is at a depth of about 50 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Murtip soil. Available water capacity is 9 to 17 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Caterl soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown gravelly loam about 19 inches thick. The upper part of the subsoil is brown very gravelly loam about 24 inches thick. The lower part is brown extremely gravelly loam about 15 inches thick. Fractured basalt bedrock is at a depth of about 58 inches. The depth to bedrock is 40 to 60 inches.

Permeability is moderate in the Caterl soil. Available water capacity is 6 to 13 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir and western hemlock. The main concerns in producing and harvesting timber are the hazard of erosion, susceptibility of the surface layer to compaction, and plant competition. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling.

Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include Douglas-fir, western hemlock, and noble fir.

39G—Murtip-Caterl complex, 35 to 60 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation includes Douglas-fir, western hemlock, noble fir, scattered Pacific silver fir, red huckleberry, salal, salmonberry, cascade Oregongrape, and western swordfern. Elevation is 1,800 to 2,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 60 to 100 days.

This unit is about 45 percent Murtip soil and 35 percent Caterl soil.

Included in this unit are small areas of Laderly soils, which formed in colluvium weathered from volcanic rock on side slopes, and Sach soils, which formed in colluvium weathered from sedimentary rock on side slopes. Also included are small areas of Murtip and Caterl soils that have boulders or stones on the surface and small areas that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

The Murtip soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and bark 2 inches thick. The surface layer is dark reddish brown loam about 11 inches thick. The upper part of the subsoil is dark brown and reddish brown loam about 31 inches thick. The lower part is brown gravelly loam about 8 inches thick. Fractured, weathered basalt breccia bedrock is at a depth of about 50 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Murtip soil. Available water capacity is 9 to 17 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

The Caterl soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark brown gravelly loam about 19 inches thick. The upper part of the subsoil is brown very gravelly loam about 24 inches thick. The lower part is brown extremely gravelly loam about 15 inches thick. Fractured basalt bedrock is at a depth of about 58 inches. The depth to bedrock is 40 to 60 inches.

Permeability is moderate in the Caterl soil. Available water capacity is 6 to 13 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir and western hemlock. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, and plant competition. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include Douglas-fir, western hemlock, and noble fir.

40A—Nehalem silt loam, 0 to 3 percent slopes. This deep, well drained soil is on flood plains. It formed in silty recent alluvium derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, red alder, vine maple, salal, salmonberry, and western swordfern. Elevation is 10 to 100 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is very dark grayish brown and dark brown silt loam about 18 inches thick. The subsoil is brown silt loam about 33 inches thick. The substratum to a depth of 60 inches or more is dark yellowish brown silt loam.

Included in this unit are small areas of Brenner and Nestucca soils in depressions on flood plains, Yachats soils near stream channels, and Logsden soils on low stream terraces. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Nehalem soil. Available water capacity is 11 to 13 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight unless the soil is flooded. This soil is occasionally flooded for

brief periods from December through April. A seasonal high water table is at a depth of 3 to 6 feet from December through April.

This unit is used mainly for hay and pasture and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the hazard of flooding, low fertility, and the cool, moist summers that inhibit proper curing of hay crops during most years. The pasture species that tolerate the occasional, brief periods of flooding should be selected for planting. All of the suitable pasture plants can be grown, but planting bunch-type species alone increases the hazard of erosion. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is not suited to homesite development because of the hazard of flooding.

41A—Nekoma-Fluvaquents complex, 0 to 3 percent slopes. This map unit is on flood plains. The native vegetation is mainly scattered Douglas-fir, western hemlock, red alder, vine maple, red huckleberry, salmonberry, and western swordfern on the Nekoma soils and willow, red alder, rushes, and sedges on Fluvaquents. Elevation is 20 to 750 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 49 to 53 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 50 percent Nekoma soil and 30 percent Fluvaquents.

Included in this unit are small areas of Kirkendall soils on the higher flood plains, Eilertsen and Treharne soils on terraces, and Meda soils on fans. Also included are small areas of soils that are gravelly or very gravelly throughout and small areas of Preacher, Bohannon, and Slickrock soils where mountain foot slopes join flood plains along the smaller tributary valleys. Included areas make up about 20 percent of the total acreage.

The Nekoma soil is deep and well drained. It formed in silty and loamy recent alluvium over stratified loamy and sandy alluvium derived from mixed sources. Nekoma soils occupy the slightly higher, convex areas of the flood plain. Typically, the surface layer is very dark grayish brown and dark brown silt loam about 13 inches thick. The subsoil is dark yellowish brown fine sandy loam about 6 inches thick. The substratum to a depth of 60 inches or more is stratified brown, dark yellowish brown, and yellowish brown fine sandy loam and very fine sandy loam.

Permeability is moderately rapid in the Nekoma soil. Available water capacity is 7 to 9 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight unless the soil is flooded. A seasonal high water table fluctuates between depths of 4 and 6 feet from November through April. This soil is frequently flooded for brief periods from November through April.

The composition of Fluvaquents is highly variable. These soils are poorly drained and formed in silty and loamy recent alluvium derived from mixed sources. These soils occupy the depressional areas of the flood plain. The surface layer is very dark brown, very dark gray, very dark grayish brown, dark gray, and dark grayish brown sandy loam to silty clay loam and is as much as 30 percent gravel. The substratum is dark gray, dark grayish brown, gray, grayish brown, or olive brown, stratified sandy loam to silty clay loam and is as much as 65 percent gravel and cobbles.

Permeability is moderate to rapid in the Fluvaquents. Available water capacity is variable. The effective rooting depth is limited by a seasonal high water table within a depth of 3 feet from November through May. This soil is frequently flooded for brief periods from November through May.

This unit is used mainly for hay and pasture and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the hazard of flooding, the susceptibility of the surface layer to compaction, and wetness in the Fluvaquents.

The hay and pasture species that tolerate the frequent, brief periods of flooding should be selected for planting. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper grazing practices, weed control, and fertilizer are needed to ensure the maximum quality of forage. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed on the Nekoma soil.

On the Fluvaquents, an system of drainage ditches and vegetated outlets is needed to remove excess water on or near the surface. A drainage system accelerates early growth, extends the grazing season, and increases the variety of forage plants that can be grown.

This unit is not suited to homesite development. The main limitations are the hazard of flooding on the Nekoma soil and flooding on and wetness in the Fluvaquents.

42C—Nelscott loam, 3 to 12 percent slopes. This moderately well drained soil is on marine terraces. It is moderately deep to an ortstein pan. The soil formed in loamy eolian material over stratified marine sediments derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, western redcedar, shore pine, Douglas-fir in protected areas, red alder, vine maple, salal, red huckleberry, evergreen huckleberry, rhododendron, salmonberry, and western swordfern. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of partially decomposed leaves, needles, twigs, cones, and moss about 1 inch thick. The surface layer is very dark grayish brown and dark brown loam about 15 inches thick. The subsoil is brown, mottled silty clay loam about 14 inches thick. The next layer is light brownish gray, mottled loamy fine sand about 7 inches thick. The next layer is variegated grayish brown, yellowish brown, and reddish brown, moderately cemented fine sand about 12 inches thick. The substratum to a depth of 60 inches or more is variegated light brownish gray, yellowish brown, and brown, loose sand that has thin lenses of weakly cemented material.

Included in this unit are small areas of Bandon soils on the higher convex slopes, Depoe soils in depressions, and Lint soils on the higher terraces. Also included are small areas of soils that are similar to the Nelscott soil but are moderately well drained or well drained and have a cemented layer at a depth of more than 40 inches and small areas of Nelscott soils that have slopes of more than 12 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderate to a depth of 36 inches in the Nelscott soil, slow through the iron-cemented layer, and moderately rapid below that layer. Available water capacity is 4 to 8 inches. The effective rooting depth is limited by the cemented layer and by a seasonal high water table. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. The cemented layer is at a depth of 24 to 40 inches. A seasonal high water table is at a depth of 2.0 to 3.5 feet from November through March.

This unit is used for timber production, wildlife habitat, homesite development, pasture, recreational development, and as a source of water.

If this unit is used for pasture, the main limitations are the hazard of erosion, the susceptibility of the surface layer to compaction, the seasonal high water table, and low fertility. Where practical, a seedbed should be prepared on the contour or across the slope. A drainage system accelerates early growth, extends the grazing season, and increases the variety of forage plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of Sitka spruce and western hemlock. Sites directly exposed to onshore winds are subject to reduced productivity because of damage to trees by wind and the effect of salt air on vegetation. The main concerns in producing and harvesting timber are the hazard of erosion, plant competition, the susceptibility of the surface layer to compaction, and the limited rooting depth. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees have a limited rooting depth as a result of the seasonal high water table and the cemented layer and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Sitka spruce and western hemlock.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of erosion, the wetness, low soil strength, and the slow permeability through the cemented layer. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. Cutbanks are not stable and are subject to slumping. Areas that have been cut and filled should be seeded or mulched. Properly designing buildings and roads helps to offset

the limited ability of the soil to support a load. The wetness can be reduced by installing drainage tile around footings. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slope, the wetness, the depth to cemented pan, and the slow permeability. The absorption lines should be installed in the less sloping areas. The depth to the cemented pan, the slow permeability, and the seasonal high water table increase the likelihood that septic tank absorption fields will fail. The absorption fields can fail or do not function properly during periods of heavy rainfall.

42E—Nelscott loam, 12 to 50 percent slopes. This moderately well drained soil is on the short incised fronts and drainageways on marine terraces. It is moderately deep to an ortstein pan. The soil formed in loamy eolian material over stratified marine sediments derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, western redcedar, shore pine, Douglas-fir in protected areas, red alder, vine maple, salal, red huckleberry, evergreen huckleberry, rhododendron, red huckleberry, salmonberry, and western swordfern. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of partially decomposed leaves, needles, twigs, cones, and moss about 1 inch thick. The surface layer is very dark grayish brown and dark brown loam about 15 inches thick. The subsoil is brown silty clay loam about 14 inches thick. The next layer is light brownish gray, mottled loamy fine sand about 7 inches thick. The next layer is variegated grayish brown, yellowish brown, and reddish brown, moderately cemented fine sand about 12 inches thick. The substratum to a depth of 60 inches or more is variegated light brownish gray, yellowish brown, and brown, loose sand that has thin lenses of weakly cemented material.

Included in this unit are small areas of Bandon soils near terrace escarpments and on the side slopes of drainageways and Fendall, Templeton, Tolovana, and Reedsport soils, which formed in colluvium weathered from sedimentary rock on the steep side slopes of drainageways and on foot slopes where hilly uplands and mountainous areas join terraces. Also included are small areas of Nelscott soils that have slopes that are less than 12 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderate to a depth of 36 inches in the Nelscott soil, slow through the iron-cemented layer, and moderately rapid below that layer. Available water capacity is 4 to 8 inches. The effective rooting depth is limited by the cemented layer and by a seasonal high water table. Runoff is medium or rapid, and the hazard of water erosion is moderate or high. The cemented layer is at a depth of 24 to 40 inches. A seasonal high water table is at a depth of 2.0 to 3.5 feet from November through April.

This unit is used mainly for timber production, wildlife habitat, and as a source of water. It also is used for homesite development and recreational development.

This unit is suited to the production of Sitka spruce and western hemlock. Sites directly exposed to onshore winds are subject to reduced productivity because of damage to trees by wind and the effect of salt air on vegetation. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. On the steeper slopes, high-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees have a limited rooting depth as a result of the seasonal high water table and the cemented layer and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Brushy plants, such as red alder, salmonberry, and salal, limit regeneration of seedlings. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for

planting. The trees that are suitable for planting include Sitka spruce and western hemlock.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of erosion, the wetness, low soil strength, and the slow permeability through the cemented layer. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Maintaining the plant cover helps to control erosion. A plant cover should be established at building sites as soon as possible to control erosion. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. Cutbanks are not stable and are subject to slumping. Areas that have been cut and filled should be seeded or mulched. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slope, the wetness, the depth to the cemented layer, and the slow permeability. The effluent from the absorption fields can surface in downslope areas, creating a health hazard. The absorption lines should be installed in the less sloping areas. The seasonal high water table, the depth to the cemented layer, and the slow permeability increase the likelihood that septic tank absorption fields will fail. The absorption fields can fail or do not function properly during periods of heavy rainfall.

43H—Neotsu-Necanicum complex, 60 to 90 percent slopes. This map unit is on steep side slopes in mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salmonberry, salal, cascade Oregongrape, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 1,800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 40 percent Neotsu soil and 35 percent Necanicum soil.

Included in this unit are small areas of Klootchie soils, which formed in colluvium weathered from volcanic rock on side slopes; Reedsport and Tolovana soils, which formed in colluvium weathered from sedimentary rock on side slopes; very gravelly soils that are less than 40 inches deep over bedrock; and Rock outcrop. Also included are small areas of Neotsu and Necanicum soils that have slopes of less than 60 percent or more than 90 percent. Included areas make up about 25 percent of the total acreage.

The Neotsu soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is very dark brown silt loam about 12 inches thick. The upper part of the subsoil is dark yellowish brown silt loam and loam about 14 inches thick. The lower part is dark yellowish brown gravelly loam about 7 inches thick. Weathered, highly fractured igneous bedrock is at a depth of about 33 inches. The depth to bedrock is 20 to 40 inches. The surface layer is loam in some areas.

Permeability is moderate in the Neotsu soil. Available water capacity is 5 to 14 inches. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Necanicum soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, and roots about 1 inch thick. The surface layer is dark reddish brown gravelly loam about 12 inches thick. The upper part of the subsoil is dark reddish brown very gravelly loam about 9 inches thick. The lower part is dark brown extremely gravelly loam about 25 inches thick. Fractured, strongly weathered basic igneous bedrock is at a depth of about 46 inches. The depth to bedrock is 40 to 60 inches.

Permeability is moderate in the Necanicum soil. Available water capacity is 4 to 9 inches. The effective rooting depth is 40 to 60 inches. Runoff is very rapid, and the hazard of water erosion is very high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Neotsu soil. Minimizing the risk of erosion is essential in harvesting timber. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and steep yarding paths to a plant cover. Landsliding and slumping can occur when the soils are saturated and have been disturbed by road construction or timber harvesting. Trees on the Neotsu soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include western hemlock and Douglas-fir. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

44H—Neskowin-Rock outcrop complex, 20 to 99 percent slopes. This map unit is on the side slopes of headlands. The native vegetation is mainly shrubs, grasses, and scattered Sitka spruce and western hemlock. Elevation is 50 to 1,100 feet. The average annual precipitation is 70 to 90 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 160 to 210 days.

This unit is about 60 percent Neskowin soil and 30 percent Rock outcrop.

Included in this unit are small areas of Salander soils, which formed in colluvium derived from volcanic material on side slopes, and Tolovana and Reedsport soils, which formed in colluvium weathered from sedimentary rock on side slopes. Also included are small areas of soils that are very gravelly and very cobbly throughout and, adjacent to the Pacific Ocean, areas where Rock outcrop can be washed by ocean waves. Included areas make up about 10 percent of the total acreage.

The Neskowin soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface layer is black and dark reddish brown silt loam about 19 inches thick. The subsoil is dark brown silt loam about 4 inches thick. Basalt bedrock is at a depth of about 23 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Neskowin soil. Available water capacity is 7 to 18 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid to very rapid, and the hazard of water erosion is high to very high.

Rock outcrop consists of exposures of hard igneous rock and pockets of weathered breccia.

This unit is used for wildlife habitat, as a source of water, and for recreational development. The slope limits the use of this unit mainly to a few paths and trails, which should extend across the slope. Salt air, strong southerly winds from coastal storms during the winter, and strong persistent northerly onshore winds during the summer retard the establishment and growth of vegetation.

45E—Neskowin-Salander silt loams, 5 to 35 percent slopes. This map unit is on ridgetops of headlands. The native vegetation is mainly Sitka spruce, western hemlock, Douglas-fir in protected areas, red alder, salal, salmonberry, thimbleberry, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 1,100 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 160 to 210 days.

This unit is about 50 percent Neskowin soil and 40 percent Salander soil.

Included in this unit are small areas of Tolovana, Reedsport, Templeton, and Fendall soils, which formed in colluvium weathered from sedimentary rock. Also included are small areas of Neskowin and Salander soils that have slopes of more than 35 percent. Included areas make up about 10 percent of the total acreage.

The Neskowin soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of moss, needles, and twigs about 1 inch thick. The surface layer is black and dark reddish brown silt loam about 19 inches thick. The subsoil is dark brown silt loam about 4 inches thick. Basalt bedrock is at a depth of about 23 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Neskowin soil. Available water capacity is 7 to 18 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Salander soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 2 inches thick. The surface layer is black, dark reddish brown, and dark brown silt loam about 28 inches thick. The upper part of the subsoil is dark brown silt loam about 14 inches thick. The lower part is dark brown silty clay loam about 18 inches thick. The depth to bedrock is more than 60 inches.

Permeability is moderate in the Salander soil. Available water capacity is 18 to 24 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Sitka spruce and western hemlock. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Neskowin soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Trees on the Neskowin soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Sitka spruce and western hemlock.

45G—Neskowin-Salander silt loams, 35 to 65 percent slopes. This map unit is on the side slopes of headlands (fig. 6). The native vegetation is mainly Sitka spruce, western hemlock, Douglas-fir in protected areas, red alder, salal, red huckleberry, evergreen huckleberry, salmonberry, thimbleberry, and western swordfern. Elevation is 50 to 1,100 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 51 degrees F, and the average frost-free period is 160 to 210 days.

This unit is about 50 percent Neskowin soil and 35 percent Salander soil.

Included in this unit are small areas of Tolovana and Reedsport soils, which formed in colluvium weathered from sedimentary rock on side slopes; very gravelly to very cobbly soils that formed in colluvium weathered from volcanic rock on side slopes; and Rock outcrop on side slopes. Also included are small areas of Neskowin and Salander soils that have slopes of less than 35 percent or more than 65 percent. Included areas make up about 15 percent of the total acreage.

The Neskowin soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of moss, needles, and twigs about 1 inch thick. The surface layer is black and dark reddish brown silt loam about 19 inches thick. The subsoil is dark brown silt loam about 4 inches thick. Basalt bedrock is at a depth of about 23 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderate in the Neskowin soil. Available water capacity is 7 to 18 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

The Salander soil is deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 2 inches thick. The surface layer is black, dark reddish brown, and dark brown silt loam about 28 inches thick. The upper part of the subsoil is dark brown silt loam about 14 inches thick. The lower part is dark brown silty clay loam about 18 inches thick. The depth to bedrock is more than 60 inches.

Permeability is moderate in the Salander soil. Available water capacity is 18 to 24 inches. The effective rooting depth is 40 to 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat, as a source of water, and for recreational development.

This unit is suited to the production of Sitka spruce and western hemlock. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Neskowin soil. Steepness of slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Neskowin soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly

Figure 6.—Red alder on Neskowin-Salander silt loams, 35 to 65 percent slopes.

preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable palnts, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. The trees that are suitable for planting include Sitka spruce and western hemlock.

46A—Nestucca silt loam, 0 to 2 percent slopes. This deep, somewhat poorly drained soil is in depressions on flood plains. It formed in silty recent alluvium derived from mixed sources. The native vegetation is mainly Sitka spruce, western hemlock, red alder, willows, grasses, skunkcabbage, rushes, and sedges. Elevation is 10 to 40 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is dark brown and very dark grayish brown silt loam about 14 inches thick. The subsoil is dark grayish brown, mottled silty clay loam about 18 inches thick. The substratum to a depth of 60 inches or more is dark gray, mottled clay loam.

Included in this unit are small areas of Brenner soils in depressions and Nehalem and Yachats soils near stream channels. Included areas make up about 20 percent of the total acreage.

Permeability is moderately slow in the Nestucca soil. Available water capacity is 10 to 12 inches. The

effective rooting depth is limited by a seasonal high water table at a depth of 1 to 2 feet from December through April. Runoff is slow to ponded, and the hazard of water erosion is slight unless the soil is flooded. This soil is frequently flooded for brief periods from November through April.

This unit is used mainly for pasture. It also is used for wildlife habitat.

If this unit is used for pasture, the main limitations are the wetness, the hazard of flooding, the susceptibility of the surface layer to compaction, and low fertility. The forage species that tolerate the frequent, brief periods of flooding should be selected for planting. The wetness resulting from the seasonal high water table limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. A drainage system accelerates early growth, extends the grazing season, and increases the variety of forage plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is not suited to homesite development. It is limited by the hazard of flooding, the wetness, and low soil strength.

47C—Netarts fine sand, 3 to 12 percent slopes. This deep, well drained soil is on stabilized dunes. It formed in sandy eolian material derived from mixed sources. The native vegetation is mainly shore pine, Sitka spruce, scattered western hemlock, salal, rhododendron, manzanita, and evergreen huckleberry. Elevation is 30 to 100 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of leaves, needles, twigs, and moss over highly decomposed organic matter about 7 inches thick. The surface layer is light gray fine sand about 5 inches thick. The subsoil is variegated dark brown fine sand and variegated dark yellowish brown and brown fine sand about 34 inches thick. The substratum to a depth of 60 inches or more is variegated light yellowish brown, grayish brown, and light brownish gray fine sand.

Included in this unit are small areas of Yaquina soils in depressions, Waldport soils on recently stabilized dunes, and Bandon soils on the higher terraces. Included areas make up about 20 percent of the total acreage.

Permeability is moderately rapid in the Netarts soil. Available water capacity is 3 to 6 inches. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. The hazard of wind erosion is severe when vegetation is disturbed.

This unit is used mainly for woodlots, homesite development, recreational development, and wildlife habitat.

This unit is suited to Sitka spruce and shore pine. However, prevailing onshore winds severely reduce tree growth in most areas. Wind erosion is a hazard when the soil surface is disturbed. Maintaining a plant cover helps to control wind erosion.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of wind erosion, the instability of cutbanks, and droughtiness. Preserving the existing plant cover during construction helps to control erosion. Establishing a plant cover as soon as possible at construction sites helps to control wind erosion. Cutbanks are not stable and must be vegetated or stabilized. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

If this unit is used as a site for septic tank absorption fields, slope is the major concern in some areas. The effluent from the absorption fields can surface in downslope areas, creating a health hazard. The absorption lines should be installed in the less sloping areas.

47E—Netarts fine sand, 12 to 30 percent slopes. This deep, well drained soil is on stabilized dunes. It formed in sandy eolian material derived from mixed sources. The native vegetation is mainly shore pine, Sitka spruce, scattered western hemlock, salal, rhododendron, manzanita, and evergreen huckleberry. Elevation is 30 to 100 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of leaves, needles, twigs, and moss over highly decomposed organic matter about 7 inches thick. The surface layer is light gray fine sand about 5 inches thick. The subsoil is variegated dark brown fine sand and variegated dark yellowish brown and brown fine sand about 34 inches thick. The substratum to a depth of 60 inches or more is variegated light yellowish brown, grayish brown, and light brownish gray fine sand.

Included in this unit are small areas of Yaquina soils in depressions, Waldport soils on recently stabilized dunes, and Bandon soils on the higher terraces. Included areas make up about 20 percent of the total acreage.

Permeability is moderately rapid in the Netarts soil. Available water capacity is 3 to 6 inches. The effective rooting depth is 60 inches or more. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. The hazard of wind erosion is severe when vegetation is disturbed.

This unit is used mainly for woodlots and wildlife habitat. A few areas are used for homesite development or recreational development.

This unit is suited to Sitka spruce and shore pine. However, prevailing onshore winds severely retard tree growth in most areas. Wind erosion is a hazard when the soil surface is disturbed. Maintaining a plant cover helps to control wind erosion.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of wind erosion, the instability of cutbanks, and droughtiness. Homesites and other structures should be located in the less sloping areas. Preserving the existing plant cover during construction helps to control erosion. Establishing a plant cover as soon as possible at construction sites helps to control wind erosion. Cutbanks are not stable and must be vegetated or stabilized. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

This unit is poorly suited to septic tank absorption fields. It is limited mainly by the steepness of slope. The effluent from the absorption fields can surface in downslope areas, creating a health hazard.

48E—Peavine silty clay loam, 3 to 30 percent slopes. This moderately deep, well drained soil is on ridgetops and benches in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, bigleaf maple, red alder, vine maple, cascade Oregongrape, salal, and western swordfern. Elevation is 200 to 1,100 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark brown silty clay loam about 7 inches thick. The subsoil is reddish brown and yellowish red silty clay and yellowish red clay about 30 inches thick. Fractured, weathered sandstone bedrock is at a depth of about 37 inches. The depth to weathered bedrock is 20 to 40 inches.

Included in this unit are small areas of Honeygrove soils, which formed in fine textured colluvium weathered from sedimentary rock on ridgetops and benches, and Preacher and Bohannon soils, which formed in the coarser textured colluvium weathered from sedimentary rock on ridgetops and benches. Also included are small areas of Peavine soils that have slopes of more than 30 percent slopes. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Peavine soil. Available water capacity is 3 to 7 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Among the trees suitable for planting is Douglas-fir.

48F—Peavine silty clay loam, 30 to 50 percent slopes. This moderately deep, well drained soil is on side slopes in mountainous areas. It formed in

colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, bigleaf maple, red alder, vine maple, cascade Oregongrape, salal, and western swordfern. Elevation is 200 to 1,100 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark brown silty clay loam about 7 inches thick. The subsoil is reddish brown and yellowish red silty clay and yellowish red clay about 30 inches thick. Fractured, weathered sandstone bedrock is at a depth of about 37 inches. The depth to weathered bedrock is 20 to 40 inches.

Included in this unit are small areas of Honeygrove soils, which formed in fine textured colluvium weathered from sedimentary rock on side slopes, and Preacher, Bohannon, and Slickrock soils, which formed in the coarser textured colluvium weathered from sedimentary rock on side slopes. Also included are small areas of Peavine soils that have slopes of less than 30 percent or more than 50 percent. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Peavine soil. Available water capacity is 3 to 7 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Among the trees suitable for planting is Douglas-fir.

49E—Preacher-Bohannon complex, 5 to 35 percent slopes. This map unit is on ridgetops and benches in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, red alder, bigleaf maple, vine maple, salal, salmonberry, cascade Oregongrape, and western swordfern. Elevation is 25 to 1,800 feet. The average annual precipitation is 60 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 60 percent Preacher soil and 30 percent Bohannon soil.

Included in this unit are small areas of Slickrock soils on ridgetops; Astoria, Apt, and McDuff soils, which formed in the finer textured colluvium weathered from sedimentary rock on ridgetops; Formader, Hemcross, and Hembre soils, which formed in colluvium weathered from volcanic rock on ridgetops; and soils that formed in mixed volcanic and sedimentary colluvium over sedimentary rock, mainly on the less sloping foot slopes of Saddleback and Stott Mountains in the northeast corner of the survey area. Also included are small areas of Bohannon and Preacher soils that have slopes of more than 35 percent. Included areas make up about 10 percent of the total acreage.

The Preacher soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 3 inches thick. The surface layer is very dark grayish brown loam about 15 inches thick. The subsoil is dark yellowish brown clay loam about 30 inches thick. The substratum is yellowish brown loam about 9 inches thick. Fractured, partially weathered, stratified sandstone and siltstone bedrock is at a depth of about 54 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Preacher soil. Available water capacity is 7 to 15 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Bohannon soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, twigs, and moss about 1 inch thick. The surface layer is very dark brown and dark brown gravelly loam about 16 inches thick. The subsoil is dark yellowish brown gravelly loam about 15 inches thick. Fractured, partially weathered sandstone bedrock is at a depth of about 31 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately rapid in the Bohannon

soil. Available water capacity is 2 to 7 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Bohannon soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Bohannon soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. The trees that are suitable for planting include Douglas-fir.

50G—Preacher-Bohannon-Slickrock complex, 35 to 60 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly Douglas-fir, western hemlock, bigleaf maple, red alder, vine maple, salal, cascade Oregongrape, salmonberry, and western swordfern. Elevation is 25 to 1,800 feet. The average annual precipitation is 60 to 110 inches, the average annual air temperature is 47 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 40 percent Preacher soil, 25 percent Bohannon soil, and 20 percent Slickrock soil.

Included in this unit are small areas of Formader, Klistan, Hemcross, Harslow, and Hembre soils, which formed in colluvium weathered from volcanic rock on side slopes, and small areas of soils that formed in mixed volcanic and sedimentary colluvium over sedimentary rock, mainly along the foot slopes of the Saddleback and Stott Mountains in the northeast corner of the survey area. Also included are small areas of Preacher, Bohannon, and Slickrock soils that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 15 percent of the total acreage.

The Preacher soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 3 inches thick. The surface layer is very dark grayish brown loam about 15 inches thick. The subsoil is dark yellowish brown clay loam about 30 inches thick. The substratum is yellowish brown loam about 9 inches thick. Fractured, partially weathered, stratified sandstone and siltstone bedrock is at a depth of about 54 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Preacher soil. Available water capacity is 7 to 15 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

The Bohannon soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, twigs, and moss about 1 inch thick. The surface layer is very dark brown and dark brown gravelly loam about 16 inches thick. The subsoil is dark yellowish brown gravelly loam about 15 inches thick. Fractured, partially weathered sandstone bedrock is at a depth of about 31 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately rapid in the Bohannon soil. Available water capacity is 5 to 10 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

The Slickrock soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of moss, needles, leaves, and twigs about 1 inch thick. The surface layer is very dark grayish brown gravelly loam about 14 inches thick. The upper part of the subsoil is dark brown gravelly loam about 25 inches thick. The lower part is dark brown and dark yellowish brown very cobbly loam about 14 inches thick. Fractured, partially weathered sandstone bedrock is at a depth of about 53 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Slickrock soil. Available water capacity is 5 to 9 inches. The effective rooting depth is 40 to 60 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir. The main concerns in producing and harvesting timber

are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Bohannon soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Bohannon soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. The trees that are suitable for planting include Douglas-fir.

51A—Quillamook silt loam, 0 to 3 percent slopes. This deep, well drained soil is on stream terraces. It formed in silty alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salmonberry, western swordfern, western brackenfern, and trailing blackberry. Elevation is 50 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is black, very dark brown, and very dark grayish brown silt loam about 34 inches thick. The subsoil is dark yellowish brown silt loam about 24 inches thick. The substratum to a depth of 60 inches or more is dark yellowish brown loamy sand.

Included in this unit are small areas of Wolfer soils on the higher convex slopes, Euchre and Hebo soils in depressions, and Siletz and Logsden soils on the lower stream terraces. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the Quillamook soil. Available water capacity is 17 to 24 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for hay and pasture. It also is used for homesite development and wildlife habitat (fig. 7). A few areas have been used for cool-season crops, berries, Christmas trees, and woodlots.

This unit is suited to hay and pasture. The main limitations are the susceptibility of the surface layer to compaction, low fertility, and the moist, cool summer that inhibits the proper curing of hay in most years. Grazing during wet periods causes compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed.

If this unit is used for cool-season crops, the main limitation is low fertility. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes or grass-legume mixtures help to maintain fertility and tilth. The soil ties up large amounts of phosphorus, which limits the amount available to plants. Lime increases the availability of phosphorus and decreases soil acidity. Grains and grasses respond to nitrogen; legumes respond to phosphorus, boron, sulfur, and lime; and vegetables and berries respond to nitrogen, phosphorus, and potassium. In summer irrigation is needed for maximum production of most crops. Sprinkler irrigation is the most suitable method. Water should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize the leaching of plant nutrients.

This unit is suited to homesite development. It is limited mainly by low soil strength. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens.

This unit is suitable as a site for septic tank absorption fields. It has few limitations. The absorption fields may function poorly during the rainy season because of the moderate permeability, which can be overcome by increasing the size of the absorption field. If the density of housing is moderate or high, community sewage systems are needed to prevent the contamination of water caused by seepage from onsite sewage disposal systems.

52H—Reedsport-Tolovana complex, 60 to 85 percent slopes. This map unit is on steep side slopes in mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, red huckleberry, evergreen huckleberry, cascade Oregongrape, and western swordfern. Elevation is 50 to 1,800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 48 to

Figure 7.—Pasture and homesites on Quillamook silt loam, 0 to 3 percent slopes.

52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 50 percent Reedsport soil and 30 percent Tolovana soil.

Included in this unit are small areas of Necanicum, Klootchie, and Neotsu soils, which formed in colluvium weathered from volcanic rock on side slopes; soils that are less than 20 inches deep over sedimentary bedrock; and sedimentary Rock outcrop on side slopes and headwalls. Also included are small areas of Reedsport and Tolovana soils that have slopes of less than 60 percent or more than 85 percent. Included areas make up about 20 percent of the total acreage.

The Reedsport soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 2 inches thick. The surface layer is very dark brown and very dark grayish brown loam about 14 inches thick. The upper part of the subsoil is dark brown loam about 10 inches thick. The lower part is brown clay loam about 8 inches thick. Fractured, partially weathered sandstone and siltstone bedrock is at a depth of about 32 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Reedsport soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Tolovana soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 1 inch thick. The surface layer is black and very dark grayish brown silt loam about 18 inches thick. The upper part of the subsoil is dark brown silt loam about 14 inches thick. The lower part is yellowish brown cobbly clay loam about 14 inches thick. The substratum to a depth of 60 inches or more is yellowish brown cobbly clay loam. The depth to weathered bedrock is more than 60 inches.

Permeability is moderate in the Tolovana soil. Available water capacity is 11 to 18 inches. The effective rooting depth is 60 inches or more. Runoff is very rapid, and the hazard of water erosion is very high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Reedsport soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Landsliding or slumping can occur when the soils are saturated and have been disturbed by road construction or timber harvesting. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Reedsport soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir and western hemlock. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

53E—Sach gravelly loam, 3 to 30 percent slopes. This moderately deep, well drained soil is on the tops of ridges in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, noble fir, scattered Pacific silver fir, vine maple, salal, red huckleberry, cascade Oregongrape, and western swordfern. Elevation is 1,800 to 2,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 60 to 100 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark brown gravelly loam about 10 inches thick. The upper part of the subsoil is brown gravelly silt loam about 9 inches thick. The lower part is light yellowish brown very gravelly loam about 8 inches thick. Weathered, highly fractured shale bedrock is at a depth of about 27 inches. The depth to weathered bedrock is 20 to 40 inches.

Included in this unit are small areas of Caterl, Laderly, and Murtip soils, which formed in colluvium weathered from volcanic rock on ridgetops; soils that are gravelly, are more than 40 inches deep over sedimentary bedrock, and are on ridgetops; and soils that are very gravelly to extremely gravelly, have sedimentary bedrock within a depth of 20 inches, and are on ridgetops. Also included are small areas of Sach soils that have slopes of more than 30 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Sach soil. Available water capacity is 3 to 9 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir, western hemlock, and noble fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Properly designed road drainage systems and care in placement of culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable

seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include Douglas-fir, western hemlock, and noble fir.

53G—Sach gravelly loam, 30 to 60 percent slopes. This moderately deep, well drained soil is on side slopes in mountainous areas. It formed in colluvium weathered from sedimentary rock. The native vegetation is mainly Douglas-fir, western hemlock, noble fir, scattered Pacific silver fir, vine maple, salal, red huckleberry, cascade Oregongrape, and western swordfern. Elevation is 1,800 to 2,800 feet. The average annual precipitation is 80 to 120 inches, the average annual air temperature is 43 to 46 degrees F, and the average frost-free period is 60 to 100 days.

Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 1 inch thick. The surface layer is dark brown gravelly loam about 10 inches thick. The upper part of the subsoil is brown gravelly silt loam about 9 inches thick. The lower part is light yellowish brown very gravelly loam about 8 inches thick. Weathered, highly fractured shale bedrock is at a depth of about 27 inches. The depth to weathered bedrock is 20 to 40 inches.

Included in this unit are small areas of Caterl, Laderly, and Murtip soils, which formed in colluvium weathered from volcanic rock on side slopes; soils that are gravelly to extremely gravelly, are more than 40 inches deep over sedimentary bedrock, and are on side slopes; and soils that are very gravelly to extremely gravelly, have sedimentary bedrock within a depth of 20 inches, and are on side slopes. Also included are small areas of Sach soils that have slopes of less than 30 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

Permeability is moderate in the Sach soil. Available water capacity is 3 to 9 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of Douglas-fir, western hemlock, and noble fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include Douglas-fir, western hemlock, and noble fir.

54A—Siletz silt loam, 0 to 3 percent slopes. This deep, well drained soil is on stream terraces. It formed in silty over loamy alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salmonberry, western swordfern, western brackenfern, and trailing blackberry. Elevation is 50 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is very dark brown silt loam about 14 inches thick. The upper part of the subsoil is dark brown silt loam and loam about 17 inches thick. The lower part is brown very fine sandy loam about 11 inches thick. The upper part of the substratum is variegated dark yellowish brown and very dark grayish brown extremely gravelly loamy sand about 13 inches thick. The lower part to a depth of 60 inches or more is dark yellowish brown fine sandy loam.

Included in this unit are small areas of Euchre and Hebo soils in depressions and Quillamook and Wolfer soils on the higher terraces. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the surface layer and subsoil of the Siletz soil and rapid in the substratum. Available water capacity is 11 to 17 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for hay and pasture. It also is used for homesite development and wildlife habitat. A few areas are used for cool-season crops, berry crops, Christmas trees, woodlots, and limited timber production.

This unit is suited to hay and pasture. The main limitations are the susceptibility of the surface layer to compaction, low fertility, and the moist, cool summers that inhibit proper curing of hay in most years. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking

rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Grasses and legumes grow well if adequate fertilizer is used. Applying lime and mixed fertilizer improves the growth of forage plants. In some years irrigation is needed.

This unit is suited to most cool-season crops. It is limited mainly by low fertility. Returning all crop residue to the soil and using a cropping system that includes grasses, legumes, or grass-legume mixtures help to maintain fertility and tilth. Grains and grasses respond to nitrogen; legumes respond to phosphorus, boron, sulfur, and lime; and vegetables and berries respond to nitrogen, phosphorus, and potassium. If the soil is plowed in fall, runoff and erosion can be reduced by fertilizing and seeding to a cover crop. In summer irrigation is needed for maximum production of most crops. Sprinkler irrigation is the most suitable method.

This unit is suited to homesite development. It has few limitations. Establishing a plant cover as soon as possible at construction sites helps to control erosion. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

55E—Templeton-Fendall silt loams, 5 to 35 percent slopes. This map unit is on broad tops of hilly uplands. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, salal, salmonberry, thimbleberry, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

This unit is about 55 percent Templeton soil and 30 percent Fendall soil.

Included in this unit are small areas of Winema soils, which formed in fine textured colluvium weathered from sedimentary rock on hilltops; Tolovana and Reedsport soils, which formed in the coarser textured colluvium weathered from sedimentary rock where hills and mountainous areas join; and Klootchie and Neotsu soils, which formed in colluvium weathered from volcanic rock where hills and mountainous areas join. Also included are small areas of Templeton and Fendall soils that have slopes of more than 35 percent. Included areas make up about 15 percent of the total acreage.

The Templeton soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, twigs, cones, leaves, moss, and roots about 3 inches thick. The surface layer is very dark brown and dark brown silt loam about 17 inches thick. The upper part of the subsoil is dark yellowish brown silt loam about 14 inches thick. The lower part is dark brown and brown silty clay loam about 24 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 55 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderate in the Templeton soil. Available water capacity is 8 to 16 inches. The effective rooting depth is 40 to 60 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Fendall soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is very dark brown and dark brown silt loam about 16 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam about 11 inches thick. The lower part is dark yellowish brown silty clay about 11 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 38 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately slow in the Fendall soil. Available water capacity is 4 to 10 inches. The effective rooting depth is 20 to 40 inches. Runoff is slow to rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock, Douglas-fir, and Sitka spruce. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Fendall soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Trees on the Fendall soil are

subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Among the trees suitable for planting are western hemlock, Douglas-fir, and Sitka spruce. Along coastal areas, stands of spruce and hemlock may produce a greater volume of wood than stands of Douglas-fir because the spruce and hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

56E—Tolovana-Reedsport complex, 3 to 35 percent slopes. This map unit is on the tops of ridges in mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, red huckleberry, evergreen huckleberry, cascade Oregongrape, and western swordfern. Elevation is 50 to 1,800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 45 percent Tolovana soil and 35 percent Reedsport soil.

Included in this unit are small areas of Klootchie and Neotsu soils, which formed in colluvium weathered from volcanic rock on ridgetops; Templeton and Fendall soils, which formed in the finer textured colluvium weathered from sedimentary rock where hills and mountainous areas join; and soils that formed in mixed volcanic and sedimentary colluvium over sedimentary rock on the less sloping foot slopes of Saddleback and Stott Mountains in the northeast corner of the survey area. Also included are small areas of Tolovana and Reedsport soils that have slopes of more than 35 percent. Included areas make up about 20 percent of the total acreage.

The Tolovana soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 1 inch thick. The surface layer is black and very dark grayish brown silt loam about 18 inches thick. The upper part of the subsoil is dark brown silt loam about 14 inches thick. The lower part is yellowish brown cobbly clay loam about 14 inches thick. The substratum is yellowish brown cobbly clay loam about 14 inches thick. The depth to weathered bedrock is more than 60 inches.

Permeability is moderate in the Tolovana soil. Available water capacity is 11 to 18 inches. The effective rooting depth is 60 inches or more. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Reedsport soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 2 inches thick. The surface layer is very dark brown and very dark grayish brown loam about 14 inches thick. The upper part of the subsoil is dark brown loam about 10 inches thick. The lower part is brown clay loam about 8 inches thick. Fractured, partially weathered sandstone and siltstone bedrock is at a depth of about 32 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Reedsport soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the hazard of erosion, the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Reedsport soil. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Reedsport soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are

capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir and western hemlock. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

56G—Tolovana-Reedsport complex, 35 to 60 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, western redcedar, red alder, vine maple, salmonberry, salal, red huckleberry, evergreen huckleberry, cascade Oregongrape, and western swordfern. Elevation is 50 to 1,800 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 48 to 52 degrees F, and the average frost-free period is 145 to 210 days.

This unit is about 50 percent Tolovana soil and 35 percent Reedsport soil.

Included in this unit are small areas of Klootchie, Neotsu, and Necanicum soils, which formed in colluvium weathered from volcanic rock on side slopes, and small areas of soils that formed in mixed volcanic and sedimentary colluvium over sedimentary rock on foot slopes of Saddleback and Stott Mountains in the northeast corner of the survey area. Also included are small areas of Tolovana and Reedsport soils that have slopes of less than 35 percent or more than 60 percent. Included areas make up about 15 percent of the total acreage.

The Tolovana soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 1 inch thick. The surface layer is black and very dark grayish brown silt loam about 18 inches thick. The upper part of the subsoil is dark brown silt loam 14 inches thick. The lower part is yellowish brown cobbly clay loam about 14 inches thick. The substratum is yellowish brown cobbly clay loam about 14 inches thick. The depth to weathered bedrock is more than 60 inches.

Permeability is moderate in the Tolovana soil. Available water capacity is 11 to 18 inches. The effective rooting depth is 60 inches or more. Runoff is rapid, and the hazard of water erosion is high.

The Reedsport soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 2 inches thick. The surface layer is very dark brown and very dark grayish brown loam about 14 inches thick. The upper part of the subsoil is dark brown loam about 10 inches thick. The lower part is brown clay loam about 8 inches thick. Fractured, partially weathered sandstone and siltstone bedrock is at a depth of about 32 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderate in the Reedsport soil. Available water capacity is 3 to 8 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, plant competition, and the limited rooting depth in the Reedsport soil. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees on the Reedsport soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include Douglas-fir and western hemlock. Along coastal areas, stands of hemlock may produce a greater volume of wood than stands of Douglas-fir because the hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

57A—Treharne silt loam, 0 to 3 percent slopes. This deep, moderately well drained soil is in depressions on stream terraces. It formed in silty alluvium derived from mixed sources. The native vegetation is mainly Douglas-fir, western hemlock, red alder, salal, salmonberry, western swordfern, and

trailing blackberry. Elevation is 20 to 750 feet. The average annual precipitation is 60 to 90 inches, the average annual air temperature is 49 to 53 degrees F, and the average frost-free period is 145 to 210 days.

Typically, the surface layer is very dark brown and very dark grayish brown silt loam about 18 inches thick. The subsoil is brown, mottled silty clay loam about 20 inches thick. The substratum to a depth of 60 inches or more is brown, mottled silty clay loam.

Included in this unit are small areas of Eilertsen soils on the higher areas of stream terraces and Nekoma soils and Fluvaquents on flood plains. Also included are small areas of clayey soils that are somewhat poorly drained and are in depressions on stream terraces. Included areas make up about 15 percent of the total acreage.

Permeability is moderately slow in the Treharne soil. Available water capacity is 10 to 13 inches. The effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from November through April. Runoff is slow, and the hazard of water erosion is slight.

This unit is used for hay and pasture and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the seasonal wetness and the susceptibility of the surface layer to compaction. The wetness resulting from the seasonal high water table limits the choice of suitable plants and the period of cutting or grazing and increases the risk of winterkill. A drainage system accelerates early growth, extends the grazing season, and increases the variety of pasture plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

If this unit is used for homesite development, the main limitations are the wetness, the moderate shrink-swell potential, and low soil strength. A drainage system is needed if roads or building foundations are constructed. Excess water can be removed by suitably designed drainage ditches. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the damage caused by shrinking and swelling. The damage caused by shrinking and swelling can be minimized by using a proper design and by backfilling with material that has a low shrink-swell potential. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load.

If this unit is used as a site for septic tank absorption fields, the main limitations are the wetness and the moderately slow permeability, both of which increase the likelihood that septic tank absorption fields will fail. The moderately slow permeability can be overcome by increasing the size of the absorption field.

58E—Urban land-Bandon complex, 12 to 50 percent slopes. This map unit is along the short incised fronts and drainageways of marine terraces. The native vegetation is mainly Sitka spruce, shore pine, western hemlock, red alder, evergreen huckleberry, salal, and rhododendron. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

This unit is about 40 percent Urban land and 35 percent Bandon soil.

Included in this unit are small areas of Nelscott soils on the less sloping parts of the landscape and soils that are similar to the Bandon soil but have a cemented layer at a depth of more than 40 inches. Also included are small areas of Bandon soils that have slopes of less than 12 percent or more than 50 percent and small areas of Fendall, Templeton, Reedsport, and Tolovana soils and Rock outcrop on the steeper side slopes along terrace fronts and drainageways. Included areas make up about 25 percent of the total acreage.

Urban land consists of areas that are covered mainly by streets, parking lots, buildings, and other impervious surfaces that obscure or alter soil characteristics so that recognition is not feasible. Some areas consist of soils that have been so altered that it was not practical to map them separately.

The Bandon soil is well drained and moderately deep to an ortstein pan. The soil formed in sandy marine and eolian material derived from mixed sources. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is dark grayish brown fine sandy loam about 3 inches thick. The subsoil is dark brown and brown loam about 25 inches thick. The next 17 inches is bands of yellowish brown, moderately cemented loamy fine sand. The substratum to a depth of 60 inches or more is dark yellowish brown and very pale brown loamy fine sand.

Permeability is moderate above the pan in the Bandon soil, slow through the pan, and moderately rapid below the pan. Available water capacity is 2 to 6 inches. The effective rooting depth is limited by the cemented layer at a depth of 18 to 36 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high. The hazard of wind erosion is severe in areas where the plant cover has been removed.

This unit is used for commercial, industrial, and residential purposes.

The main limitations for development on the Bandon soil are the slope, the hazards of wind erosion and water erosion, and the instability of cutbanks. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Excavation for buildings, houses, and access roads in places exposes material that is highly susceptible to wind erosion. Preservation of as many trees as possible helps to provide a natural windbreak at construction sites. Establishing a plant cover as soon as possible at construction sites helps to control erosion. Cutbanks are not stable and must be protected by a plant cover or stabilized. Landsliding and sloughing can occur on the unit when the soil is saturated and has been disturbed by road construction or building site development. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and other ornamentals. Mulch, fertilizer, and irrigation are needed to establish lawn grasses and other small-seeded plants. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

59C—Urban land-Nelscott complex, 0 to 12 percent slopes. This map unit is on marine terraces. The native vegetation is mainly Sitka spruce, shore pine, western hemlock, western redcedar, red alder, evergreen huckleberry, salmonberry, salal, rhododendron, and western swordfern. Elevation is 50 to 250 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

This unit is about 55 percent Urban land and 30 percent Nelscott soil.

Included in this unit are small areas of Bandon soils on the higher convex slopes and Depoe soils in depressions. Also included are small areas of soils that are similar to the Nelscott soil but are moderately well drained or well drained and have a cemented layer at a depth of more than 40 inches and small areas of Nelscott soils that have slopes of more than 12 percent. Included areas make up about 15 percent of the total acreage.

Urban land consists of areas covered mainly by streets, parking lots, buildings, or other impervious surfaces that obscure or alter soil characteristics so that recognition and interpretation are not feasible. Some areas consist of soils that have been so altered that it was not practical to map them separately.

The Nelscott soil is moderately well drained and moderately deep to an ortstein pan. It formed in loamy eolian material over stratified marine sediments from mixed sources. Typically, the surface is covered with a mat of partially decomposed leaves, needles, cones, and moss about 1 inch thick. The surface layer is very dark grayish brown and dark brown loam about 15 inches thick. The subsoil is brown, mottled silty clay loam about 14 inches thick. The next layer is light brownish gray, mottled loamy fine sand about 7 inches thick. The next layer is a variegated grayish brown, yellowish brown, and reddish brown, moderately cemented fine sand about 12 inches thick. The substratum to a depth of 60 inches or more is variegated light brownish gray, yellowish brown, and brown, loose sand that has thin lenses of weakly cemented material.

Permeability is moderate to a depth of 36 inches in the Nelscott soil, slow through the iron-cemented layer, and moderately rapid below that layer. Available water capacity is 4 to 8 inches. The effective rooting depth is limited by the cemented layer and by a seasonal high water table. Runoff is slow or medium, and the hazard of water erosion is slight or moderate. The cemented layer is at a depth of 24 to 40 inches. A seasonal high water table is at a depth of 2.0 to 3.5 feet from November through March.

This unit is used for commercial, industrial, and residential purposes.

The main limitations for development on the Nelscott soil are the slope, the hazard of erosion, low soil strength, the wetness, and the instability of cutbanks. Building sites should be located in the less sloping areas. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. Cutbanks are not stable and are subject to slumping. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. Areas that have been cut and filled should be seeded or mulched. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The wetness can be reduced by installing drainage tile around footings. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes.

60C—Urban land-Waldport complex, 0 to 12 percent slopes. This map unit is on recently stabilized dunes. The native vegetation is mainly shore pine, Sitka spruce, salal, rhododendron, and evergreen huckleberry. Other common vegetation that occurs on more recently stabilized dunes is mainly European beachgrass, American beachgrass, and Scotch broom. Elevation is 10 to 150 feet. The average annual precipitation is 60 to 80 inches, the average annual air

temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

This unit is about 60 percent Urban land and 30 percent Waldport soil.

Included in this unit are small areas of Netarts and Yaquina soils on the older stabilized dunes; small areas of poorly drained, recently stabilized, sandy soils in interdune depressions; and small areas of dredge spoils. Included areas make up about 10 percent of the total acreage.

Urban land consists of areas largely covered by concrete, asphalt, buildings, or other impervious surfaces that obscure or alter soil characteristics so that recognition is not feasible. Some areas consist of soils that have been so altered that it was not practical to map them separately.

The Waldport soil is deep and excessively drained. It formed in eolian sand derived from mixed sources. Typically, the surface is covered with loose litter of needles, leaves, and twigs over highly decomposed organic matter about 3 inches thick. The surface layer is dark grayish brown fine sand about 7 inches thick. The substratum to a depth of 60 inches or more is pale brown, light brownish gray, and light gray fine sand.

Permeability is very rapid in the Waldport soil. Available water capacity is 2 to 4 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is severe.

This unit is used mainly for commercial building sites, homesite development, roads, and streets.

The main limitations for development are the slope, the hazard of wind erosion, the instability of cutbanks, and droughtiness. Building sites should be located in the less sloping areas. Excavation for buildings, houses, and access roads can expose material that is highly susceptible to wind erosion. Cutbanks are not stable and must be protected by a plant cover or stabilized. Establishing a plant cover as soon as possible at construction sites helps to control wind erosion. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Selecting proper planting stock is critical in areas that require stabilization. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

61E—Valsetz-Yellowstone complex, 3 to 30 percent slopes. This map unit is on the tops of ridges in mountainous areas. The native vegetation is mainly western hemlock, noble fir, Douglas-fir, Pacific silver fir, red huckleberry, rhododendron, salal, and salmonberry. Elevation is 2,800 to 3,350 feet. The average annual precipitation is 100 to 200 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is less than 60 days.

This unit is about 50 percent Valsetz soil and 30 percent Yellowstone soil.

Included in this unit are small areas of Laderly, Murtip, and Caterl soils, which formed in colluvium weathered from volcanic rock, and Sach soils, which formed in colluvium weathered from sedimentary rock on ridgetops. Also included are small areas of Histic cryaquepts in depressions, Rock outcrop, sedimentary soils that are very gravelly loam and are 10 to 40 inches deep over sedimentary bedrock, and Valsetz and Yellowstone soils that have slopes of more than 30 percent. Included areas make up about 20 percent of the total acreage.

The Valsetz soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark reddish brown cobbly loam about 5 inches thick. The upper part of the subsoil is reddish brown very cobbly loam about 9 inches thick. The lower part is brown and strong brown extremely cobbly loam about 22 inches thick. Fractured basic igneous bedrock is at a depth of about 36 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderately rapid in the Valsetz soil. Available water capacity is 2 to 4 inches. The effective rooting depth is 20 to 40 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

The Yellowstone soil is shallow and somewhat excessively drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 0.5 inch thick. The surface layer is dark reddish brown stony loam about 10 inches thick. The substratum is a dark reddish brown extremely cobbly loam about 8 inches thick. Fractured igneous bedrock is at a depth of about 18 inches. The depth to bedrock is 10 to 20 inches.

Permeability is moderately rapid in the surface layer of the Yellowstone soil and rapid in the substratum. Available water capacity is 1 to 3 inches. The effective rooting depth is 10 to 20 inches. Runoff is medium or rapid, and the hazard of water erosion is moderate or high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and noble fir. The main concerns in producing and harvesting timber are the hazard of erosion, rock fragments on the surface of the soil, and the limited rooting depth. Minimizing the risk of erosion is essential in harvesting timber. Properly designed road drainage

systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Excessive disturbance of the Yellowstone soil can expose areas of bedrock. Stones on the surface can interfere with felling, yarding, and other operations involving the use of equipment. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Trees are subject to windthrow during periods when the soils are excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include western hemlock and noble fir.

61G—Valsetz-Yellowstone complex, 30 to 60 percent slopes. This map unit is on side slopes in mountainous areas. The native vegetation is mainly western hemlock, noble fir, Douglas-fir, Pacific silver fir, red huckleberry, salal, and salmonberry. Elevation is 2,800 to 3,350 feet. The average annual precipitation is 100 to 200 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 60 days or less.

This unit is about 50 percent Valsetz soil and 30 percent Yellowstone soil.

Included in this unit are small areas of Laderly, Murtip, and Caterl soils, which formed in colluvium weathered from volcanic rock, and Sach soils, which formed in colluvium weathered from sedimentary rock on side slopes. Also included are small areas of sedimentary soils that are very gravelly and are 10 to 40 inches deep over sedimentary bedrock and Valsetz and Yellowstone soils that have slopes of less than 30 percent or more than 60 percent. Included areas make up about 20 percent of the total acreage.

The Valsetz soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark reddish brown cobbly loam about 5 inches thick. The upper part of the subsoil is reddish brown very cobbly loam about 9 inches thick. The lower part is brown and strong brown extremely cobbly loam about 22 inches thick. Fractured basic igneous bedrock is at a depth of about 36 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderately rapid in the Valsetz soil. Available water capacity is 2 to 4 inches. The effective rooting depth is 20 to 40 inches. Runoff is rapid, and the hazard of water erosion is high.

The Yellowstone soil is shallow and somewhat excessively drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 0.5 inch thick. The surface layer is dark reddish brown stony loam about 10 inches thick. The substratum is a dark reddish brown extremely cobbly loam about 8 inches thick. Fractured igneous bedrock is at a depth of about 18 inches. The depth to bedrock is 10 to 20 inches.

Permeability is moderately rapid in the surface layer of the Yellowstone soil and rapid in the substratum. Available water capacity is 1 to 3 inches. The effective rooting depth is 10 to 20 inches. Runoff is rapid, and the hazard of water erosion is high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and noble fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, rock fragments on the surface of the soil, and the limited rooting depth. Minimizing the risk of erosion is essential in harvesting timber. Excessive disturbance of the Yellowstone soil can expose areas of bedrock. The slope limits the kinds of forest management equipment that can be used. Stones on the surface can interfere with felling, yarding, and other operations involving the use of equipment. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Landsliding and slumping can occur when the soils are saturated and have been disturbed by road construction or timber harvesting. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees are subject to windthrow during periods when the soils are excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly

preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include western hemlock and noble fir.

61H—Valsetz-Yellowstone complex, 60 to 90 percent slopes. This map unit is on steep side slopes in mountainous areas. The native vegetation is mainly western hemlock, noble fir, Douglas-fir, Pacific silver fir, red huckleberry, salal, and salmonberry. Elevation is 2,800 to 3,350 feet. The average annual precipitation is 100 to 200 inches, the average annual air temperature is 42 to 45 degrees F, and the average frost-free period is 60 days or less.

This unit is about 50 percent Valsetz soil and 30 percent Yellowstone soil.

Included in this unit are small areas of Caterl, Laderly, and Murtip soils, which formed in colluvium weathered from volcanic rock on side slopes. Also included are small areas of Valsetz and Yellowstone soils that have slopes of less than 60 percent or more than 90 percent. Included areas make up about 20 percent of the total acreage.

The Valsetz soil is moderately deep and well drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, and twigs about 1 inch thick. The surface layer is dark reddish brown cobbly loam about 5 inches thick. The upper part of the subsoil is reddish brown very cobbly loam about 9 inches thick. The lower part is brown and strong brown extremely cobbly loam about 22 inches thick. Fractured basic igneous bedrock is at a depth of about 36 inches. The depth to bedrock is 20 to 40 inches.

Permeability is moderately rapid in the Valsetz soil. Available water capacity is 2 to 4 inches. The effective rooting depth is 20 to 40 inches. Runoff is very rapid, and the hazard of water erosion is very high.

The Yellowststone soil is shallow and somewhat excessively drained. It formed in colluvium derived from volcanic material. Typically, the surface is covered with a mat of needles, leaves, twigs, roots, and moss about 0.5 inch thick. The surface layer is dark reddish brown stony loam about 10 inches thick. The substratum is a dark reddish brown extremely cobbly loam about 8 inches thick. Fractured igneous bedrock is at a depth of about 18 inches. The depth to bedrock is 10 to 20 inches.

Permeability is moderately rapid in the surface layer of the Yellowstone soil and rapid in the substratum. Available water capacity is 1 to 3 inches. The effective rooting depth is 10 to 20 inches. Runoff is very rapid, and the hazard of water erosion is very high.

This unit is used mainly for timber production. It also is used for wildlife habitat and as a source of water.

This unit is suited to the production of western hemlock and noble fir. The main concerns in producing and harvesting timber are the slope, the hazard of erosion, rock fragments on the surface of the soil, and the limited rooting depth. Minimizing the risk of erosion is essential in harvesting timber. Excessive disturbance of the Yellowstone soil can expose areas of bedrock. Stones on the surface can interfere with felling, yarding, and other operations involving the use of equipment. The slope limits the kinds of forest management equipment that can be used. High-lead or other cable logging systems that fully or partially suspend the logs above the ground will damage the soil less than other systems. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Roads, landings, and steep yarding paths can be protected from erosion by constructing water bars and by seeding cuts, fills, and yarding paths to a plant cover. Trees are subject to windthrow during periods when the soils are excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. Selection of suitable seedlings is necessary to ensure seedling survival. The trees that are suitable for planting include western hemlock and noble fir.

62C—Wadecreek silt loam, 3 to 12 percent slopes. This deep and moderately well drained soil is on high terraces. It formed in silty and clayey alluvium derived from mixed sources. The native vegetation is mainly Douglas-fir, western hemlock, Sitka spruce, red alder, vine maple, salmonberry, salal, western swordfern, western brackenfern, and trailing blackberry. Elevation is 200 to 500 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface is covered with a mat of decomposing needles, leaves, twigs, and moss about 2 inches thick. The surface layer is dark reddish brown and dark brown silt loam about 9 inches thick. The next layer is dark brown silty clay loam about 10 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam, yellowish brown and grayish

brown, mottled silty clay loam, and yellowish brown silty clay about 29 inches thick. The lower part is yellowish brown and strong brown, mottled silty clay loam about 7 inches thick. The substratum to a depth of 60 inches or more is yellowish brown and light gray, mottled loam.

Included in this unit are small areas of highly diverse soils that are dominantly well drained, are nongravelly to very cobbly, have weathered bedrock at a depth of 20 to more than 60 inches, and are on the steeper terrace escarpments. Also included are small areas of soils that are similar to the Wadecreek soil but are well drained. Included areas make up about 15 percent of the total acreage.

Permeability is slow in the Wadecreek soil. Available water capacity is 10 to 12 inches. The effective rooting depth is limited by a seasonal high water table at a depth of 2 to 3 feet from November through May. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used for pasture, limited timber production, homesite development, and wildlife habitat.

If this unit is used for pasture, the main limitations are the slope, the hazard of erosion, the seasonal high water table, the susceptibility of the surface layer to compaction, and low fertility. Where practical, a seedbed should be prepared on the contour or across the slope. A drainage system accelerates early growth, extends the grazing season, and increases the variety of forage plants that can be grown. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth. Using standard wheeled and tracked equipment when the soil is moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees have a limited rooting depth as a result of the seasonal high water table and are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of reforestation is needed to minimize competition from undesirable understory plants. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include western hemlock and Douglas-fir.

If this unit is used for homesite development, the main limitations are the slope, the hazard of erosion, the wetness, the moderate shrink-swell potential, and low soil strength. Erosion is a hazard in the steeper areas. Preserving the existing plant cover during construction helps to control erosion. Building sites should be located in the less sloping areas. A drainage system is needed if roads or building foundations are constructed. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. The wetness can be reduced by installing drainage tile around footings. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load. The damage caused by shrinking and swelling can be minimized by using a proper design and by backfilling with material that has a low shrink-swell potential.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slow permeability and the seasonal high water table, both of which increase the likelihood that septic tank absorption fields will fail during rainy periods. The slow permeability can be overcome by increasing the size of the absorption field.

63E—Waldport fine sand, 0 to 30 percent slopes. This deep, excessively drained soil is on recently stabilized dunes. It formed in sandy eolian material derived from mixed sources. The native vegetation is mainly shore pine, Sitka spruce, salal, evergreen huckleberry, and rhododendron. Other common vegetation occurring on the more recently stabilized dunes is mainly European beachgrass, American beachgrass, and Scotch broom. Elevation is 10 to 150 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a loose litter of needles, leaves, and twigs over highly decomposed organic matter about 3 inches thick. The surface layer is dark grayish brown fine sand about 7 inches thick.

Figure 8.—The plant cover helps to control erosion near these homesites on Waldport fine sand, 0 to 30 percent slopes.

The substratum to a depth of 60 inches or more is pale brown fine sand and light brownish gray and light gray fine sand.

Included in this unit are small areas of Netarts soils on the older dunes; Yaquina soils in the older interdune positions; recently stabilized, poorly drained, sandy soils in interdune positions; and Dune land. Also included are small areas of Waldport soils that have slopes of more than 30 percent. Included areas make up about 20 percent of the total acreage.

Permeability is very rapid in the Waldport soil. Available water capacity is 2 to 4 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight. The hazard of wind erosion is severe. The hazard of erosion by ocean waves is high along sandspit areas.

This unit is used mainly for homesite development, recreational development, and wildlife habitat.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of wind erosion, the instability of cutbanks, the very rapid permeability, and droughtiness (fig. 8). Building sites should be located in the less sloping areas. Excavation for buildings and access roads exposes material that is highly susceptible to wind erosion. Cutbanks are not stable and must be protected by a plant cover or stabilized. Revegetating disturbed areas as soon as possible helps to control wind erosion. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Selection of suitable vegetation is critical in the establishment of lawns, shrubs, trees, and vegetable gardens. In summer irrigation is needed to improve the growth of lawn grasses, shrubs, vines, shade trees, and ornamental trees.

This soil is poorly suited to septic tank absorption fields. The main limitations are the slope and the very rapid permeability. The slope limits the selection of sites

for septic tank absorption fields, and the effluent from the absorption fields can surface in downslope areas, creating a health hazard. Because of the very rapid permeability, the absorption fields have a poor filtering capacity and seepage of the effluent can contaminate ground water.

64C—Winema-Fendall silt loams, 3 to 15 percent slopes. This map unit is on broad tops of hilly uplands. The native vegetation is mainly western hemlock, Sitka spruce, Douglas-fir, red alder, salal, salmonberry, thimbleberry, red huckleberry, evergreen huckleberry, and western swordfern. Elevation is 50 to 500 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 210 days.

This unit is about 45 percent Winema soil and 40 percent Fendall soil.

Included in this unit are small areas of Templeton soils, which formed in the less clayey material weathered from sedimentary rock on hilltops; Tolovana and Reedsport soils, which formed in the coarser textured colluvium weathered from sedimentary rock on ridges where mountain areas join hilly uplands; Klootchie, Neotsu, Neskowin, and Salander soils, which formed in colluvium weathered from volcanic rock on ridges where mountainous areas join hilly uplands; and, in the Lincoln City area, small areas of soils that are similar to the Fendall soil but are less clayey and are dark colored and soils that have been influenced by eolian material, are moderately deep or deep over bedrock, are loamy and sandy, and are less than 35 percent clay. Also included are Winema and Fendall soils that have slopes of more than 15 percent. Included areas make up about 15 percent of the total acreage.

The Winema soil is deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface layer is black silt loam about 18 inches thick. The next layer is very dark brown silty clay loam about 7 inches thick. The subsoil is dark yellowish brown silty clay and silty clay loam about 29 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 54 inches. The depth to weathered bedrock is 40 to 60 inches.

Permeability is moderately slow in the Winema soil. Available water capacity is 9 to 16 inches. The effective rooting depth is 40 to 60 inches. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

The Fendall soil is moderately deep and well drained. It formed in colluvium weathered from sedimentary rock. Typically, the surface is covered with a mat of needles, leaves, twigs, and moss about 2 inches thick. The surface layer is very dark brown and dark brown silt loam about 16 inches thick. The upper part of the subsoil is dark yellowish brown silty clay loam about 11 inches thick. The lower part is dark yellowish brown silty clay about 11 inches thick. Fractured, partially weathered siltstone bedrock is at a depth of about 38 inches. The depth to weathered bedrock is 20 to 40 inches.

Permeability is moderately slow in the Fendall soil. Available water capacity is 4 to 10 inches. The effective rooting depth is 20 to 40 inches. Runoff is slow or medium, and the hazard of water erosion is slight or moderate.

This unit is used for hay and pasture, homesite and recreational development, timber, and wildlife habitat.

If this unit is used for hay and pasture, the main limitations are the slope, the hazard of erosion, the susceptibility of the surface layer to compaction, low fertility, and cool, moist summers that inhibit proper curing of hay in most years. Where practical, a seedbed should be prepared on the contour or across the slope. All of the suitable pasture plants can be grown, but planting bunch-type species alone increases the hazard of erosion. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is suited to the production of western hemlock and Douglas-fir. The main concerns in producing and harvesting timber are the susceptibility of the surface layer to compaction, plant competition, and the limited rooting depth in the Fendall soil. Properly designed road drainage systems and carefully located culverts help to control erosion. Spoil from excavations is subject to rill and gully erosion and to sloughing. Using standard wheeled and tracked equipment when the soils are moist causes rutting and compaction. Puddling can occur during wet periods. Using low-pressure ground equipment minimizes damage to the soil and helps to maintain productivity. Roads and landings can be protected from erosion by constructing water bars and by seeding areas that have been cut and filled. Skid trails and landings that are not intended for permanent use should be ripped during summer, when the amount of soil moisture is at a minimum. This measure breaks up compacted layers, improves tilth, and increases the seedling survival rate. Trees on the Fendall soil are subject to windthrow during periods when the soil is excessively wet and winds are strong.

After the trees are harvested, careful management of

reforestation is needed to minimize competition from undesirable understory plants. If the site is not adequately prepared, competition from undesirable plants can prevent or delay establishment of volunteer or planted trees. Because plant competition retards the growth of desirable plants, the larger, vigorous seedlings that are capable of rapid initial growth should be selected for planting. Competing weeds, brush, and trees can be controlled by properly preparing the site and by spraying, cutting, or girdling. Hand planting of nursery stock generally is necessary to establish or improve a stand. The trees that are suitable for planting include western hemlock, Douglas-fir, and Sitka spruce. Along coastal areas, stands of spruce and hemlock may produce a greater volume of wood than stands of Douglas-fir because the spruce and hemlock are better suited to the climate, can tolerate shade, and outgrow competing vegetation.

If this unit is used for homesite or recreational development, the main limitations are the slope, the hazard of erosion, the moderately slow permeability, low soil strength, a moderate shrink-swell potential, and the depth to soft bedrock in the Fendall soil. Erosion is a hazard in the steeper areas. Only the part of the site that is used for construction should be disturbed. On sites for access roads, an adequate cut-slope grade and drains are needed to control surface runoff and keep soil losses to a minimum. Preserving the existing plant cover during construction and revegetating disturbed areas as soon as possible help to control erosion. A plant cover can be established and maintained through applications of fertilizer, seeding, mulching, and shaping of the slopes. Cuts needed to provide essentially level building sites can expose the soft bedrock in the Fendall soil. The damage caused by shrinking and swelling can be minimized by using a proper design and by backfilling with material that has a low shrink-swell potential. Properly designing buildings and roads helps to offset the limited ability of the soil to support a load.

If this unit is used as a site for septic tank absorption fields, the main limitations are the slope and the moderately slow permeability. The effluent from the absorption fields can surface in downslope areas, creating a health hazard. The absorption lines should be installed in the less sloping areas. The moderately slow permeability increases the likelihood that septic tank absorption fields will fail during the rainy season. The permeability can be overcome by increasing the size of the absorption field.

65A—Wolfer silt loam, 0 to 3 percent slopes. This deep, somewhat excessively well drained soil is on stream terraces. It formed in silty over sandy and gravelly alluvium derived from mixed sources. The native vegetation is mainly western hemlock, Douglas-fir, Sitka spruce, red alder, vine maple, salmonberry, western swordfern, western brackenfern, and trailing blackberry. Elevation is 100 to 300 feet. The average annual precipitation is 70 to 100 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the upper part of the surface layer is very dark brown silt loam about 9 inches thick. The lower part of the surface layer is very dark brown gravelly silt loam. The subsoil is dark brown very gravelly loam about 10 inches thick. The upper part of the substratum is variegated brown, strong brown, dark brown, and yellowish brown extremely gravelly loamy sand about 9 inches thick. The lower part to a depth of 60 or more inches is variegated dark brown and yellowish brown extremely gravelly loamy coarse sand.

Included in this unit are small areas of Euchre soils in depressions, Quillamook soils on the more nearly level slopes, Siletz soils on the lower stream terrace, and Knappa soils on the higher terraces. Included areas make up about 15 percent of the total acreage.

Permeability is moderate in the upper part of the Wolfer soil and rapid in the lower part. Available water capacity is 6 to 10 inches. The effective rooting depth is limited by droughtiness in the substratum. Runoff is slow, and the hazard of water erosion is slight.

This unit is used mainly for hay and pasture. It also is used for wildlife habitat and gravel pits.

If this unit is used for hay and pasture, the main limitations are gravel and cobbles in the soil, a low available water capacity during the growing season, and low fertility. Deep or excessive tillage may expose the gravel and cobbles. In summer irrigation is needed for maximum production of most crops. Sprinkler irrigation is the most suitable method. Water should be applied in amounts sufficient to wet the root zone but in amounts small enough to minimize the leaching of plant nutrients. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

If this unit is used for homesite development, the main limitations are gravel and cobbles in the soil and the rapid permeability of the substratum. Excavation for roads and buildings exposes the gravel and cobbles. Because of the rapid permeability, septic tank absorption fields have a poor filtering capacity.

66A—Yachats very fine sandy loam, 0 to 3 percent slopes. This deep, well drained soil is on flood plains. It formed in loamy and sandy recent alluvium derived from mixed sources. The native vegetation is mainly scattered red alder, salmonberry, western swordfern, grasses, and forbs. Elevation is 10 to 100 feet. The average annual precipitation is 70 to 90 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 160 to 210 days.

Typically, the surface layer is dark brown very fine sandy loam and fine sandy loam about 14 inches thick. The subsoil is brown loam about 8 inches thick. The upper part of the substratum is brown fine sandy loam about 9 inches thick. The lower part to a depth of 60 inches or more is brown loamy fine sand.

Included in this unit are small areas of Nehalem soils on the higher flood plains and Nestucca and Brenner soils in depressions on flood plains. Also included are small areas of soils with an average content of more than 35 percent gravel and cobbles. Included areas make up about 20 percent of the total acreage.

Permeability is moderately rapid in the Yachats soil. Available water capacity is 6 to 8 inches. The effective rooting depth is 60 inches or more. Runoff is slow, and the hazard of water erosion is slight unless the soil is flooded. A seasonal high water table fluctuates between depths of 4 and 6 feet from November through April. This soil is frequently flooded for brief periods from November through April.

This unit is used for pasture and wildlife habitat. If this unit is used for pasture, the main limitations are the hazard of flooding and low fertility. The pasture species that tolerate the frequent, brief periods of flooding should be selected for planting. Grazing during wet periods results in compaction of the surface layer, poor tilth, and excessive runoff. Proper stocking rates, pasture rotation, and restricted grazing during wet periods help to keep the pasture in good condition and control erosion. Periodic mowing and clipping help to maintain uniform growth and prevent selective grazing. Applying lime and mixed fertilizer improves the growth of forage plants.

This unit is not suited to homesite development. It is limited mainly by the flooding.

67A—Yaquina fine sand, 0 to 3 percent slopes. This deep, somewhat poorly drained soil is on interdune areas on low marine terraces along the Pacific Ocean. The soil formed in sandy eolian and alluvial material derived from mixed sources. The native vegetation is mainly shore pine, scattered Sitka spruce, rhododendron, azalea, salal, evergreen huckleberry, and sedges. Elevation is 10 to 50 feet. The average annual precipitation is 60 to 80 inches, the average annual air temperature is 49 to 52 degrees F, and the average frost-free period is 180 to 240 days.

Typically, the surface is covered with a mat of needles, leaves, and twigs about 2 inches thick. The surface layer is gray fine sand about 6 inches thick. The upper part of the subsoil is brown fine sand and brown, mottled fine sand about 18 inches thick. The lower part is brown mottled, fine sand about 11 inches thick. The substratum to a depth of 60 inches or more is variegated olive gray and olive fine sand.

Included in this unit are small areas of Netarts soils on dunes and Waldport soils on recently stabilized dunes. Also included are small areas of very poorly drained organic soils and light colored, sandy, poorly drained or very poorly drained soils in depressions. Included areas make up about 20 percent of the total acreage.

Permeability is moderately rapid in the Yaquina soil, but internal drainage is slow. Available water capacity is 3 to 4 inches. The effective rooting depth is limited by a seasonal high water table 0.5 foot above to 2.0 feet below the surface from November through April. Runoff is slow to ponded, and the hazard of water erosion is low. The hazard of wind erosion is severe if the soil is drained and plant cover is removed.

This unit is used mainly for wildlife habitat. It also is used for homesite development, recreational development, and woodlots.

This unit is poorly suited to homesite development. It is limited mainly by wetness and the sandy texture of the soil. A drainage system is needed if roads or building foundations are constructed, but excavation for houses and access roads can expose material that is highly susceptible to wind erosion. Revegetating disturbed areas as soon as possible helps to control wind erosion.

This unit is poorly suited as a site for septic tank absorption fields. It is limited mainly by the wetness resulting from the seasonal high water table.

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help avoid soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreation facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

Crops and Pasture

William R. Rodgers, Lincoln County extension agent, Oregon State University, assisted with the preparation of this section.

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main hay and pasture plants commonly grown are listed for each soil.

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Grasses and legumes for pasture and hay are the main crops in the survey area. Oats are sometimes grown after an old pasture is plowed and before it is reseeded. This rotation helps to break down the sod for better seedbed preparation before a long-term forage mix is planted. The oats are used mainly for hay.

The main pasture grasses are perennial ryegrass, orchardgrass, tall fescue, meadow foxtail, and native bentgrass. The main legumes are New Zealand white clover, Mediterranean subclover, and big trefoil. Precipitation is usually sufficient late in spring and early in summer to sustain the pasture and to permit a hay crop to mature. Close to the coast, low pastureland can provide green forage most of the summer. Fall rains often bring strong forage growth in October.

Field trials conducted over a number of years have shown benefits from nitrogen fertilizer applied in September and early January. Forage produced at these times reduces the amount of hay that needs to be grown or purchased to sustain the critical winter feeding period.

About 10,000 acres in the survey area is suitable for harvested crops. This land is used mainly as pasture for beef cattle, sheep, dairy cattle, and horses. Holly, Christmas trees, caneberries, strawberries, blueberries, vegetables, and nursery stock are also grown commercially. Greenhouse and field production of bedding plants and ornamentals is becoming increasingly important. Climatic conditions in the survey area are favorable for producing high-quality artichokes, meadowfoam (oilseed), mushrooms, flower bulbs, and a variety of specialty vegetable and herb products.

One of the major limitations for most agricultural producers is a lack of nearby major markets. Many

farmers market their products directly to consumers and local retailers or make some products available for hauling to canneries or other buyers in the Willamette Valley.

Flooding is a hazard on the Brenner, Coquille, Kirkendall, Nehalem, Nekoma, Nestucca, and Yachats soils, and the Coquille soils that are not diked are subject to year-round flooding, dominantly during high tides. Good pasture management and vegetative cover are necessary to protect the soils from erosion during flooding and to maintain or improve water quality.

Drainage is a major concern on the Brenner, Coquille, Chitwood, Euchre, Hebo, and Nestucca soils and a somewhat lesser concern on the Bentilla, Grindbrook, McCurdy, Treharne, and Wadecreek soils. Providing drainage on the soils extends the season of use, increases yields for pastures, and widens the variety of suitable grasses and legumes for pasture and hay.

Compaction of the soil is a common hazard on most pastures. It reduces permeability, restricts root development, and increases runoff and erosion, which lowers productivity and reduces the quality of the soil and water. Restricted grazing during wet periods helps to prevent or reduce compaction.

Irrigation will increase production of forage significantly on the Eilertsen, Elsie, Kirkendall, and Wolfer soils during most years and on most of the other soils during dry years.

Yields per Acre

The average yields per acre that can be expected of pasture and hay under a high level of management are shown in table 5. In any given year, yields may be higher or lower than those indicated in the table because of variations in rainfall and other climatic factors.

The yields are based mainly on the experience and records of farmers, conservationists, and extension agents. Available yield data from nearby counties and results of field trials and demonstrations are also considered.

The management needed to obtain the indicated yields of the pasture and hay depends on the kind of soil and the crop. Management can include drainage, erosion control, and protection from flooding; the proper planting and seeding rates; suitable high-yielding crop varieties; appropriate and timely tillage; control of weeds, plant diseases, and harmful insects; favorable soil reaction and optimum levels of nitrogen, phosphorus, potassium, and trace elements for each crop; effective use of crop residue, barnyard manure, and green-manure crops; and harvesting that ensures the smallest possible loss.

The estimated yields reflect the productive capacity of each soil for pasture and hay. Yields are likely to increase as new production technology is developed. The productivity of a given soil compared with that of other soils, however, is not likely to change.

Crops not shown in table 5 are grown in the survey area, but estimated yields are not listed because the acreage of such crops is small. The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about the management and productivity of the soils for those crops.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The grouping does not take into account major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor does it consider possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for woodland, and for engineering purposes.

In the capability system, soils generally are grouped at three levels: capability class, subclass, and unit. Only class and subclass are used in this survey. These levels are defined in the following paragraphs.

Capability classes, the broadest groups, are designated by Roman numerals I through VIII. The numerals indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class I soils have few limitations that restrict their use.

Class II soils have moderate limitations that reduce the choice of plants or that require moderate conservation practices.

Class III soils have severe limitations that reduce the choice of plants or that require special conservation practices, or both.

Class IV soils have very severe limitations that reduce the choice of plants or that require very careful management, or both.

Class V soils are not likely to erode but have other limitations, impractical to remove, that limit their use.

Class VI soils have severe limitations that make them generally unsuitable for cultivation.

Class VII soils have very severe limitations that make them unsuitable for cultivation.

Class VIII soils and miscellaneous areas have limitations that nearly preclude their use for commercial crop production.

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e, w, s,* or *c,* to the class numeral, for example, IIe. The letter *e* shows that the main limitation is risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

In class I there are no subclasses because the soils of this class have few limitations. Class V contains only the subclasses indicated by *w, s,* or *c* because the soils in class V are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, woodland, wildlife habitat, or recreation.

Capability units are soil groups within a subclass. The soils in a capability unit are enough alike to be suited to the same crops and pasture plants, to require similar management, and to have similar productivity. Capability units generally are designated by adding an Arabic numeral to the subclass symbol, for example, IIe-4 or IIIe-6.

The capability classification of each map unit is given in table 5.

Woodland Management and Productivity

By Jerome M. Proutt, forester, Natural Resources Conservation Service.

Woodland covers 90 percent of the Lincoln County Area, and the potential productivity for timber is high because of the favorable climate, fertile soils, and well suited timber species. The woodland is 60 percent privately owned, and the rest and is owned and administered mainly by the U.S. Forest Service, the U.S. Bureau of Land Management, the U.S. Bureau of Indian Affairs, and the State of Oregon.

The town of Newport has a deep-water port and is a major coastal shipping center for forest products, including raw logs and finished products to foreign and domestic markets. Several mills produce lumber, plywood, veneer, wood chips for pulp, and paper products. Some smaller plants and mills provide specialty products, such as shakes from western redcedar.

The principal forest cover type in the survey area is coastal Douglas-fir in inland areas. Other major forest cover types are western hemlock, Sitka spruce, and small areas of western redcedar generally located in the isomesic zone. A small but distinctive type is shore pine on sandy and poorly drained soils of the coastal areas.

The forested areas are affected by many diseases and insects, and the extent and type of damage vary from year to year. Western hemlock is attacked by several trunk, butt, and root rots and by the hemlock looper (Lambdina fiscellaria), which is the most serious threat. The Douglas-fir beetle (Dendroctonus pseudotsugae) is the primary insect attacking Douglas-fir. Laminated root rot (Phylinius weirii) is a major fungus that attacks Douglas-fir in localized infected areas. The Sitka spruce weevil (Dissodes sitchensis) kills the terminal shoots of spruce, and the spruce aphid (Aphis abientina) significantly limits growth of Sitka spruce.

Soils vary in their ability to produce trees. Depth, fertility, texture, and available water capacity are the main factors that influence that ability. Elevation and climate determine the kinds of trees that can be expected on a specific site. The forest soils in the survey area range from shallow to deep, from nongravelly to extremely gravelly, and from fine textured to coarse.

The description of each detailed soil map unit in this survey presents information concerning forest productivity and limitations for harvesting timber. Potential common native understory plants are also named.

Table 6 summarizes the forestry information given in the detailed soil map unit descriptions and can serve as a quick reference for woodland interpretations. The table rates some of the major concerns for woodland managers.

Seedling mortality refers to the probability of death of tree seedlings caused by factors other than plant competition. The ratings apply to healthy, dormant seedlings from good stock that are properly planted during a period of sufficient moisture. *Slight* indicates that no mortality is expected under normal conditions, *moderate* indicates that some mortality can be expected and that extra precautions are advisable, and *severe* indicates that mortality will be high and that extra precautions are essential for successful reforestation. Soil wetness, droughtiness, and topography are the main factors used to determine the ratings for seedling mortality. Large planting stock, special site preparation, surface drainage, or reinforcement planting will help to reduce the risk of mortality.

Plant competition refers to the likelihood of the invasion of undesirable plants when openings are made in the tree canopy. *Slight* indicates that unwanted plants are not likely to retard the development of natural or planted seedlings, *moderate* indicates that competition

will retard natural or planted reforestation, and *severe* indicates that competition can be expected to prevent natural or planted reforestation. Favorable climate and soil conditions account for plant competition problems. In many areas the rating for plant competition is determined by the quantity and proximity of seed sources of undesirable plants or the quantity of unwanted brush rootstock that will resprout after harvesting. Moderate and severe ratings indicate the need for careful and thorough site preparation and the potential need for treatment to retard growth of competing vegetation.

Windthrow hazard rates the likely development of tree roots and the ability of the soil to support trees. A rating of *slight* indicates that trees are not normally blown down by the wind, *moderate* indicates that an occasional tree may be blown down during periods of soil wetness combined with moderate or strong winds, and *severe* indicates that many trees may be blown down during periods when the soil is wet and winds are moderate or strong. Restricted rooting depth as a result of a high water table, underlying bedrock, or an impervious layer and poor anchoring of roots because of loose soil result in windthrow. Moderate and severe ratings indicate the need for care in thinning forest stands, periodic salvage of windblown trees, and an adequate road and trail system to service salvage operations.

Equipment limitation describes the restriction on the use of equipment as a result of soil characteristics. A rating of *slight* indicates that equipment use is not normally restricted because of soil factors; moderate indicates short seasonal limitation because of soil wetness, a fluctuating water table, or some other factor; and *severe* indicates a seasonal limitation, a need for special equipment, or a hazard to the use of equipment. Steepness of slope, soil wetness, and the susceptibility of the soil to compaction are the main factors that cause equipment limitations. As slope gradient and length increase, it becomes more difficult to use wheeled equipment. On steeper slopes, tracked equipment must be used. On the steepest slopes, cable yarding or full suspension systems should be used. Soil wetness, especially where the soil material is fine textured, can severely limit the use of equipment and make harvesting practical only during dry periods in summer.

Fire damage gives the probability that a fire of moderate fireline intensity (116 to 520 BTUs per second per foot) will damage the soil. A rating of *slight* indicates that damage to soil characteristics is not expected; *moderate* indicates that damage, mainly erosion, can occur. and caution is advised in planning prescribed burns; and *severe* indicates that damage is likely to occur and that extreme caution is advised in planning prescribed burns. Duff layer thickness, organic matter content, and texture are soil factors considered in determining the ability of soil to resist fire damage. Winter burning, alternative firing techniques, monitoring of fuel moisture content, yarding of unmerchantable material, elimination of prescribed fires, and erosion control measures following burning will help to reduce fire damage risks.

Cut and fill slope erosion hazard refers to the probability that damage will occur as a result of erosion from road and trail cuts and fills. Seeding of cut and fill slopes to permanent vegetative cover is the common recommended measure to prevent this hazard. A *slight* rating indicates that no other preventive measures are needed under ordinary conditions; *moderate* indicates that additional erosion control measures, such as mulching and sediment traps, are needed under certain conditions; and *severe* indicates that additional erosion and water control practices are needed under most conditions. The texture of the surface and subsurface layers of the soil, the slope angle, and the slope length all contribute to the extent of cut and fill slope erosion. The erosion hazard becomes more severe as cut and fill slopes increase in length and erodibility.

Sheet and rill erosion hazard refers to the probability of excessive erosion as a result of operations where soil is exposed. A *slight* rating indicates that no particular erosion control measures are needed under ordinary conditions, *moderate* indicates that some erosion control measures are needed, and *severe* indicates that extra precautions are needed to control erosion during most activities.

Erosion hazard ratings are determined by the topography, the erodibility of a soil, and the local climate. Moderate and severe ratings may indicate the need for modified road construction, special harvesting systems, and alternative site preparation techniques.

Soil displacement refers to soil being mechanically gouged, scraped, or pushed, mainly during slash disposal and site preparation. A *slight* rating indicates that equipment use is not restricted and that special precautions are generally not needed; *moderate* indicates that specialized equipment, such as a brush rake, is recommended; and *severe* indicates that extreme caution is necessary. Duff and surface layer thickness, coarse fragment content, and texture are soil factors considered in making soil displacement hazard ratings. Removing or mixing the duff layer and exposing the mineral soil are necessary for natural regeneration of many species. However, where excessive soil displacement has occurred, vegetative recovery rates may be impaired. Prolonged exposure of the soil may

result in increased rates of erosion and further deterioration of the site.

Soil compaction refers to the probability that damage will occur to soil structure as a result of repeated equipment use during wet or moist conditions. The ratings assume the soil is in a wet or moist condition. Soil compaction decreases air spaces in the soil. Air and water movement are thus reduced, restricting root growth and increasing the risk of surface erosion. A *slight* rating indicates that special precautions are generally not necessary, but the use of designated skid trails and protection of the duff layer are needed; *moderate* indicates the need for extra precautions or restrictions, such as cable yarding instead of ground skidding equipment and the need for seasonal restrictions on equipment use; and *severe* indicates the need for extreme caution and in some instances restorative ripping or discing after harvest activities. Duff layer thickness, coarse fragment content, texture, and plasticity are soil characteristics considered in making the compaction ratings.

Table 7 shows the potential productivity of important commercial or common tree species on soils commonly used to produce timber.

The *potential productivity* of *common trees* on a soil is expressed as a site index. This index is determined by measuring the height and age of selected trees within stands of a given species (*4, 5, 7, 8, 9, 17*). The site index applies to fully stocked, even-aged, native stands growing on a particular soil map unit. The highest timber yields can be expected from map units with the highest site indices. Site index values can be converted into estimated yields at various ages by using the appropriate yield tables.

Trees are listed in the order of their general occurrence as observed on the map unit. Species preferred for wood production are those that are planted for reforestation or are allowed to regenerate without management. The desired product, topographic position, and personal preference are only some of the factors that influence the choice of trees to use for reforestation.

Recreation

The soils of the survey area are rated in table 8 according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, vegetation, access to water, potential water impoundment sites, and access to public sewerlines. The capacity of the soil to absorb septic tank effluent and the ability of the soil to support vegetation are also important. Soils subject to flooding are limited for recreation use by the duration and intensity of flooding and the season when flooding occurs. In planning recreation facilities, onsite assessment of the height, duration, intensity, and frequency of flooding is essential.

In table 8, the degree of soil limitation is expressed as slight, moderate, or severe. *Slight* means that soil properties generally are favorable and that limitations are minor and easily overcome. *Moderate* means that limitations can be overcome or alleviated by planning, design, or special maintenance. *Severe* means that soil properties are unfavorable and that limitations can be offset only by costly soil reclamation, special design, intensive maintenance, limited use, or by a combination of these measures.

The information in table 8 can be supplemented by other information in this survey; for example, interpretations for dwellings without basements and for local roads and streets in table 9 and interpretations for septic tank absorption fields in table 10.

Camp areas require site preparation such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The best soils are gently sloping and are not wet or subject to flooding during the period of use. The surface has few or no stones or boulders, absorbs rainfall readily but remains firm, and is not dusty when dry. Strong slopes and stones or boulders can greatly increase the cost of constructing campsites.

Picnic areas are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The best soils for picnic areas are firm when wet, are not dusty when dry, are not subject to flooding during the period of use, and do not have slopes or stones or boulders that increase the cost of shaping sites or of building access roads and parking areas.

Playgrounds require soils that can withstand intensive foot traffic. The best soils are almost level and are not wet or subject to flooding during the season of use. The surface is free of stones and boulders, is firm after rains, and is not dusty when dry. If grading is needed, the depth of the soil over bedrock or a hardpan should be considered.

Paths and trails for hiking and horseback riding should require little or no cutting and filling. The best soils are not wet, are firm after rains, are not dusty when dry, and are not subject to flooding more than once a year during the period of use. They have

moderate slopes and few or no stones or boulders on the surface.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

Wildlife Habitat

By Clyde A. Scott, biologist, Natural Resources Conservation Service.

Soils affect the kind and amount of vegetation available to wildlife as food and cover. The kind and abundance of wildlife that populate an area depend on the amount and distribution of food, cover, and water.

Wildlife habitat varies greatly throughout the survey area. The kind, abundance, and management of wildlife species in the county are related generally to four landscape zones. This section describes the habitat and wildlife community of each of those zones and and provides their location on the general soil map.

Flood plain zone. This zone consists of the tidal flood plains in general soil map unit 1, the coastal valley flood plains in unit 2, and the interior valley flood plains of unit 5. The native vegetation consists mainly of wetland plants and stands of hardwoods, young conifers, shrubs, and herbaceous plants. Many of these areas have been diked and drained and planted to pasture. The pastures that are surrounded by woodland and shrubs are grazed by elk and deer. The wetland areas are habitat for ducks, geese, sea gulls, herons, bald eagles, hawks, and other birds. Beaver, mink, nutria, muskrat, opossum, and salamanders are common along streams. The California brown pelican inhabits the areas along bays and estuaries during summer. Flounder, perch, cod, herring, and anchovy are common saltwater species in the bays and estuaries. Crab and ghost shrimp are also abundant in the estuaries. Migrating coho, chum, and Chinook salmon, steelhead trout, and sea-run cutthroat trout use the perennial streams for spawning.

Dune zone. This zone consists of the areas on dunes and in interdunal swales in general soil map unit 3. Wetland plants are in the swamps and marshes of the interdunal swales. Along the younger dunes, the plant community is dominantly beachgrass, Scotch broom, and shore pine plantings. Conifers, shrubs, and herbaceous plants are native on the older stable dunes. Ducks, geese, beaver, and muskrat are common in the wet interdunal swales. A few deer inhabit the dunes, along with moles, gophers, and many varieties of songbirds.

Terrace zone. This zone consists of the marine terraces of general soil map unit 3, the coastal valley streams of unit, and the interior valley terraces of unit 5. The native vegetation consists of conifers, hardwoods, shrubs, and herbaceous plants and of rushes and sedges in the wetter areas. Many areas have been cleared and planted with pasture. Elk and deer feed on the pasture and use the surrounding woodlands for cover. Moles, gophers, and shrews are common in the pastures. Hawks and songbirds are abundant throughout this zone, and bears inhabit the brushy and wooded areas of the marine terraces.

Coastal headland, upland, and mountain and interior mountain zone. This zone consists of general soil map units 6 to 13. The soils in this zone are used for timber production. Clearcutting is the dominant method of timber harvest. Conifers dominate the timber stands, which have variable amounts of understory plants, depending on stand age and canopy density. After clearcutting, successional stages of herbaceous plants, shrubs, and hardwoods dominate the areas. Browse for elk and deer is more readily available in clearcut areas. Clearcut areas that are surrounded by trees provide the best habitat for elk and deer. Other wildlife common to this zone are black bear, cougar, bobcat, coyote, porcupine, rabbit, squirrel, mountain beaver, snake, and salamander. The common birds are hawk, owl, ruffed grouse, band-tailed pigeon, dove, jay, crow, woodpecker, and various songbirds.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. The ratings are given in the following tables: Building Site Development, Sanitary Facilities, Construction Materials, and Water Management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the neefor onsite investigation of the soils or for

testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations need to be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kind of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to (1) evaluate the potential of areas for residential, commercial, industrial, and recreation uses; (2) make preliminary estimates of construction conditions; (3) evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; (4) evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; (5) plan detailed onsite investigations of soils and geology; (6) locate potential sources of gravel, sand, earthfill, and topsoil; (7) plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and (8) predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps and soil descriptions, and other data provided in this survey can be use to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the Glossary.

Building Site Development

Table 9 shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging, filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and the depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrink-swell potential, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 to 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material, a base of gravel, crushed rock, or stabilized soil material, and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, frost action potential, and depth to a high water table affect the traffic supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of

the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

Table 10 shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary landfills. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required.

Table 10 also shows the suitability of the soils for use as daily cover for landfills. A rating of *good* indicates that soil properties and site features are favorable for the use and good performance and low maintenance can be expected; *fair* indicates that soil properties and site features are moderately favorable for the use and one or more soil properties or site features make the soil less desirable than the soils rated good; and *poor* indicates that one or more soil properties or site features are unfavorable for the use and overcoming the unfavorable properties requires special design, extra maintenance, or costly alteration.

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 72 inches is evaluated. The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water.

Table 9 gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage because of rapid permeability of the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Sanitary landfills are areas where solid waste is disposed of by burying it in soil. There are two types of landfill — trench and area. In a trench landfill, the waste is placed in a trench. It is spread, compacted, and covered daily with a thin layer of soil excavated at the site. In an area landfill, the waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground water pollution. Ease of excavation and revegetation needs to be considered.

The ratings in table 10 are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench type landfills. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area type sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to wind erosion.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Construction Materials

Table 11 gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good, fair,* or *poor* as a source of roadfill and topsoil. They are rated as a probable or improbable source of sand and gravel. The ratings are based on soil properties and site features that affect the removal of the soil and its use as construction material. Normal compaction, minor processing, and other standard construction practices are assumed. Each soil is evaluated to a depth of 5 or 6 feet.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In this table, the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel, or both. They have at least 5 feet of suitable material, low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have a plasticity index of more than 10, a high shrink-swell potential, many stones, or slopes of more than 25 percent. They are wet, and the depth to the water table is less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and gravel are natural aggregates suitable for commercial use with a minimum of processing. Sand and gravel are used in many kinds of construction. Specifications for each use vary widely. In table 11, only the probability of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the taxonomic unit descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a *probable* source has a layer of clean sand or gravel or a layer of sand or gravel that is as much as 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an *improbable* source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable loamy material to a

depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

Table 12 gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas and embankments, dikes, and levees. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and potential frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to reduce erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of wind or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large

stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of wind erosion, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and maintenance of the grass after construction.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features listed in tables are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classifications, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

Table 13 gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 to 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each taxonomic unit under "Soil Series and Their Morphology."

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added; for example, "gravelly." Textural terms are defined in the Glossary.

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials (*1*) and the Unified soil classification system (*2*).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification; for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on

laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

Table 14 shows estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given for each taxonomic unit under "Soil Series and Their Morphology."

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at ⅓ bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In this table, the estimated moist bulk density of each major soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems, septic tank absorption fields, and construction where the rate of water movement under saturated conditions affects behavior.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soils. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The change is based on the soil fraction less than 2 millimeters in diameter. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (as much as 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value the more susceptible the soil is to sheet and rill erosion.

Erosion factor T is an estimate of the maximum average rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to wind erosion in cultivated areas. The groups indicate the susceptibility of soil to wind erosion and the amount of soil lost. Soils are grouped according to the amount of stable aggregates 0.84 millimeters in size. These are represented idealistically by USDA textural classes. Soils containing rock fragments can occur in any group.

1. Sand, fine sand, and very fine sand. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish on them.
2. Loamy sand, loamy fine sand, and loamy very fine sand. These soils are very highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
3. Sandy loam, coarse sandy loam, fine sandy loam, and very fine sandy loam. These soils are highly erodible. Crops can be grown if intensive measures to control wind erosion are used.
4. Clay, silty clay, clay loam, and silty clay loam that are more than 35 percent clay. These soils are moderately erodible. Crops can be grown if measures to control wind erosion are used.
5. Loamy soils that are less than 20 percent clay and less than 5 percent finely divided calcium carbonate and sandy clay loam and sandy clay that are less than 5 percent finely divided calcium carbonate. These soils are slightly erodible. Crops can be grown if measures to control wind erosion are used.
6. Loamy soils that are 20 to 35 percent clay and less than 5 percent finely divided calcium carbonate, except silty clay loam. These soils are very slightly erodible. Crops can easily be grown.
7. Silty clay loam that is less than 35 percent clay and less than 5 percent finely divided calcium carbonate. These soils are very slightly erodible. Crops can easily be grown.
8. Stony or gravelly soils and other soils not subject to wind erosion.

Organic matter is the plant and animal residue in the soil at various stages of decomposition.

In table 14, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter of a soil can be maintained or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Water and Soil Features

Table 15 gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

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

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sand or gravelly sand. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potenital) when thoroughly wet. These consist chiefly of clay that has high shrink-swell potential, soils that have a permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams, by runoff from adjacent slopes, or by inflow from high tides. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered to be flooding. Standing water in swamps and marshes or

in closed depressional areas is considered to be ponding.

Table 15 gives the frequency and duration of flooding and the time of year when flooding is most likely to occur.

Frequency, duration, and probable period of flooding are estimated. Frequency is expressed as *none, rare, occasional,* frequent. *None* means that flooding is not probable, *rare* that it is unlikely but is possible under unusual weather conditions (chance of flooding in any year is 0 to 5 percent), *occasional* that it occurs infrequently under normal weather conditions (chance of flooding in any year is 5 to 50 percent), and *frequent* that it occurs often under normal weather conditions (chance of flooding in any year is more than 50 percent).

Duration is expressed as *very brief* (less than 2 days), *brief* (2 to 7 days), *long* (7 days to 1 month), and *very long* (more than 1 month). The time of year that flooding is most likely to occur is expressed in months. November-May, for example, means that flooding can occur during the period November through May. About two-thirds to three-fourths of all flooding occurs during the stated period.

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and absence of distinctive horizons, which are characteristic of soils that are not subject to flooding.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic flood. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is the highest level of a saturated zone in the soil in most years. The depth to a seasonal high water table applies to undrained soils. The estimates are based mainly on the evidence of a saturated zone, namely grayish colors or mottles in the soil. Indicated in table 15 are the depth to the seasonal high water table; the kind of water table'that is, *perched, artesian,* or *apparent*; and the months of the year that the water table usually is highest. A water table that is seasonally high for less than 1 month is not indicated in the table.

An *apparent* water table is a thick zone of free water in the soil. It is indicated by the level at which water stands in an uncased borehole after adequate time is allowed for adjustment in the surrounding soil. An *artesian* water table is under hydrostatic head, generally below an impermeable layer. When this layer is penetrated, the water level rises in an uncased borehole. A *perched* water table is water standing above an unsaturated zone. In places an upper, or perched, water table is separated from a lower water table by a dry zone.

The two numbers in the column "High water table" indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. A plus sign preceding the range in depth indicates that the water table is above the surface of the soil. "More than 6.0" indicates that the water table is below a depth of 6 feet or that the water table exists for less than a month.

Table 16 gives estimates of various soil features. The estimates are used for land use planning that involves engineering.

Depth to bedrock is given if bedrock is within a depth of 5 feet. The depth is based on many soil borings and on observations during soil mapping. The rock is specified as either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

A cemented pan is a cemented or indurated subsurface layer at a depth of 5 feet or less. Such a pan causes difficulty in excavation. Pans are classified as thin or thick. A *thin* pan is one that is less than 3 inches thick if continuously indurated or less than 18 inches thick if discontinuous or fractured. Excavations can be made by trenching machines, backhoes, or small rippers. A *thick* pan is one that is more than 3 inches thick if continuously indurated or more than 18 inches thick if it is discontinuous or fractured. Such a pan is so thick or massive that blasting or special equipment is needed in excavation.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors creates a severe corrosion environment. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed

as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (*16*). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. Table 17 shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Ten soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Entisol.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Aquent (*Aqu*, meaning water, plus *ent*, from Entisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Fluvaquents (*Fluv*, meaning subject to flooding, plus *aquent*, the suborder of the Entisols that have an aquic moisture regime).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other known kind of soil. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Aeric Tropic* identifies the subgroup that typifies the great group. An example is Aeric Tropic Fluvaquents.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Mostly the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineral content, temperature regime, thickness of the root zone, consistence, moisture equivalent, slope, and permanent cracks. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-silty, mixed, nonacid, isomesic Aeric Tropic Fluvaquents.

SERIES. The series consists of soils that have similar horizons in their profile. The horizons are similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. The texture of the surface layer or of the substratum can differ within a series.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. The descriptions are arranged in alphabetic order.

Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the unit in the survey area is described. The detailed description of each soil horizon follows standards in the *Soil Survey Manual* (*14*). Many of the technical terms used in the descriptions are defined in *Soil Taxonomy* (*16*). Unless otherwise stated, colors in the descriptions are for moist soil. Following the pedon description is the range of important characteristics of the soils in the unit.

The map units of each series are described in the section "Detailed Soil Map Units."

Apt Series

The Apt series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on broad ridgetops, benches, and side slopes in mountainous areas. Slopes are 5 to 50 percent. The mean annual precipitation is about 75

inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Apt silty clay loam, in an area of Apt-McDuff silty clay loams, 5 to 30 percent slopes, on a 25 percent, south- to southwest-facing slope about 0.5 mile up a hill to the left of the first road off Mill Creek Road, at an elevation of about 500 feet, NW¼NW¼SE¼ sec. 28, T. 9 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, and twigs.
A1—0 to 5 inches; very dark brown (10YR 2/2) silty clay loam, dark brown (10YR 4/3) dry; strong fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many fine irregular pores; strongly acid (pH 5.2); clear wavy boundary.
A2—5 to 12 inches; dark brown (7.5YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky and granular structure; hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular and tubular pores; very strongly acid (pH 5.0); clear wavy boundary.
AB—12 to 19 inches; dark brown (7.5YR 3/3) silty clay loam, brown (7.5YR 5/4) dry; moderate fine and very fine subangular blocky structure; hard, firm, slightly sticky and plastic; many very fine and few fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual wavy boundary.
Bt1—19 to 30 inches; dark brown (10YR 4/3) silty clay, yellowish brown (10YR 5/4) dry; moderate fine and very fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; few faint clay films on faces of peds; very strongly acid (pH 4.6); gradual wavy boundary.
Bt2—30 to 39 inches; dark yellowish brown (10YR 4/4) silty clay, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure parting to moderate very fine subangular blocky; very hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; few faint clay films on faces of peds; about 5 percent soft siltstone fragments; very strongly acid (pH 4.6); clear wavy boundary.
BCt3—39 to 60 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; weak fine subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; few faint clay films on faces of peds; few fine fragments of very pale brown (10YR 7/3), soft, weathered material; very strongly acid (pH 4.6).

The mean annual soil temperature is 48 to 52 degrees F. The depth to bedrock is more than 60 inches.

The A and AB horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma generally of 2 or 3 when moist or dry. In some pedons the AB horizon has chroma of 4 when dry. These horizons have 0 to 10 percent soft rock fragments.

The Bt horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 to 6 when moist or dry. It is silty clay or clay. It has 0 to 35 percent soft rock fragments and 45 to 60 percent clay.

The BCt horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay, clay, or silty clay loam. It has 0 to 60 percent soft rock fragments and 35 to 45 percent clay.

Astoria Series

The Astoria series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on benches and broad ridgetops in mountainous areas. Slopes are 5 to 30 percent. The mean annual precipitation is about 90 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Astoria silt loam, 5 to 30 percent slopes, on a 15 percent, west-facing slope along an old dirt road on a ridge, at an elevation of about 750 feet, NW¼SE¼ sec. 14, T. 10 S., R. 10 W.

Oi—2 inches to 0; moss, needles, leaves, and twigs.
A—0 to 15 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many very fine irregular pores; strongly acid (pH 5.2); gradual smooth boundary.
BA—15 to 28 inches; dark yellowish brown (10YR 3/4) silt loam, yellowish brown (10YR 5/4) dry; moderate fine subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; common fine roots; many very fine tubular and irregular pores; very strongly acid (pH 5.0); clear smooth boundary.
Bw1—28 to 42 inches; dark yellowish brown (10YR 4/4) silty clay, light yellowish brown (10YR 6/4) dry; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few fine roots; common very fine tubular pores; very strongly acid (pH 4.8); clear smooth boundary.
Bw2—42 to 50 inches; brown (7.5YR 4/4) silty clay, brown (7.5YR 5/4) dry; moderate fine subangular

blocky structure; hard, firm, sticky and plastic; common very fine tubular pores; about 10 percent soft sandstone fragments; very strongly acid (pH 4.6); gradual smooth boundary.

BC—50 to 60 inches; brown (7.5YR 4/4) silty clay loam, brown (7.5YR 5/4) dry; weak fine subangular blocky structure; hard, firm, sticky and plastic; common very fine tubular pores; about 20 percent soft siltstone and sandstone fragments; very strongly acid (pH 4.6).

The mean annual soil temperature is 48 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to bedrock is more than 60 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 5 when dry, and chroma of 2 or 3 when moist and 3 when dry. It has 0 to 10 percent soft rock fragments.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 to 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist and 4 to 8 when dry. It is silty clay or clay. It has 0 to 35 percent soft rock fragments and 40 to 60 percent clay.

The BC horizon has hue of 10YR or 7.5YR, value of 3 to 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist and 4 to 8 when dry. It has 0 to 60 percent soft rock fragments and 27 to 35 percent clay.

Bandon Series

The Bandon series consists of well drained soils that formed in sandy marine and eolian material. These soils are moderately deep to an ortstein pan. They are on old stabilized dunes and incised fronts on marine terraces. Slopes are 3 to 50 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Bandon fine sandy loam, 3 to 12 percent slopes, on a 10 percent, south- to southwest-facing slope east of Highway 101 and west of the south end of the runway at the Newport Airport, at an elevation of about 80 feet, SE¼NE¼ sec. 31, T. 11 S., R. 11 W.

Oi—2 inches to 0; needles, leaves, twigs, and moss.

E—0 to 3 inches; dark grayish brown (10YR 4/2) fine sandy loam, grayish brown (10YR 5/2) dry; weak medium and fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine irregular pores; moderately acid (pH 5.6); abrupt wavy boundary.

Bs1—3 to 12 inches; dark brown (7.5YR 3/4) loam, brown (7.5YR 4/4) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine irregular pores; about 5 percent very firm 2- to 10-millimeter nodules; strongly acid (pH 5.2); clear wavy boundary.

Bs2—12 to 28 inches; brown (7.5YR 4/4) loam, light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) dry; moderate fine and very fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular and irregular pores; about 25 percent very hard 2- to 10-millimeter nodules; strongly acid (pH 5.4); abrupt wavy boundary.

Bsm—28 to 45 inches; yellowish brown (10YR 5/4, 5/6), moderately cemented bands of loamy fine sand that has reddish brown (5YR 4/3) rinds or coatings; light yellowish brown (10YR 6/4) and very pale brown (10YR 7/3) dry; brown (7.5YR 4/4) loamy material in fractures; massive and fractured; very firm and extremely firm; few very fine roots in fractures; few very fine tubular and irregular pores; strongly acid (pH 5.4); clear wavy boundary.

C—45 to 60 inches; dark yellowish brown (10YR 4/4, 4/6) loamy fine sand, light yellowish brown (10YR 6/4) and yellow (10YR 7/6) dry; massive or single grain with weakly cemented lenses; brittle to loose; moderately acid (pH 5.6).

The mean annual soil temperature is 50 to 52 degrees F. Depth to the cemented Bsm horizon is 20 to 36 inches.

The E horizon has value of 3 or 4 when moist and 5 or 6 when dry and chroma of 1 or 2 when moist or dry.

The Bs horizon has hue of 5YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is sandy loam or loam. It has 5 to 30 percent 2- to 20-millimeter nodules and 5 to 15 percent clay.

The Bsm horizon has hue of 5YR to 10YR, value of 4 to 6 when moist and 4 to 7 when dry, and chroma of 3 to 8 when moist or dry. It is weakly cemented to strongly cemented.

The C horizon has hue of 7.5YR or 10YR, value of 4 or 5 when moist and 6 to 8 when dry, and chroma of 2 to 6 when moist or dry. It is fine sand to loam. It has 5 to 18 percent clay.

Bentilla Series

The Bentilla series consists of deep, moderately well drained soils that formed in fine textured alluvium. These soils are on terraces. Slopes are 3 to 12 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Bentilla silty clay loam, 3 to 12

percent slopes, at an elevation of about 150 feet, about 500 feet south and 600 feet east of the northwest corner of sec. 21, T. 9 S., R. 10 W.

Oi—2 inches to 0; needles, leaves, roots, twigs, and moss.
A1—0 to 3 inches; very dark brown (10YR 2/2) silty clay loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular pores; very strongly acid (pH 4.6); clear smooth boundary.
A2—3 to 9 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 4/3) dry; moderate very fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.
AB—9 to 16 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); abrupt wavy boundary.
Bt1—16 to 28 inches; brown (10YR 4/3) silty clay, light yellowish brown (10YR 6/4) dry; moderate fine and very fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores; few faint clay films on faces of peds and in pores; very strongly acid (pH 4.6); clear smooth boundary.
Bt2—28 to 40 inches; yellowish brown (10YR 5/4) clay, very pale brown (10YR 7/4) dry; many fine and very fine distinct light brownish gray (10YR 6/2) and strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; extremely acid (pH 4.4); gradual smooth boundary.
Bt3—40 to 51 inches; light brownish gray (10YR 6/2) silty clay, light gray (10YR 7/2) dry; many fine prominent strong brown (7.5YR 5/8) mottles; weak fine prismatic structure parting to moderate fine angular blocky; common very fine tubular pores; many distinct clay films on faces of peds and in pores; extremely acid (pH 4.4); clear smooth boundary.
BCtg—51 to 60 inches; gray (10YR 6/1) clay, light gray (10YR 7/1) dry; many fine and medium strong brown (7.5YR 5/8, 4/6) mottles; weak coarse angular blocky structure parting to moderate medium and fine angular blocky; common very fine tubular pores; common faint clay films on faces of peds and in pores; extremely acid (pH 4.4).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick.

The A and AB horizons have value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry.

The Bt horizon has value of 4 to 6 when moist and 5 to 7 when dry and chroma of 2 to 4 when moist or dry. It is silty clay or clay. It has 40 to 60 percent clay.

The BCtg horizon has hue of 10YR or 2.5Y, value of 6 or 7 when moist or dry, and chroma of 1 or 2 when moist or dry. It is silty clay loam, silty clay, or clay. It has 35 to 60 percent clay.

Blachly Series

The Blachly series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on broad ridges, benches, and side slopes in mountainous areas. Slopes are 5 to 50 percent. The mean annual precipitation is about 90 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Blachly silty clay loam, 5 to 35 percent slopes, on a 5 percent, south-facing slope on a ridge east of Bentilla Creek Road, about 1 mile north of Siletz-Logsden Highway, at an elevation of about 600 feet, SW¼NW¼ sec. 31, T. 9 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, twigs, and moss.
A—0 to 8 inches; dark reddish brown (5YR 3/2) silty clay loam, reddish brown (5YR 4/3) dry; strong fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; very strongly acid (pH 5.5); clear wavy boundary.
AB—8 to 21 inches; dark reddish brown (5YR 3/4) silty clay loam, reddish brown (5YR 4/4) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, sticky and plastic; many very fine and common fine roots; many very fine tubular and irregular pores; strongly acid (pH 5.2); clear wavy boundary.
Bw1—21 to 38 inches; reddish brown (5YR 4/4) silty clay, reddish brown (5YR 5/4) dry; moderate fine and very fine subangular blocky structure; hard, firm, very sticky and very plastic; common fine and very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual wavy boundary.
Bw2—38 to 50 inches; yellowish red (5YR 4/6) clay, yellowish red (5YR 5/6) dry; moderate very fine subangular blocky structure; hard, firm, very sticky

and very plastic; few fine roots; many very fine tubular pores; about 10 percent soft sandstone fragments; very strongly acid (pH 4.8); clear wavy boundary.

BC—50 to 60 inches; strong brown (7.5YR 4/6) clay, strong brown (7.5YR 5/6) dry; weak fine subangular blocky structure; hard, firm, very sticky and very plastic; many very fine tubular pores; about 20 percent soft sandstone fragments; very strongly acid (pH 4.6).

The mean annual soil temperature is 48 to 52 degrees F. The depth to bedrock is more than 60 inches.

The A horizon has hue of 7.5YR, 5YR, or 2.5YR, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 2 to 4 when moist.

The Bw horizon has hue of 5YR or 2.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay or clay. It has 0 to 15 percent soft rock fragments and 40 to 50 percent clay.

The BC horizon has hue of 7.5YR or 5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 4 to 8 when moist or dry. It is silty clay or clay. It has 0 to 40 percent soft rock fragments and 40 to 50 percent clay.

Bohannon Series

The Bohannon series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on narrow ridges, slump benches, and side slopes in mountainous areas. Slopes are 5 to 90 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Bohannon gravelly loam, in an area of Preacher-Bohannon complex, 5 to 35 percent slopes, on a 10 percent, west-facing slope, at an elevation of about 1,500 feet, SE¼NE¼ sec. 2, T. 8 S., R. 9 W.

Oi—1 inch to 0; needles, twigs, and moss.

A1—0 to 2 inches; very dark brown (10YR 2/2) gravelly loam, dark brown (10YR 4/3) dry; strong very fine granular structure; soft, very friable, nonsticky and nonplastic; weakly smeary; common fine roots; many fine irregular pores; about 15 percent gravel; very strongly acid (pH 5.0); clear smooth boundary.

A2—2 to 5 inches; dark brown (10YR 3/3) gravelly loam, brown (10YR 5/3) dry; strong very fine subangular blocky and granular structure; soft, very friable, nonsticky and slightly plastic; weakly smeary; common fine roots; many fine and very fine irregular pores; about 15 percent gravel and 3 percent cobbles; very strongly acid (pH 4.9); clear smooth boundary.

A3—5 to 16 inches; dark brown (7.5YR 3/3) gravelly loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine roots; many fine irregular and tubular pores; about 15 percent gravel and 5 percent cobbles; very strongly acid (pH 4.9); clear wavy boundary.

Bw—16 to 31 inches; dark yellowish brown (10YR 4/4) gravelly loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; firm, friable, slightly sticky and slightly plastic; few fine roots; many fine tubular pores; about 20 percent gravel and 10 percent cobbles; strongly acid (pH 5.2); clear wavy boundary.

Cr—31 inches; fractured, partially weathered sandstone.

The mean annual soil temperature is 48 to 52 degrees F. The umbric epipedon is 7 to 18 inches thick. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. It has 15 to 25 percent gravel and 0 to 5 percent cobbles.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 3 or 4 when moist or dry. It is gravelly loam, cobbly loam, or cobbly clay loam. It has 20 to 35 percent gravel and cobbles and 18 to 30 percent clay.

Brallier Series

The Brallier series consists of deep, very poorly drained, organic soils that formed in partially decomposed herbaceous plant material. These soils are on tide-influenced flood plains. Slopes are 0 to 1 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Brallier mucky peat, 0 to 1 percent slopes, about 150 feet north of Beaver Creek, 50 feet south of Beaver Creek Road, about 25 feet west of an access road in an area of natural vegetation, at an elevation of about 9 feet, SW¼NW¼ sec. 20, T. 12 S., R. 11 W.

Oe1—0 to 4 inches; mucky peat, dark brown (7.5YR 3/2) broken face, rubbed, and pressed; about 75 percent fibers, 20 percent rubbed; many very fine, fine, and medium roots; moderately acid (pH 6.0); gradual smooth boundary.

Oe2—4 to 10 inches; mucky peat, dark brown (7.5YR 3/3) broken face, dark brown (10YR 3/3) rubbed and pressed; about 60 percent fibers, 15 percent

rubbed; many very fine, fine, and medium roots; neutral (pH 6.6); gradual smooth boundary.
Oe3—10 to 42 inches; mucky peat, dark brown (10YR 3/3) broken face, very dark brown (10YR 2/2) rubbed and pressed; about 80 percent fibers, 20 percent rubbed; many very fine roots; neutral (pH 6.8); gradual smooth boundary.
Oa—42 to 60 inches; muck, dark brown (10YR 3/3) broken face, very dark brown (10YR 2/2) rubbed and pressed; about 5 percent fibers unrubbed and rubbed; many very fine roots; neutral (pH 7.2).

The mean annual soil temperature is 49 to 52 degrees F. Reaction is moderately acid to neutral throughout the profile.

The surface tier has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3 when moist, and chroma of 1 to 3 when moist, before and after rubbing. The content of fibers ranges from 55 to 80 percent before rubbing and from 10 to 40 percent after rubbing.

The subsurface tier has hue of 5YR, 7.5YR, or 10YR. Before rubbing, it has value of 3 and chroma of 3 or 4 when moist. After rubbing, it has value of 2 or 3 and chroma of 2 when moist. The content of fibers ranges from 60 to 90 percent before rubbing and from 15 to 40 percent after rubbing.

The bottom tier has hue of 7.5YR or 10YR. Before rubbing, it has value of 3 and chroma of 2 to 4 when moist. After rubbing, it has value of 2 or 3 and chroma of 2 when moist. The content of fibers ranges from 5 to 15 percent before and after rubbing.

The Brallier soils in this survey area are a taxadjunct to the series because they are in an unprotected area and therefore have a pH of 4.5 or more in 0.01M calcium chloride. This difference, however, does not significantly affect the use and management of the soils.

Brenner Series

The Brenner series consists of deep, poorly drained soils that formed in silty and clayey recent alluvium. These soils are in depressional areas or backswamps on flood plains. Slopes are 0 to 2 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Brenner silt loam, 0 to 2 percent slopes, south of Thiel Creek, about 200 feet east of Highway 101, SW¼NE¼ sec. 6, T. 12 S., R. 11 W.

A—0 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; few fine distinct (7.5YR 4/6) strong brown mottles in the lower part; moderate fine subangular blocky structure parting to very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular and tubular pores; strongly acid (pH 5.4); clear wavy boundary.
Bg—14 to 34 inches; dark grayish brown (10YR 4/2) silty clay loam, grayish brown (10YR 5/2) dry; many fine prominent strong brown (7.5YR 4/6) and distinct gray (10YR 6/1) mottles; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common fine and very fine roots; many fine and very fine tubular pores; very strongly acid (pH 4.8); clear wavy boundary.
BCg—34 to 60 inches; gray (10YR 5/1) and grayish brown (10YR 5/2) silty clay, light gray (10YR 7/1) dry; prominent strong brown (7.5YR 5/6) mottles and stains along root channels and on faces of some peds; weak medium subangular blocky structure; very hard, very firm, very sticky and plastic; few fine and very fine tubular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 14 inches thick.

The A or Ap horizon, if it occurs, has hue of 10YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bg horizon has hue of 10YR or 2.5Y, value of 4 or 5 when moist and 5 to 7 when dry, and chroma of 1 or 2 when moist or dry. It is silty clay loam or silt loam. It has 18 to 30 percent clay.

The BCg horizon has hue of 10YR or 2.5Y, value of 3 to 5 when moist and 4 to 7 when dry, and chroma of 2 to neutral when moist or dry. It is silty clay loam or silty clay. It has 27 to 50 percent clay.

Caterl Series

The Caterl series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridges and side slopes in mountainous areas. Slopes are 5 to 65 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 45 degrees F.

Typical pedon of Caterl gravelly loam, in an area of Murtip-Caterl complex, 35 to 60 percent slopes, on a 55 percent, northeast-facing slope about 100 feet southwest of the road on Big Tip Mountain, at an elevation of about 2,200 feet, NW¼SE¼ sec. 25, T. 8 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, twigs, and roots.
A1—0 to 10 inches; dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 5/3) dry; moderate very fine granular structure; slightly hard, friable, slightly

sticky and slightly plastic; weakly smeary; many very fine and fine roots; many very fine irregular pores; about 20 percent gravel and 10 percent cobbles; very strongly acid (pH 4.8); gradual wavy boundary.

A2—10 to 19 inches; dark brown (7.5YR 3/3) gravelly loam, brown (7.5YR 5/3) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine and fine roots; many very fine irregular pores; about 15 percent gravel and 10 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.

Bw—19 to 43 inches; brown (7.5YR 4/4) very gravelly loam, brown (7.5YR 5/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine and medium roots; many very fine irregular pores; about 35 percent gravel and 10 percent cobbles; very strongly acid (pH 5.0); clear wavy boundary.

BC—43 to 58 inches; brown (7.5YR 4/4) extremely gravelly loam, strong brown (7.5YR 5/6) dry; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine irregular pores; about 55 percent gravel and 10 percent cobbles; strongly acid (pH 5.2); abrupt irregular boundary.

R—58 inches; fractured basalt.

The mean annual soil temperature is 44 to 46 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to bedrock is 40 to 60 inches.

The A horizon has hue of 7.5YR or 5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist and 3 or 4 when dry. It has 15 to 30 percent gravel and 0 to 10 percent cobbles.

The Bw horizon has hue of 7.5YR or 5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 3 or 4 when moist and 4 to 6 when dry. It is gravelly or very gravelly loam. It has 15 to 45 percent gravel, 0 to 10 percent cobbles, and 12 to 27 percent clay.

The BC horizon has hue of 7.5YR or 5YR, value of 4 or 5 when moist or dry, and chroma of 4 to 6 when moist or dry. It is extremely gravelly or extremely cobbly loam. It has 30 to 75 percent gravel, 0 to 30 percent cobbles, 0 to 10 percent stones, and 12 to 27 percent clay.

Chitwood Series

The Chitwood series consists of deep, somewhat poorly drained soils that formed in fine textured alluvium. These soils are on terraces along the major streams. Slopes are 0 to 7 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Chitwood silt loam, 0 to 7 percent slopes, at an elevation of about 180 feet, about 700 feet north and 1,500 feet east of the southeast corner of sec. 8, T. 10 S., R. 10 W.

Oi—3 inches to 0; moss, needles, leaves, roots, and twigs.

A1—0 to 4 inches; very dark brown (10YR 2/2) silt loam, dark brown (10YR 3/3) dry; moderate very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many medium, fine, and very fine roots; many very fine irregular pores; extremely acid (pH 4.4); clear smooth boundary.

A2—4 to 15 inches; very dark brown (10YR 2/2) silt loam, dark brown (10YR 3/3) dry; weak fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many medium, fine, and very fine roots; many very fine tubular and irregular pores; extremely acid (pH 4.4); gradual wavy boundary.

AB—15 to 19 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; common very fine distinct dark yellowish brown (10YR 4/6) and yellowish brown (10YR 5/6) mottles; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 4.6); clear wavy boundary.

Bw1—19 to 25 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; many fine and very fine distinct yellowish brown (10YR 5/6) and dark yellowish brown (10YR 4/6) mottles; moderate fine and very fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; common dark brown (10YR 3/3) organic stains on faces of peds; extremely acid (pH 4.4); clear wavy boundary.

Bw2—25 to 35 inches; brown (10YR 5/3) silty clay, pale brown (10YR 6/3) dry; many fine and very fine prominent strong brown (7.5YR 4/6) and distinct light brownish gray (10YR 6/2) mottles; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores; common brown (10YR 4/3) organic stains on faces of peds and in pores; extremely acid (pH 4.4); gradual smooth boundary.

Bw3—35 to 45 inches; light yellowish brown (10YR 6/4) silty clay, very pale brown (10YR 7/3) dry; many

medium and fine prominent strong brown (7.5YR 5/6, 5/8) and distinct light brownish gray (10YR 6/2) mottles; moderate fine and very fine angular blocky structure; very hard, very firm, very sticky and very plastic; many very fine tubular pores; extremely acid (pH 4.4); gradual smooth boundary.

C—45 to 60 inches; light brownish gray (2.5Y 6/2) silty clay loam, light gray (10YR 7/1) dry; common fine and very fine prominent yellowish brown (10YR 5/6) mottles; massive; very hard, firm, sticky and plastic; many very fine tubular pores; extremely acid (pH 4.4).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick.

The A and AB horizons have value of 2 or 3 when moist and 3 to 5 when dry and chroma of 2 or 3 when moist or dry.

The Bw horizon has value of 3 to 6 when moist and 4 to 7 when dry and chroma of 3 or 4 when moist or dry. It is silty clay or silty clay loam. It has 35 to 45 percent clay.

The C horizon has hue of 10YR or 2.5Y, value of 5 to 7 when moist or dry, and chroma of 1 or 2 when moist or dry. It is silty clay or silty clay loam. It has 35 to 45 percent clay.

Coquille Series

The Coquille series consists of deep, very poorly drained soils that formed in silty recent alluvium. These soils are on tide-influenced flood plains. Slopes are 0 to 1 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Coquille silt loam, 0 to 1 percent slopes, on a tidal flat west of McCaffery Slough, NW¼SW¼ sec. 34, T. 11 S., R. 11 W.

A—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular pores; neutral (pH 6.6); clear smooth boundary.

C1—7 to 15 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; common very fine faint dark yellowish brown (10YR 4/4) mottles and few fine prominent reddish brown (5YR 4/4) stains on faces of peds; weak very fine subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; many fine irregular and very fine tubular pores; slightly acid (pH 6.4); clear wavy boundary.

C2—15 to 24 inches; dark grayish brown (10YR 4/2) silty clay loam, light gray (10YR 7/2) dry; many prominent dark red (2.5YR 3/6) and dark reddish brown (5YR 3/4) stains along root channels and on faces of some peds; weak fine subangular blocky structure; hard, firm, sticky and plastic; common fine and very fine roots; common very fine tubular pores; slightly acid (pH 6.2); abrupt wavy boundary.

2Cg1—24 to 44 inches; dark gray (10YR 4/1) silty clay loam, gray (10YR 6/1) dry; many prominent strong brown (7.5YR 4/6) and dark red (2.5YR 3/6) stains; massive; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; neutral (pH 6.6); abrupt smooth boundary.

2Cg2—44 to 60 inches; dark gray (5Y 4/1) silt loam, light brownish gray (2.5Y 6/2) dry; massive; hard, firm, slightly sticky and slightly plastic; common thin lenses of sulfidic-smelling peat; neutral (pH 6.8).

The mean annual soil temperature is 49 to 52 degrees F. Under natural conditions, reaction is moderately acid to neutral throughout the profile. In areas that have been diked and drained, it generally is extremely acid to very strongly acid but may be strongly acid or medium acid below a depth of 40 inches.

The A horizon has hue of 2.5Y or 10YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 1 or 2 when moist or dry.

The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 or 4 when moist and 6 or 7 when dry, and chroma of 2 when moist or dry. It is silt loam or silty clay loam. It has 25 to 35 percent clay.

The 2Cg horizon has hue of 2.5Y or 5Y, value of 3 or 4 when moist and 6 or 7 when dry, and chroma of 1 or less when moist and 2 or less when dry. It is silt loam or silty clay loam. It has 25 to 35 percent clay.

Depoe Series

The Depoe series consists of poorly drained soils that formed in stratified marine sediments. These soils are shallow to an ortstein pan. They are in depressional areas on marine terraces. Slopes are 0 to 7 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Depoe loam, 0 to 7 percent slopes, 2.25 miles due north of Waldport, Oregon, and about 25 feet north of a gravel road, NW¼SW¼SW¼ sec. 5, T. 13 S., R. 11 W.

Oi—4 inches to 0; partially decomposed leaves, needles, twigs, cones, and moss having many fine and very fine roots.

A—0 to 4 inches; very dark grayish brown (10YR 3/2) and dark grayish brown (10YR 4/2) loam, grayish brown (10YR 5/2) and light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure or massive; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.

E1—4 to 9 inches; dark gray (10YR 4/1) sandy loam, light gray (10YR 7/1) dry; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; common very fine tubular pores; few weakly cemented nodules; very strongly acid (pH 4.6); clear wavy boundary.

E2—9 to 16 inches; grayish brown (2.5Y 5/2) loam, light gray (2.5Y 7/2) dry; common medium prominent light olive brown (2.5Y 5/6) mottles; massive; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; common firm nodules; very strongly acid (pH 4.8); abrupt wavy boundary.

2Bsm—16 to 21 inches; brownish yellow (10YR 6/6, 6/8), strongly cemented fine sand that has thin dark red (2.5YR 3/6) and red (2.5YR 4/6) bands or seams; light gray (10YR 7/2) and yellowish red (5YR 5/6, 5/8) dry; massive; extremely hard, extremely firm, nonsticky and nonplastic; few very fine tubular pores; strongly acid (pH 5.2); abrupt wavy boundary.

2BCsm—21 to 48 inches; brownish yellow (10YR 6/6), moderately cemented fine sand that has strongly cemented yellowish red (5YR 4/6) irregular bands; very pale brown (10YR 7/3, 7/4) and strong brown (7.5YR 5/8) dry; massive; hard and extremely hard, extremely firm, nonsticky and nonplastic; few very fine tubular pores; moderately acid (pH 5.6); abrupt wavy boundary.

2C—48 to 60 inches; light gray (10YR 7/1) fine sand that has thin strong brown (7.5YR 5/8) layers or bands; white (10YR 8/1) dry; massive; slightly hard, friable, nonsticky and nonplastic; thin, weakly cemented, intermittent bands or nodules; common very fine irregular and tubular pores; moderately acid (pH 5.6).

The mean annual soil temperature is 50 to 52 degrees F. Depth to the ortstein layer is 12 to 20 inches.

The A horizon has hue of 10YR, value of 2 to 4 when moist and 5 or 6 when dry, and chroma of 1 to 3 when moist or dry.

The E horizon has hue of 10YR, value of 4 or 5 when moist and 6 to 8 when dry, and chroma of 1 or 2 when moist or dry. It is loam or sandy loam. It has 15 to 27 percent clay.

The 2Bsm and 2BCsm horizons are variegated and have hue of 10YR to 2.5YR, value of 3 to 6 when moist and 5 to 7 when dry, and chroma of 3 to 8 when moist and 2 to 8 when dry. They are loamy sand or sand. They are moderately cemented or strongly cemented.

The 2C horizon is variegated and has hue of 10YR and 7.5YR, value of 3 to 7 when moist and 5 to 8 when dry, and chroma of 1 to 8 when moist or dry. It is loamy fine sand, fine sand, or sand that is weakly stratified in some areas and has intermittent cemented lenses. It has 1 to 5 percent clay.

Eilertsen Series

The Eilertsen series consists of deep, well drained soils that formed in silty alluvium. These soils are on stream terraces. Slopes are 0 to 5 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Eilertsen silt loam, 0 to 5 percent slopes, on a low terrace west of the bridge across Little Rock Creek, at an elevation of about 380 feet, SE¼SE¼ sec. 15, T. 10 S., R. 8 W.

Ap—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular and tubular pores; very strongly acid (pH 5.0); abrupt smooth boundary.

A—7 to 13 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 5.0); clear smooth boundary.

Bt1—13 to 22 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and plastic; few faint clay films on faces of peds; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.

Bt2—22 to 34 inches; yellowish brown (10YR 5/4) silty clay loam, very pale brown (10YR 7/4) dry; moderate medium and fine subangular blocky structure; hard, firm, slightly sticky and plastic; few faint clay films on faces of peds and in pores; few very fine roots; many very fine tubular pores; very strongly acid (pH 4.5); gradual smooth boundary.

Bt3—34 to 44 inches; yellowish brown (10YR 5/4) silty clay loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; very hard, firm,

sticky and plastic; few faint clay films on faces of peds and in pores; few very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); gradual smooth boundary.

2BC—44 to 51 inches; yellowish brown (10YR 5/4) silt loam, pale brown (10YR 6/3) dry; common medium and fine prominent strong brown (7.5YR 5/8) and distinct very pale brown (10YR 7/3) and dark brown (7.5YR 4/4) mottles; weak fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; common very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.

2C—51 to 60 inches; yellowish brown (10YR 5/4) silt loam, light yellowish brown (10YR 6/4) dry; many fine prominent yellowish red (5YR 4/6), strong brown (7.5YR 5/6), and light gray (10YR 7/2) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 53 degrees F. The umbric epipedon is 10 to 20 inches thick.

The Ap and A horizons have value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry.

The Bt horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 3 to 6 when moist or dry. It is silt loam or silty clay loam. It has 18 to 35 percent clay.

The 2BC and 2C horizons have value of 4 or 5 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist or dry. They are loam or silt loam. They have 18 to 25 percent clay.

Elsie Series

The Elsie series consists of deep, well drained soils that formed in silty alluvium. These soils are on terraces. Slopes are 3 to 12 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Elsie silt loam, 3 to 12 percent slopes, on a high terrace about 0.5 mile west of Harlan and east of Grant Ridge Road, on a 10 percent, northwest-facing slope, at an elevation of about 350 feet, NW¼SE¼ sec. 7, T. 12 S., R. 8 W.

Ap—0 to 10 inches; very dark brown (10YR 2/2) silt loam, brown (10YR 5/3) dry; moderate very fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; strongly acid (pH 5.4); abrupt smooth boundary.

A—10 to 21 inches; very dark brown (10YR 2/2) silt loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular pores; strongly acid (pH 5.2); clear smooth boundary.

Bt1—21 to 35 inches; dark brown (7.5YR 4/4) silty clay loam, yellowish brown (10YR 5/4) dry; moderate fine and very fine subangular blocky structure; hard, friable, sticky and plastic; common fine and very fine roots; many very fine irregular and tubular pores; few faint clay films on faces of peds; very strongly acid (pH 4.6); clear wavy boundary.

Bt2—35 to 47 inches; strong brown (7.5YR 4/6) silty clay loam, light yellowish brown (10YR 6/4) dry; moderate fine and very fine subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; many very fine irregular and few very fine tubular pores; few faint clay films on faces of peds; many krotovinas filled with friable soil material from the upper horizons; about 10 percent soft sandstone gravel; extremely acid (pH 4.4); clear wavy boundary.

BC—47 to 60 inches; strong brown (7.5YR 5/6) loam, light yellowish brown (10YR 6/4) dry; weak medium subangular blocky structure; very hard, firm, sticky and slightly plastic; many very fine irregular and few very fine tubular pores; extremely acid (pH 4.2).

The mean annual soil temperature is 50 to 53 degrees F. The umbric epipedon is 20 to 30 inches thick.

The Ap and A horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 2 or 3 when moist or dry.

The Bt horizon has hue of 10YR or 7.5YR, value of 3 to 5 when moist and 5 or 6 when dry, and chroma of 3 to 6 when moist or dry. It is silt loam or silty clay loam. It has 22 to 30 percent clay.

The BC horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 4 or 5 when moist or dry. It is loam or silt loam. It has 18 to 27 percent clay.

Euchre Series

The Euchre series consists of deep, somewhat poorly drained soils that formed in silty and loamy alluvium. These soils are in depressional areas on stream terraces. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Euchre silt loam, 0 to 3 percent slopes, about 350 feet east of Highway 229 and about

150 feet south of Huhtala Road, NE¼ sec. 28, T. 9 S., R. 10 W.

A1—0 to 5 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate fine and very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine roots; many very fine irregular pores; extremely acid (pH 4.4); clear smooth boundary.

A2—5 to 15 inches; black (10YR 2/1) silt loam, dark brown (10YR 3/3) dry; weak fine subangular blocky structure parting to moderate very fine subangular and granular; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine roots; many very fine irregular pores; very strongly acid (pH 4.6); clear wavy boundary.

2Bw—15 to 25 inches; dark yellowish brown (10YR 4/4) clay loam, light yellowish brown (10YR 6/4) dry; many fine and very fine distinct strong brown (7.5YR 4/6) and dark grayish brown (10YR 4/2) mottles; moderate fine and very fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; common dark brown organic coatings on peds and in pores; about 10 percent fine and medium concretions; extremely acid (pH 4.4); clear wavy boundary.

2C1—25 to 32 inches; brown (10YR 4/3) and dark yellowish brown (10YR 4/4) fine sandy loam, light yellowish brown (10YR 6/4) and brownish yellow (10YR 6/6) dry; many distinct fine and very fine dark reddish brown (5YR 3/4), strong brown (7.5YR 4/6), and dark grayish brown (10YR 4/2) mottles; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine irregular and tubular pores; about 10 percent medium and coarse concretions; very strongly acid (pH 4.6); clear wavy boundary.

2C2—32 to 36 inches; yellowish brown (10YR 5/4) clay loam, very pale brown (10YR 7/4) dry; many fine and very fine distinct gray (10YR 5/1), dark gray (10YR 4/1), and strong brown (7.5YR 4/6) mottles; massive; hard, friable, slightly sticky and slightly plastic; many very fine tubular and irregular pores; very strongly acid (pH 4.8); clear wavy boundary.

3C—36 to 60 inches; dark brown (7.5YR 3/2, 3/4) sandy loam, brown (7.5YR 4/4) and strong brown (7.5YR 4/6) dry; massive; slightly hard, very friable, nonsticky and nonplastic; many very fine irregular pores; about 5 percent weathered gravel; strongly acid (pH 5.4).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick.

The A horizon has value of 2 or 3 when moist and 3 to 5 when dry and chroma of 1 to 3 when moist or dry. It has 0 to 15 percent gravel.

The 2Bw horizon has value of 4 or 5 when moist and 5 or 6 when dry and chroma of 4 to 6 when moist or dry. It is silty clay loam or clay loam. It has 0 to 15 percent gravel and 27 to 35 percent clay.

The 2C horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 3 to 6 when moist or dry. It is fine sandy loam or clay loam. It has 0 to 15 percent gravel and 10 to 35 percent clay.

The 3C horizon has hue of 7.5YR or 10YR, value of 3 to 5 when moist and 4 to 7 when dry, and chroma of 2 to 6 when moist or dry. It is sandy loam, loamy sand, or gravelly loamy sand. It has 0 to 35 percent gravel, 0 to 15 percent soft rock fragments, and 3 to 10 percent clay.

Fendall Series

The Fendall series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on the broad tops and side slopes of hilly uplands. Slopes are 3 to 60 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Fendall silt loam, in an area of Templeton-Fendall silt loams, 5 to 35 percent slopes, on a ridge about 2 miles east of Highway 101 on a 15 percent, southwest-facing slope, at an elevation of about 450 feet, SW¼SW¼ sec. 9, T. 12 S., R. 11 W.

Oi—2 inches to 0; needles, leaves, twigs, and moss.

A—0 to 5 inches; very dark brown (7.5YR 2/2) silt loam, brown (7.5YR 4/2) dry; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; strongly acid (pH 5.5); clear wavy boundary.

AB—5 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; strong very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and plastic; many very fine roots; many very fine tubular and irregular pores; strongly acid (pH 5.4); clear wavy boundary.

Bw1—16 to 27 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; moderate fine subangular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots; many very fine tubular pores; about 5 percent soft siltstone fragments; very strongly acid (pH 5.0); gradual wavy boundary.

Bw2—27 to 38 inches; dark yellowish brown (10YR 4/4) silty clay, light yellowish brown (10YR 6/4) dry; moderate fine subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores; about 10 percent soft siltstone fragments; very strongly acid (pH 4.8); abrupt wavy boundary.
Cr—38 inches; fractured, partially weathered siltstone.

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to weathered bedrock is 20 to 40 inches.

The A and AB horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 1 to 3 when moist or dry.

The Bw horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 3 to 6 when moist or dry. It is silty clay loam, clay, or silty clay. It has 0 to 50 percent soft rock fragments and 30 to 50 percent clay.

Fluvaquents

Fluvaquents consist of deep, poorly drained soils that formed in medium textured and moderately fine textured recent alluvium. These soils are in depressional areas on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Reference pedon of Fluvaquents, in an area of Nekoma-Fluvaquents complex, 0 to 3 percent slopes, about 2.75 miles north of Salado, along Deer Creek,, SW¼NW¼ sec. 27, T. 11 S., R. 9 W.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores; strongly acid (pH 5.4); clear smooth boundary.
C1—6 to 24 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; many fine prominent strong brown (7.5YR 4/6) and few fine distinct gray (10YR 6/1) mottles; massive; hard, firm, sticky and slightly plastic; common very fine roots; many very fine tubular pores; moderately acid (pH 5.6); abrupt smooth boundary.
2C2—24 to 37 inches; dark grayish brown (10YR 4/2) fine sandy loam, light gray (10YR 7/2) dry; many fine distinct dark brown (7.5YR 3/4) and prominent strong brown (7.5YR 4/6) mottles; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; moderately acid (pH 5.8); clear smooth boundary.
2C3—37 to 45 inches; dark grayish brown (10YR 4/2) loam, light gray (10YR 7/2) dry; many fine prominent strong brown (7.5YR 4/6) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; moderately acid (pH 5.8); clear smooth boundary.
2C4—45 to 60 inches; dark grayish brown (2.5Y 4/2) sandy loam, light brownish gray (2.5Y 6/2) dry; many fine prominent strong brown (7.5YR 4/6) mottles; massive; soft, very friable, nonsticky and nonplastic; many very fine irregular pores; moderately acid (pH 5.8).

The A horizon has value of 2 to 4 when moist and 5 or 6 when dry and chroma of 1 or 2 when moist or dry. It is silty clay loam to sandy loam. It has 0 to 30 percent gravel.

The C and 2C horizons have hue of 10YR, 2.5Y, or 5Y, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of neutral to 2 when moist or dry. They are silty clay loam to sandy loam. They have 0 to 65 percent gravel and cobbles.

Formader Series

The Formader series consists of moderately deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridges and side slopes in mountainous areas. Slopes are 3 to 80 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Formader loam, in an area of Formader-Hemcross complex, 35 to 60 percent slopes, about 3 miles west of Stott Mountain on a south-facing slope, at an elevation of about 1,200 feet, about 1,950 feet south and 600 feet east of the northwest corner of sec. 32, T. 7 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, twigs, roots, and moss.
A1—0 to 11 inches; dark brown (7.5YR 3/3) loam, brown (7.5YR 4/3) dry; moderate fine subangular blocky and fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine and very fine roots; many very fine irregular pores; about 5 percent gravel and 5 percent soft rock fragments; common fine rounded iron concretions; very strongly acid (pH 4.8); gradual wavy boundary.
A2—11 to 19 inches; dark brown (7.5YR 3/3) loam, brown (7.5YR 4/4) dry; moderate very fine

subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine irregular pores; about 10 percent gravel and 5 percent soft rock fragments; common fine rounded iron concretions; very strongly acid (pH 5.0); gradual wavy boundary.

Bw—19 to 30 inches; dark brown (7.5YR 3/4) loam, brown (7.5YR 5/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and very fine roots; many very fine irregular pores; about 10 percent gravel and 20 percent soft rock fragments; strongly acid (pH 5.2); clear irregular boundary.

Cr—30 inches; fractured and weathered basic igneous rock.

The mean annual soil temperature is 47 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has hue of 10YR to 5YR when moist and 10YR or 7.5YR when dry, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 2 or 3 when moist or dry. It has 0 to 10 percent gravel and 0 to 10 percent soft rock fragments.

The Bw horizon has hue of 7.5YR or 5YR when moist and 10YR or 7.5YR when dry, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 3 or 4 when moist or dry. It is loam, clay loam, or silty clay loam. It has 5 to 30 percent gravel, 0 to 10 percent cobbles, 5 to 30 percent soft rock fragments, and 20 to 35 percent clay.

Gleneden Series

The Gleneden series consists of deep, somewhat poorly drained soils that formed in fine textured alluvium. These soils are on marine terraces. Slopes are 2 to 12 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Gleneden silty clay loam, 2 to 12 percent slopes, about 0.75 mile north of Lincoln Beach community, SE¼SE¼ sec. 21, T. 8 S., R. 11 W.

Oi—1 inch to 0; needles, twigs, small branches, leaves, and cones.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; strong fine and very fine granular structure; slightly hard, friable, sticky and plastic; many fine and very fine roots; many fine irregular pores; strongly acid (pH 5.5); clear wavy boundary.

A2—4 to 11 inches; very dark grayish brown (10YR 3/2) silty clay loam, grayish brown (10YR 5/2) dry; common prominent dark reddish brown (5YR 3/2) organic coatings; moderate fine and medium subangular blocky structure; hard, firm, sticky and plastic; many fine and very fine roots; common very fine irregular pores; strongly acid (pH 5.5); clear wavy boundary.

BA—11 to 18 inches; dark brown (10YR 3/3) silty clay, grayish brown (10YR 5/2) dry; many medium prominent reddish brown (5YR 4/4) organic coatings and strong brown (7.5YR 5/6) iron stains; moderate fine and medium subangular blocky structure; hard, very firm, sticky and very plastic; few very fine and fine tubular pores; strongly acid (pH 5.3); abrupt wavy boundary.

Bw—18 to 25 inches; brown (10YR 4/3) clay, pale brown (10YR 6/3) dry; many fine distinct dark grayish brown (10YR 4/2) and strong brown (7.5YR 5/6) mottles; moderate fine and medium subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine and fine tubular pores; strongly acid (pH 5.3); abrupt wavy boundary.

BCg—25 to 36 inches; grayish brown (10YR 5/2) clay, light brownish gray (10YR 6/2) dry; many coarse prominent strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; extremely hard, extremely firm, very sticky and very plastic; few very fine tubular pores; common medium and large dark reddish brown (5YR 3/3) stains on peds; strongly acid (pH 5.3); abrupt wavy boundary.

Cg—36 to 60 inches; light brownish gray (10YR 6/2) clay, light gray (10YR 7/2) dry; many large prominent strong brown (7.5YR 5/8) and gray (N 6/0) mottles; massive; very hard, very firm, very sticky and very plastic; strongly acid (pH 5.1).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick.

The A horizon has hue of 10YR and 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bw horizon has hue of 10YR and 2.5Y, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 3 when moist or dry. It is clay or silty clay. It has 0 to 30 percent percent soft rock fragments and 40 to 50 percent clay.

The BCg horizon has hue of 10YR and 2.5Y, value of 4 or 5 when moist and 6 or 7 when dry, and chroma of 1 or 2 when moist or dry. It has 0 to 35 percent soft rock fragments and 50 to 60 percent clay.

The Cg horizon has hue of 10YR or 2.5Y, value of 4 to 6 when moist, and chroma of 2 or less when moist or

dry. It has 0 to 35 percent soft rock fragments and 50 to 60 percent clay.

Grindbrook Series

The Grindbrook series consists of deep, moderately well drained soils that formed in silty alluvium. These soils are on terraces. Slopes are 2 to 12 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Grindbrook silt loam, 2 to 12 percent slopes, at an elevation of about 300 feet, about 75 feet north and 30 feet east of the southwest corner of sec. 31, T. 9 S., T. 9 W.

Oi—1 inch to 0; needles, leaves, twigs, and roots.
A1—0 to 8 inches; dark brown (10YR 3/3) silt loam, dark grayish brown (10YR 4/2) dry; few yellowish red (5YR 4/6) fired peds and concretions; moderate fine subangular blocky structure parting to strong fine granular; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many fine irregular pores; very strongly acid (pH 5.0); gradual wavy boundary.
A2—8 to 21 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; few yellowish red (5YR 4/6) fired peds; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 4.8); clear wavy boundary.
Bw1—21 to 31 inches; dark brown (10YR 4/3) silty clay loam, yellowish brown (10YR 5/4) dry; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); gradual wavy boundary.
Bw2—31 to 42 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; common fine prominent yellowish red (5YR 4/6, 5/8) and few fine distinct grayish brown (10YR 5/2) mottles; moderate fine and very fine subangular blocky structure; very hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.
BC—42 to 60 inches; pale brown (10YR 6/3) silty clay loam, light yellowish brown (10YR 6/4) dry; common medium prominent strong brown (7.5YR 4/6) and faint light gray (10YR 7/2) mottles; weak medium and fine subangular blocky structure; very hard, very firm, very sticky and plastic; few very fine roots; common very fine tubular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 20 to 30 inches thick.

The A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 1 to 3 when moist or dry.

The Bw1 horizon has value of 2 to 4 when moist and 3 to 5 when dry and chroma of 2 to 4 when moist or dry. It is silt loam or silty clay loam. It has 20 to 35 percent clay.

The Bw2 and BC horizons have value of 4 to 6 when moist or dry and chroma of 1 to 4 when moist or dry. They are silty clay loam, silty clay, or clay. They have 30 to 45 percent clay.

Harslow Series

The Harslow series consists of moderately deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on side slopes in mountainous areas. Slopes are 20 to 90 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 49 degrees F.

Typical pedon of Harslow very gravelly loam, in an area of Klistan-Harslow very gravelly loams, 20 to 60 percent slopes, on a 50 percent, southeast-facing slope, at an elevation of about 1,600 feet, SE¼SE¼ sec. 16, T. 8 S., R. 9 W.

Oi—1 inch to 0; needles, twigs, cones, roots, and moss.
A—0 to 10 inches; dark reddish brown (5YR 3/3) very gravelly loam, reddish brown (5YR 4/3) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 35 percent gravel and 2 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.
Bw—10 to 25 inches; reddish brown (5YR 4/4) very gravelly loam, reddish brown (5YR 5/4) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine irregular and tubular pores; about 40 percent gravel and 5 percent cobbles; very strongly acid (pH 5.0); clear wavy boundary.
BC—25 to 36 inches; dark brown (7.5YR 4/4) extremely gravelly loam, brown (7.5YR 5/4) dry; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots, many fine irregular pores; about 50 percent gravel and 15 percent cobbles; very strongly acid (pH 4.6); abrupt irregular boundary.
R—36 inches; fractured basalt.

The mean annual soil temperature is 47 to 52

degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to bedrock is 20 to 40 inches.

The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bw horizon has hue of 5YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist and 4 to 6 when dry. It is very gravelly loam or very cobbly loam. It has 20 to 50 percent gravel, 0 to 35 percent cobbles, and 20 to 27 percent clay.

The BC horizon has hue of 5YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist and 4 to 6 when dry. It is extremely gravelly or extremely cobbly loam. It has 30 to 70 percent gravel, 0 to 35 percent cobbles, and 15 to 25 percent clay.

Hebo Series

The Hebo series consists of deep, poorly drained soils that formed in fine textured alluvium. These soils are in depressional areas on terraces. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Hebo silty clay loam, 0 to 3 percent slopes, about 100 feet north of the trailer house along a gravel road and about 250 feet east of the road, at an elevation of about 110 feet, NW¼SW¼NW¼ sec. 3, T. 9 S., R. 10 W.

Oi—5 inches to 0; roots, leaves, and woody material.

A—0 to 3 inches; black (10YR 2/1) silty clay loam, dark gray (10YR 4/1) dry; few very fine faint strong brown (7.5YR 5/6) mottles; moderate fine subangular blocky structure; hard, friable, sticky and plastic; many fine and very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); abrupt wavy boundary.

BA—3 to 10 inches; very dark gray (10YR 3/1) silty clay, gray (10YR 5/1) dry; common fine distinct strong brown (7.5YR 5/8) mottles; weak medium subangular blocky structure; hard, firm, very sticky and very plastic; many fine and very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); gradual smooth boundary.

Bg1—10 to 24 inches; gray (5Y 5/1) silty clay, gray (5Y 6/1) dry; many fine prominent strong brown (7.5YR 5/6, 5/8) mottles; common dark gray coatings on faces of peds and in pores; weak coarse subangular blocky structure; very hard, very firm, very sticky and very plastic; common fine and very fine roots; common very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.

Bg2—24 to 27 inches; gray (5Y 6/1) clay, light gray (5Y 7/1) dry; common fine prominent yellowish brown (10YR 5/6, 5/8) mottles; weak fine subangular blocky structure; extremely hard, extremely firm, very sticky and very plastic; common very fine roots; common very fine tubular pores; very strongly acid (pH 4.6); clear smooth boundary.

Bg3—27 to 36 inches; gray (5Y 6/1) silty clay, light gray (5Y 7/1) dry; many fine prominent strong brown (7.5YR 5/8) mottles; weak fine and very fine subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores, very strongly acid (pH 4.6); gradual smooth boundary.

BCg—36 to 48 inches; gray (5Y 6/1) and light gray (N 7/0) clay, light gray (5Y 7/1) dry; common fine prominent yellowish brown (10YR 5/8) mottles; weak fine subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; very strongly acid (pH 4.8); clear smooth boundary.

2Cg—48 to 60 inches; light gray (N 7/0) and light brownish gray (2.5Y 6/2) clay loam, light gray (10YR 7/1) dry; common fine prominent strong brown (7.5YR 4/6) mottles; massive; hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular and irregular pores; strongly acid (pH 5.2).

The mean annual soil temperature is 50 to 52 degrees F.

The A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 1 or 2 when moist or dry.

The BA horizon, if it occurs, has hue of 10YR or 2.5Y, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 1 or 2 when moist or dry.

The Bg and BCg horizons have hue of 5Y or 2.5Y, value of 4 to 6 when moist and 5 to 7 when dry, and chroma of 1 or less when moist or dry. They are silty clay or clay. They have 40 to 60 percent clay.

The 2Cg horizon has hue of 10YR, 2.5Y, or 5Y, value of 4 to 7 when moist and 5 to 7 when dry, and chroma of 2 or less when moist and 1 or 2 when dry. It is clay loam, silty clay loam, or silty clay. It has 35 to 45 percent clay.

Hembre Series

The Hembre series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops, benches, and side slopes in mountainous areas. Slopes are 3 to 60 percent. The mean annual precipitation is about 90 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Hembre silt loam, 35 to 60 percent slopes, on a 55 percent, southwest-facing slope, at an elevation of about 850 feet, NW¼NW¼ sec. 8, T. 10 S., R. 8 W.

Oi—1 inch to 0; needles, leaves, and twigs.
A1—0 to 9 inches; dark reddish brown (5YR 3/2) silt loam, brown (7.5YR 5/3) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine and fine irregular pores; common medium rounded iron concretions and common medium rounded iron-manganese concretions; about 5 percent cobbles; strongly acid (pH 5.2); clear smooth boundary.
A2—9 to 12 inches; dark reddish brown (5YR 3/3) silt loam, brown (7.5YR 5/4) dry; moderate very fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine and fine irregular pores; few medium rounded iron concretions and few medium rounded iron-manganese concretions; about 5 percent cobbles; strongly acid (pH 5.2); gradual wavy boundary.
AB—12 to 19 inches; dark reddish brown (5YR 3/3) silt loam, brown (7.5YR 5/4) dry; moderate very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular and tubular pores; about 5 percent stones; very strongly acid (pH 5.0); gradual wavy boundary.
Bw1—19 to 36 inches; dark reddish brown (5YR 3/4) silty clay loam, yellowish red (5YR 5/6) dry; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine roots; many very fine irregular and tubular pores; about 3 percent cobbles and 2 percent stones; very strongly acid (pH 4.8); gradual wavy boundary.
Bw2—36 to 51 inches; dark reddish brown (5YR 3/4) silty clay loam, yellowish red (5YR 5/6) dry; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; few fine roots; many very fine irregular and tubular pores; about 3 percent cobbles and 2 percent stones; very strongly acid (pH 4.8); clear wavy boundary.
BC—51 to 60 inches; strong brown (7.5YR 4/6) silty clay loam, strong brown (7.5YR 5/6) and reddish yellow (7.5YR 6/6) dry; moderate very fine and fine subangular blocky structure; very hard, firm, sticky and plastic; few fine roots; common very fine irregular and tubular pores; about 5 percent cobbles; very strongly acid (pH 4.6).

The mean annual soil temperature is 48 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to bedrock is more than 60 inches.

The A and AB horizons have hue of 5YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist and 3 or 4 when dry. They have 0 to 5 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones.

The Bw horizon has hue of 5YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay loam or silt loam. It has 0 to 5 percent gravel, 0 to 5 percent cobbles, 0 to 5 percent stones, and 25 to 30 percent clay.

The BC horizon has hue of 5YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay loam, silt loam, or gravelly silty clay loam. It has 0 to 30 percent gravel, 0 to 10 percent cobbles, 0 to 10 percent stones, and 25 to 30 percent clay.

Hemcross Series

The Hemcross series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 80 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 49 degrees F.

Typical pedon of Hemcross silt loam, 35 to 60 percent slopes, 0.75 mile southeast of Cougar Mountain, on a 45 percent, southwest-facing slope, at an elevation of about 1,300 feet, NE¼SE¼SW¼ sec. 24, T. 7 S., R. 10 W.

Oi—1 inch to 0; needles, leaves, twigs, and roots.
A—0 to 15 inches; dark brown (7.5YR 3/3) silt loam, brown (7.5YR 4/4) dry; moderate fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; smeary; many very fine, fine, and medium roots; many very fine irregular pores; about 10 percent gravel; very strongly acid (pH 5.0); clear wavy boundary.
Bw1—15 to 34 inches; brown (7.5YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; weak coarse subangular blocky structure parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; smeary; many very fine and fine roots; many very fine irregular and tubular pores; about 5 percent gravel and 5 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.
Bw2—34 to 48 inches; strong brown (7.5YR 4/6) gravelly silt loam, brownish yellow (10YR 6/6) dry; weak coarse subangular blocky structure parting to moderate medium and fine subangular blocky;

slightly hard, friable, slightly sticky and slightly plastic; smeary; common fine and very fine roots; many very fine irregular and tubular pores; about 20 percent gravel and 5 percent cobbles; very strongly acid (pH 4.6); clear wavy boundary.

2BC—48 to 60 inches; strong brown (7.5YR 4/6) very gravelly loam, reddish yellow (7.5YR 6/6) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine roots; many very fine irregular and tubular pores; about 30 percent gravel and 10 percent cobbles; very strongly acid (pH 4.8).

The mean annual soil temperature is 48 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to bedrock is more than 60 inches.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist and 2 to 4 when dry. It has 0 to 15 percent basalt gravel.

The Bw horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 4 to 6 when moist or dry. It is silt loam, loam, or gravelly loam. It has 5 to 25 percent gravel, 0 to 5 percent cobbles, and 18 to 27 percent clay.

The 2BC horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 to 7 when dry, and chroma of 4 to 6 when moist or dry. It has 35 to 50 percent gravel, 0 to 10 percent cobbles, and 15 to 25 percent clay.

Histic Cryaquepts

Histic cryaquepts consist of deep, poorly drained soils that formed in mixed colluvium and alluvium with a surface mantle of organic matter. These soils are in broad depressions in high mountainous areas. Slopes are 0 to 3 percent. The mean annual precipitation is about 150 inches, and the mean annual air temperature is about 43 degrees F.

Reference pedon of Histic cryaquepts, 0 to 3 percent slopes, at an elevation of about 2,300 feet, SW¼NW¼ sec. 12, T. 7 S., R. 9 W.

Oe—0 to 8 inches; moderately decomposed woody material, sphagnum, and sedge peat, very dark grayish brown (10YR 3/2) broken face, dark brown (7.5YR 3/2) rubbed; about 60 percent fibers, 15 percent rubbed; massive; nonsticky and nonplastic; many fine and very fine roots; about 20 percent mineral silt and fine sand; very strongly acid (pH 4.8); clear smooth boundary.

Oa—8 to 12 inches; very dark gray (10YR 3/1) muck; about 80 percent highly decomposed organic matter; massive; slightly sticky and slightly plastic; common very fine roots; about 20 percent mineral silt; very strongly acid (pH 5.0); clear wavy boundary.

C1—12 to 16 inches; variegated strong brown (7.5YR 4/6) and grayish brown (10YR 5/2) silty clay loam; weak fine subangular blocky structure; sticky and plastic; about 5 percent fine gravel; strongly acid (pH 5.2); gradual wavy boundary.

C2—16 to 24 inches; variegated dark grayish brown (10YR 4/2), brown (10YR 4/3), dark yellowish brown (10YR 4/4), and strong brown (7.5YR 4/6) loam; weak fine subangular blocky structure; slightly sticky and slightly plastic; about 10 percent gravel; strongly acid (pH 5.4); gradual wavy boundary.

C3—24 to 36 inches; variegated pale brown (10YR 6/3), gray (10YR 5/1), brown (10YR 4/3), and yellowish red (5YR 4/6) gravelly sandy loam; massive; slightly sticky and slightly plastic; about 15 percent gravel; moderately acid (pH 5.6); clear wavy boundary.

C4—36 to 60 inches; variegated gray (10YR 6/1) and pale brown (10YR 6/3) cobbly loam; massive; firm, slightly sticky and slightly plastic; about 15 percent gravel and 10 percent cobbles; moderately acid (pH 5.6).

The histic epipedon is 8 to 16 inches thick. The depth to bedrock is more than 60 inches.

The content of rock fragments in the mineral layers is 0 to 50 percent, and the clay content is 10 to 40 percent.

Honeygrove Series

The Honeygrove series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on broad ridgetops and benches in mountainous areas. Slopes are 3 to 30 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Honeygrove silty clay loam, 3 to 30 percent slopes, on an east-facing bench with slope of 3 percent, west of Holman Creek, at an elevation of about 750 feet, NE¼SE¼ sec. 34, T. 8 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, and twigs.

A—0 to 7 inches; dark reddish brown (5YR 3/3) silty clay loam, reddish brown (5YR 4/3) dry; strong very fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common fine and very fine roots; many fine irregular pores; few fine concretions; strongly acid (pH 5.5); clear wavy boundary.

Bt1—7 to 24 inches; reddish brown (5YR 4/4) silty clay, reddish brown (5YR 5/4) dry; moderate fine and very fine subangular blocky structure; hard, firm,

very sticky and very plastic; common fine and very fine roots; many very fine tubular and irregular pores; few faint clay films on faces of peds; strongly acid (pH 5.2); clear wavy boundary.

Bt2—24 to 48 inches; yellowish red (5YR 4/6) silty clay, yellowish red (5YR 5/6) dry; moderate fine and very fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; very strongly acid (pH 5.0); gradual wavy boundary.

BCt—48 to 60 inches; yellowish red (5YR 4/6) silty clay, yellowish red (5YR 5/6) dry; weak fine subangular blocky structure; hard, firm, sticky and slightly plastic; common very fine tubular pores; few faint clay films on faces of peds; about 15 percent soft rock fragments; very strongly acid (pH 4.8).

The mean annual soil temperature is 49 to 52 degrees F. The depth to bedrock is more than 60 inches.

The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 2 to 4 when moist or dry.

The Bt horizon has hue of 2.5YR or 5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 4 to 6 when moist or dry. It is clay or silty clay. It has 0 to 25 percent soft rock fragments and 50 to 60 percent clay.

The BCt horizon has hue of 2.5YR or 5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 4 to 6 when moist or dry. It is clay or silty clay. It has 0 to 50 percent soft rock fragments and 50 to 60 percent clay.

Kilowan Series

The Kilowan series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on ridgetops, benches, and side slopes in mountainous areas. Slopes are 5 to 60 percent. The mean annual precipitation is about 90 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Kilowan clay loam, 5 to 35 percent slopes, on a 20 percent, southwest-facing slope, at an elevation of about 1,600 feet, NW¼SW¼NW¼ sec. 8, T. 9 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, and twigs.

A—0 to 8 inches; dark brown (7.5YR 3/2) clay loam, brown (7.5YR 5/2) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, sticky and slightly plastic; common fine and very fine roots; many very fine irregular pores; about 20 percent soft rock fragments; strongly acid (pH 5.2); clear wavy boundary.

Bw1—8 to 13 inches; reddish brown (5YR 4/4) clay, reddish brown (5YR 5/4) dry; moderate fine and very fine subangular blocky structure; hard, friable, very sticky and plastic; common very fine roots; many very fine tubular and irregular pores; about 10 percent soft rock fragments; strongly acid (pH 5.1); clear wavy boundary.

Bw2—13 to 27 inches; yellowish red (5YR 4/6) clay, yellowish red (5YR 5/6) dry; moderate fine subangular blocky structure; very hard, firm, very sticky and very plastic; common fine and very fine roots; many very fine tubular and irregular pores; about 10 percent soft rock fragments; very strongly acid (pH 4.8); clear wavy boundary.

BC—27 to 37 inches; yellowish red (5YR 5/6) silty clay loam, yellowish red (5YR 5/8) dry; weak fine subangular blocky structure; hard, firm, sticky and plastic; few fine and very fine roots; common fine tubular pores; about 30 percent soft rock fragments; very strongly acid (pH 4.8); abrupt irregular boundary.

Cr—37 inches; fractured and weathered sandstone.

The mean annual soil temperature is 48 to 52 degrees F. The depth to bedrock is 20 to 40 inches.

The A horizon has hue of 7.5YR or 5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 to 4 when moist and 3 to 6 when dry. It has 0 to 35 percent soft rock fragments.

The Bw horizon has hue of 5YR or 2.5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay loam, clay, or silty clay. It has 0 to 35 percent soft rock fragments and 35 to 50 percent clay.

The BC horizon has hue of 5YR or 7.5YR, value of 4 or 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist and 4 to 8 when dry. It is silty clay loam, clay, or silty clay. It has 10 to 35 percent soft rock fragments and 35 to 50 percent clay.

Kirkendall Series

The Kirkendall series consists of deep, well drained soils that formed in silty recent alluvium. These soils are on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Kirkendall silt loam, 0 to 3 percent slopes, about 100 feet south of the road and 50 feet north of Big Elk Creek, at an elevation of about 60 feet, SE¼SW¼SW¼ sec. 31, T. 12 S., R. 9 W.

A1—0 to 5 inches; very dark grayish brown (10YR 3/2)

silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky and very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular and tubular pores; strongly acid (pH 5.2); clear smooth boundary.

A2—5 to 12 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky and very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular pores; strongly acid (pH 5.2); gradual smooth boundary.

AB—12 to 17 inches; dark brown (10YR 3/3) silt loam, yellowish brown (10YR 5/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual smooth boundary.

Bw—17 to 36 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual smooth boundary.

C—36 to 60 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; very strongly acid (pH 4.8).

The mean annual soil temperature is 50 to 53 degrees F. The umbric epipedon is 10 to 20 inches thick.

The A and AB horizons have value of 2 or 3 when moist and 4 or 5 when dry and chroma generally of 2 or 3 when moist or dry. In some pedons the AB horizon has chroma of 4 when dry.

The Bw horizon has value of 3 or 4 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist or dry. It is silt loam or silty clay loam. It has 20 to 35 percent clay.

The C horizon has value of 3 to 5 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist or dry. It is loam, silt loam, or silty clay loam. It has 15 to 35 percent clay.

Klistan Series

The Klistan series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 20 to 80 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 49 degrees F.

Typical pedon of Klistan very gravelly loam, in an area of Formader-Klistan-Hemcross complex, 60 to 80 percent slopes, about 30 yards west of a rock quarry on the north fork of Mill Creek on an 80 percent, southeast-facing slope, at an elevation of about 1,000 feet, SE¼SE¼NW¼ sec. 24, T. 9 S., R. 9 W.

Oi—1/2 inch to 0; needles, leaves, twigs, roots, and moss.

A1—0 to 2 inches; black (10YR 2/1) very gravelly loam, very dark brown (10YR 2/2) dry; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine and fine irregular pores; about 35 percent gravel; very strongly acid (pH 4.8); gradual wavy boundary.

A2—2 to 10 inches; very dark brown (7.5YR 2/2) very gravelly loam, very dark grayish brown (10YR 3/2) dry; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many fine and very fine irregular pores; about 50 percent gravel; very strongly acid (pH 4.8); gradual wavy boundary.

A3—10 to 19 inches; dark brown (7.5YR 3/2) very gravelly loam, brown (10YR 4/3) dry; moderate very fine and fine granular structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine and fine irregular pores; about 50 percent gravel; very strongly acid (pH 4.8); gradual wavy boundary.

Bw1—19 to 27 inches; dark brown (7.5YR 3/4) very gravelly loam, brown (7.5YR 4/4) dry; moderate very fine and fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine and fine irregular and tubular pores; about 40 percent gravel and 5 percent cobbles; strongly acid (pH 5.2); gradual wavy boundary.

Bw2—27 to 39 inches; dark reddish brown (5YR 3/4) very gravelly loam, brown (7.5YR 5/4) dry; moderate very fine and fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine and fine irregular and tubular pores; about 40 percent gravel and 10 percent cobbles; very strongly acid (pH 5.0); clear wavy boundary.

BC—39 to 47 inches; dark brown (7.5YR 3/4) very gravelly loam, yellowish brown (10YR 5/4) dry; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine and fine irregular and tubular pores; about 45 percent gravel and 10 percent cobbles; very

strongly acid (pH 4.8); abrupt wavy boundary.
R—47 inches; fractured basalt.

The mean annual soil temperature is 47 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to bedrock is 40 to 60 inches.

The A horizon has hue of 5YR, 7.5YR, or 10YR, value of 2 or 3 when moist and 2 to 5 when dry, and chroma of 1 to 3 when moist or dry. It has 35 to 60 percent gravel and 0 to 10 percent cobbles.

The Bw and BC horizons have hue of 5YR, 7.5YR, or 10YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 when moist or dry. They are very gravelly loam or extremely gravelly loam. They have 40 to 70 percent gravel, 0 to 15 percent cobbles, and 18 to 25 percent clay.

Klootchie Series

The Klootchie series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 60 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Klootchie silt loam, in an area of Klootchie-Neotsu silt loams, 30 to 60 percent slopes, about 500 feet southeast of Forest Service Road 17, on a 40 percent, southeast-facing slope, at an elevation of about 950 feet, NE¼SE¼SW¼ sec. 31, T. 7 S., R. 10 W.

Oi—1 inch to 0; needles, leaves, twigs, roots, and moss.
A1—0 to 4 inches; dark reddish brown (5YR 3/2) silt loam, brown (7.5YR 4/3) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 5 percent gravel; very strongly acid (pH 4.8); clear smooth boundary.
A2—4 to 14 inches; dark reddish brown (5YR 3/3) silt loam, brown (7.5YR 4/3) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine and very fine roots; many very fine irregular and tubular pores; about 5 percent gravel; very strongly acid (pH 4.6); clear wavy boundary.
Bw1—14 to 29 inches; dark brown (7.5YR 3/4) silt loam, strong brown (7.5YR 4/6) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine irregular and tubular pores; about 5 percent gravel; very strongly acid (pH 4.8); gradual wavy boundary.
Bw2—29 to 44 inches; brown (7.5YR 4/4) silt loam, strong brown (7.5YR 5/6) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few medium roots; many very fine irregular and tubular pores; about 10 percent soft rock fragments and 5 percent gravel; very strongly acid (pH 4.6); gradual wavy boundary.
BC—44 to 53 inches; strong brown (7.5YR 4/6) gravelly silt loam, reddish yellow (7.5YR 6/6) dry; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few very fine roots; many very fine irregular and tubular pores; about 10 percent soft rock fragments and 20 percent gravel; extremely acid (pH 4.4); clear wavy boundary.
Cr—53 inches; fractured and partially weathered basic igneous rock.

The mean annual soil temperature is 49 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick. The depth to weathered bedrock is 40 to 60 inches.

The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. It has 5 to 15 percent gravel.

The Bw horizon has hue of 5YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is silt loam, loam, or silty clay loam. It has 5 to 15 percent gravel, 0 to 25 percent soft rock fragments, and 22 to 30 percent clay.

The BC horizon has hue of 5YR or 7.5YR, value of 4 or 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is gravelly loam, gravelly silt loam, or gravelly silty clay loam. It has 15 to 35 percent gravel, 0 to 40 percent soft rock fragments, and 20 to 30 percent clay.

Knappa Series

The Knappa series consists of deep, well drained soils that formed in silty alluvium. These soils are on terraces. Slopes are 2 to 7 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Knappa silt loam, 2 to 7 percent slopes, east of a driveway on an old terrace, at an elevation of about 250 feet, NE¼SW¼SW¼ sec. 20, T. 9 S., R. 9 W.

Ap—0 to 10 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate fine and very fine subangular blocky and granular

structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 5.0); gradual smooth boundary.

A—10 to 23 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 4.8); clear smooth boundary.

Bw1—23 to 31 inches; brown (10YR 4/3) silty clay loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; hard, firm, sticky and plastic; many very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 4.8); gradual smooth boundary.

Bw2—31 to 54 inches; dark yellowish brown (10YR 4/4) silty clay loam, light yellowish brown (10YR 6/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 4.8); gradual smooth boundary.

BC—54 to 60 inches; yellowish brown (10YR 5/6) silty clay loam, very pale brown (10YR 7/4) dry; weak very fine subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 20 to 30 inches thick. The depth to bedrock is more than 60 inches.

The Ap and A horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bw and BC horizons have hue of 10YR or 7.5YR, value of 3 to 5 when moist and 5 to 7 when dry, and chroma of 3 to 6 when moist or dry. They are silty clay loam or silt loam. They have 22 to 35 percent clay.

Laderly Series

The Laderly series consists of moderately deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 65 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 45 degrees F.

Typical pedon of Laderly gravelly loam, in an area of Laderly-Murtip complex, 3 to 30 percent slopes, at an elevation of about 2,100 feet, SE¼SE¼ sec. 6, T. 9 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, and twigs.

A1—0 to 4 inches; very dark brown (7.5YR 2/2) gravelly loam, brown (7.5YR 4/2) dry; moderate fine and very fine granular structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 25 percent gravel; very strongly acid (pH 4.8); clear wavy boundary.

A2—4 to 10 inches; dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 4/2) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine tubular and irregular pores; about 25 percent gravel; very strongly acid (pH 5.0); clear wavy boundary.

AB—10 to 18 inches; dark brown (7.5YR 3/3) gravelly loam, brown (7.5YR 5/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine tubular and irregular pores; about 30 percent gravel and 2 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.

Bw—18 to 30 inches; dark brown (7.5YR 4/4) extremely gravelly loam, strong brown (7.5YR 5/6) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine tubular and irregular pores; about 50 percent gravel and 15 percent cobbles; very strongly acid (pH 4.6); abrupt wavy boundary.

R—30 inches; fractured basalt.

The mean annual soil temperature is 44 to 46 degrees F. The umbric epipedon 10 to 20 inches thick. The depth to bedrock is 20 to 40 inches.

The A and AB horizons have hue of 10YR to 5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist or dry. They are gravelly loam or very gravelly loam. They have 20 to 50 percent gravel and 0 to 10 percent cobbles.

The Bw horizon has hue of 10YR to 5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 4 or 5 when moist and 5 or 6 when dry. It is extremely gravelly loam or extremely cobbly loam. It has 20 to 60 percent gravel, 0 to 50 percent cobbles, 0 to 15 percent stones, and 15 to 27 percent clay.

Lint Series

The Lint series consists of deep, well drained soils that formed in silty eolian and alluvial material. These soils are on high, dissected marine terraces. Slopes are 5 to 25 percent. The mean annual precipitation is about

70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Lint silt loam, 5 to 25 percent slopes, about 1 mile east of Lost Creek subdivision, on a convex southwest-facing slope of 7 percent, at an elevation of about 350 feet, SE¼SE¼NW¼ sec. 8, T. 12 S., R. 11 W.

Oi—5 to 3 inches; moss, needles, leaves, and twigs.
Oe—3 inches to 0; moderately decomposed organic matter with many fine and very fine roots.
A1—0 to 10 inches; dark brown (7.5YR 3/2) silt loam, dark brown (7.5YR 4/2) dry; strong fine granular structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many very fine irregular pores; strongly acid (pH 5.2); clear wavy boundary.
A2—10 to 19 inches; dark brown (7.5YR 3/3) silt loam, brown (7.5YR 4/3) dry, moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; few fine and very fine roots; many very fine irregular pores; strongly acid (pH 5.1); clear wavy boundary.
Bw—19 to 36 inches; dark yellowish brown (10YR 3/4) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few very fine roots; many very fine irregular and tubular pores; common krotovinas filled with soil material from the above horizons; very strongly acid (pH 5.0); clear wavy boundary.
BC—36 to 51 inches; brown (10YR 4/3) silt loam, yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; many very fine irregular and tubular pores; very strongly acid (pH 4.8); clear wavy boundary.
C—51 to 60 inches; yellowish brown (10YR 5/4) silty clay loam, very pale brown (10YR 7/4) dry; common faint very fine pale brown (10YR 6/3) mottles and prominent medium and fine white (10YR 8/2) splotches or soft nodules (possibly diatomaceous material); massive; hard, firm, sticky and plastic; common very fine tubular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bw and BC horizons have hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 to 7 when dry, and chroma of 3 or 4 when moist or dry. They are silt loam or silty clay loam. They have 15 to 30 percent clay.

The C horizon has value of 4 to 6 when moist and 6 or 7 when dry and chroma of 3 or 4 when moist or dry. It is silt loam or silty clay loam. It has 15 to 30 percent clay.

Logsden Series

The Logsden series consists of deep, well drained soils that formed in silty and stratified, loamy alluvium. These soils are on low stream terraces. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Logsden silt loam, 0 to 3 percent slopes, about 300 yards east of the confluence of Sams Creek with the Siletz River, NE¼SE¼ sec. 1, T. 10 S., R. 10 W.

Oi—1 inch to 0; leaves, twigs, needles, and moss.
A1—0 to 7 inches; very dark grayish brown (10YR 3/2) silt loam that has some very dark brown (10YR 2/2) coatings and dark brown (10YR 3/3) interiors; brown (10YR 5/3) dry; moderate fine and very fine granular structure; slightly hard, very friable, slightly sticky and plastic; many very fine roots; many very fine irregular pores; few fine concretions; very strongly acid (pH 4.6); clear smooth boundary.
A2—7 to 19 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure parting to very fine subangular blocky and fine granular; soft, friable, slightly sticky and plastic; many very fine roots; many very fine irregular pores; very strongly acid (pH 4.8); gradual smooth boundary.
Bw1—19 to 26 inches; dark brown (10YR 4/3) and dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; moderate medium subangular blocky structure parting to very fine subangular blocky; slightly hard, friable, slightly sticky and plastic; many very fine roots; many very fine tubular pores; very strongly acid (pH 5.0); clear wavy boundary.
Bw2—26 to 42 inches; dark yellowish brown (10YR 4/4, 4/6) silty clay loam, very pale brown (10YR 7/4) dry; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.
2C1—42 to 48 inches; dark yellowish brown (10YR 3/6) fine sandy loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, very friable, slightly sticky and nonplastic; few very fine roots; many very

fine tubular pores; very strongly acid (pH 4.6); clear wavy boundary.

2C2—48 to 60 inches; dark yellowish brown (10YR 3/4), stratified loamy sand and fine sandy loam, light yellowish brown (10YR 6/4) dry; massive; soft, very friable, nonsticky and nonplastic; many very fine irregular pores; extremely acid (pH 4.4).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick.

The A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry.

The Bw horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 3 to 6 when moist or dry. It is silt loam or silty clay loam. It has 20 to 35 percent clay.

The 2C horizon has value of 3 to 5 when moist and 5 or 6 when dry and chroma of 3 to 6 when moist or dry. It is commonly stratified and is loamy sand to loam. It has 5 to 20 percent clay.

McCurdy Series

The McCurdy series consists of deep, moderately well drained soils that formed in fine textured alluvium. These soils are on high terraces. Slopes are 3 to 12 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees

Typical pedon of McCurdy silt loam, 3 to 12 percent slopes, on a high terrace along the Little Rock Creek drainage, about 100 yards north of Logsden-Nashville Road and west of a dirt road, at an elevation of about 400 feet, SE¼SE¼ sec. 15, T. 10 S., R. 8 W.

A1—0 to 10 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; moderate fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular and irregular pores; strongly acid (pH 5.2); clear smooth boundary.

A2—10 to 16 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular and irregular pores; very strongly acid (pH 4.8); clear wavy boundary.

Bt1—16 to 32 inches; yellowish brown (10YR 5/6) silty clay loam, yellow (10YR 7/6) dry; weak medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, sticky and plastic; few fine and very fine roots; many very fine tubular pores; few faint clay films on faces of peds; very strongly acid (pH 4.5); gradual wavy boundary.

Bt2—32 to 46 inches; yellowish brown (10YR 5/6) silty clay, yellow (10YR 7/6) dry; many fine prominent light brownish gray (10YR 6/2) mottles; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; many very fine tubular pores; few faint clay films on faces of peds; very strongly acid (pH 4.5); abrupt wavy boundary.

C—46 to 60 inches; strong brown (7.5YR 5/8) silty clay loam, brownish yellow (10YR 6/8) dry; common fine prominent light brownish gray (10YR 6/2) and light gray (10YR 7/2) mottles; massive; hard, firm, slightly sticky and slightly plastic; common very fine tubular pores; very strongly acid (pH 4.5).

The mean annual soil temperature is 50 to 53 degrees F.

The A horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 2 to 4 when moist or dry.

The Bt horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 to 7 when dry, and chroma of 6 to 8 when moist or dry. It is silty clay loam or silty clay. It has 35 to 50 percent clay.

The C horizon has hue of 10YR or 7.5YR, value of 4 to 6 when moist and 4 to 7 when dry, and chroma of 4 to 8 when moist or dry. It is silty clay loam, silty clay, or clay. It has 35 to 50 percent clay.

McDuff Series

The McDuff series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on broad ridgetops, benches, and side slopes in mountainous areas. Slopes are 5 to 50 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of McDuff silty clay loam, in an area of Apt-McDuff silty clay loams, 30 to 50 percent slopes, about 0.75 mile north of Highway 20 on a logging road west of Wakefield Creek, at an elevation of about 800 feet, NW¼SE¼ sec. 7, T. 11 S., R. 8 W.

Oi—1/2 inch to 0; moss, needles, leaves, and twigs.

A1—0 to 8 inches; very dark grayish brown (10YR 3/2) silty clay loam, brown (10YR 5/3) dry; moderate fine subangular blocky and granular structure; hard, friable, slightly sticky and slightly plastic; common fine roots; many very fine tubular and irregular pores; about 5 percent soft sandstone and siltstone fragments; very strongly acid (pH 4.8); gradual wavy boundary.

A2—8 to 12 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 5/3) dry; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; common fine roots; many very fine tubular pores; about 5 percent soft sandstone and siltstone fragments; very strongly acid (pH 5.0); clear wavy boundary.

Bt—12 to 20 inches; brown (7.5YR 4/4) clay, light yellowish brown (10YR 6/4) dry; moderate medium and very fine subangular blocky structure; very hard, firm, very sticky and very plastic; common fine roots; many very fine tubular pores; many faint clay films on faces of peds; about 15 percent soft sandstone and siltstone fragments; very strongly acid (pH 5.0); clear wavy boundary.

BCt—20 to 36 inches; strong brown (7.5YR 4/6) clay, brownish yellow (10YR 6/6) dry; weak fine subangular blocky structure; hard, firm, very sticky and very plastic; few fine roots; many very fine tubular pores; many faint clay films on faces of peds; about 35 percent soft sandstone and siltstone fragments; very strongly acid (pH 5.0); abrupt irregular boundary.

Cr—36 inches; fractured and highly weathered siltstone and sandstone.

The mean annual soil temperature is 48 to 52 degrees F. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bt horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 3 to 6 when moist or dry. It is clay or silty clay. It has 0 to 30 percent soft rock fragments and 40 to 60 percent clay.

The BCt horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is silty clay or clay. It has 15 to 50 percent soft rock fragments and 40 to 60 percent clay.

Meda Series

The Meda series consists of deep, well drained soils that formed in loamy alluvium derived from mixed sources. These soils are on alluvial fans. Slopes are 3 to 12 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Meda loam, 3 to 12 percent slopes, about 250 feet south and 250 feet west of the Yachats River, at an elevation of about 100 feet, SE¼SW¼SE¼ sec. 33, T. 14 S., R. 11 W.

Ap—0 to 7 inches; very dark brown (10YR 2/2) loam, brown (10YR 4/3) dry; moderate medium subangular blocky structure parting to strong fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular and tubular pores; about 5 percent gravel; moderately acid (pH 5.8); clear smooth boundary.

A—7 to 11 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 4/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular pores; about 5 percent gravel and 3 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.

Bw1—11 to 20 inches; brown (10YR 4/3) gravelly loam, yellowish brown (10YR 5/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and plastic; many very fine roots; many very fine tubular pores; about 10 percent gravel and 5 percent cobbles; very strongly acid (pH 4.6); gradual wavy boundary.

Bw2—20 to 30 inches; brown (10YR 4/3) gravelly loam, yellowish brown (10YR 5/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; about 20 percent gravel and 10 percent cobbles; very strongly acid (pH 4.6); gradual wavy boundary.

2C1—30 to 45 inches; brown (10YR 4/3) very gravelly loam, yellowish brown (10YR 5/4) dry; common dark reddish brown (2.5YR 3/4) streaks; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; about 30 percent gravel and 15 percent cobbles; very strongly acid (pH 4.5); gradual wavy boundary.

2C2—45 to 60 inches; brown (10YR 4/3) very gravelly loam, yellowish brown (10YR 5/4) dry; many dark reddish brown (2.5YR 3/4) weathering stains; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; about 30 percent gravel and 10 percent cobbles; very strongly acid (pH 4.5).

The mean annual soil temperature is 50 to 53 degrees F. The umbric epipedon is 10 to 20 inches thick.

The Ap and A horizons have value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry.

The Bw horizon has value of 3 or 4 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist and 2 to 4 when dry. It is gravelly loam or gravelly clay loam.

It has 15 to 35 percent gravel, 0 to 10 percent cobbles, and 25 to 35 percent clay.

The 2C horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 3 to 6 when moist or dry. It is very gravelly loam, very gravelly sandy loam, or gravelly sandy loam. It has 15 to 50 percent gravel, 0 to 15 percent cobbles, and 3 to 15 percent clay.

Murtip Series

The Murtip series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops, slump benches, and side slopes in mountainous areas. Slopes are 3 to 60 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 45 degrees F.

Typical pedon of Murtip loam, in an area of Laderly-Murtip complex, 3 to 30 percent slopes, on a south-facing slope, at an elevation of about 2,100 feet, SW¼SE¼SW¼ sec. 5, T. 9 S., R. 9 W.

Oi—2 inches to 0; needles, leaves, twigs, and bark.

A—0 to 11 inches; dark reddish brown (5YR 2/2) loam, dark brown (7.5YR 3/2) dry; moderate fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine roots; many fine and very fine irregular pores; many 1- to 2-millimeter concretions; very strongly acid (pH 4.8); clear wavy boundary.

Bw1—11 to 18 inches; dark brown (7.5YR 4/4) loam, brown (7.5YR 5/4) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 10 percent gravel; very strongly acid (pH 4.8); gradual wavy boundary.

Bw2—18 to 42 inches; reddish brown (5YR 4/4) loam, light brown (7.5YR 6/4) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common fine roots; many very fine irregular and tubular pores; about 10 percent gravel and 5 percent soft rock fragments; very strongly acid (pH 4.6); clear irregular boundary.

BC—42 to 50 inches; brown (7.5YR 4/4) gravelly loam, brownish yellow (10YR 6/6) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few fine roots; many very fine irregular and tubular pores; about 20 percent gravel and 10 percent soft rock fragments; very strongly acid (pH 4.6); clear irregular boundary.

Cr—50 inches; fractured and weathered basalt breccia.

The mean annual soil temperature is 44 to 46 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to weathered bedrock is 40 to 60 inches.

The A horizon has hue of 5YR or 7.5YR, value of 2 or 3 when moist and 3 or 4 when dry, and chroma of 2 or 3 when moist or dry. It has 0 to 10 percent gravel.

The Bw horizon has hue of 5YR to 10YR, value of 3 to 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is loam or gravelly loam. It has 0 to 30 percent gravel and 18 to 24 percent clay.

The BC horizon has hue of 5YR to 10YR, value of 4 or 5 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is gravelly loam or very gravelly loam. It has 15 to 55 percent gravel and 18 to 24 percent clay.

Necanicum Series

The Necanicum series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on side slopes in mountainous areas. Slopes are 60 to 90 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Necanicum gravelly loam, in an area of Neotsu-Necanicum complex, 60 to 90 percent slopes, about 200 feet downslope from a logging road, on a 70 percent, south-facing slope, at an elevation of about 400 feet, NE¼NW¼SE¼ sec. 8, T. 8 S., R. 10 W.

Oi—1 inch to 0; needles, leaves, twigs, and roots.

A1—0 to 4 inches; dark reddish brown (5YR 2/2) gravelly loam, dark brown (7.5YR 4/2) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine roots; many very fine irregular pores; about 20 percent gravel and 10 percent soft rock fragments; very strongly acid (pH 5.0); clear wavy boundary.

A2—4 to 12 inches; dark reddish brown (5YR 3/3) gravelly loam, dark brown (7.5YR 4/3) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine and fine roots; many very fine irregular pores; about 25 percent gravel and 10 percent soft rock fragments; very strongly acid (pH 4.8); clear wavy boundary.

Bw—12 to 21 inches; dark reddish brown (5YR 3/4) very gravelly loam, brown (7.5YR 4/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; moderately sticky; common fine and medium

roots; many very fine irregular pores; about 40 percent gravel and 15 percent soft rock fragments; very strongly acid (pH 4.6); clear wavy boundary.

BC—21 to 46 inches; dark brown (7.5YR 4/4) extremely gravelly loam, strong brown (7.5YR 5/6) dry; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; few very fine roots; many very fine irregular pores; about 55 percent gravel, 10 percent cobbles, and 15 percent soft rock fragments; very strongly acid (pH 4.8); clear wavy boundary.

Cr—46 inches; fractured and strongly weathered basic igneous rock.

The mean annual soil temperature is 49 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick. The depth to weathered bedrock is 40 to 60 inches.

The A horizon has hue of 7.5YR or 5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. It has 20 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 20 percent soft rock fragments.

The Bw horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It has 30 to 60 percent gravel, 0 to 10 percent cobbles, 0 to 25 percent soft rock fragments, and 12 to 18 percent clay.

The BC horizon has hue of 10YR or 7.5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 4 to 6 when moist or dry. It is extremely gravelly loam or extremely cobbly loam. It has 20 to 60 percent gravel, 5 to 45 percent cobbles, 0 to 10 percent stones, 0 to 15 percent soft rock fragments, and 8 to 20 percent clay.

Nehalem Series

The Nehalem series consists of deep, well drained soils that formed in silty recent alluvium. These soils are on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Nehalem silt loam, 0 to 3 percent slopes, on the higher part of the flood plain along the Yachats River, about 150 feet northeast of the river, at an elevation of about 48 feet, SE¼NW14NE¼ sec. 36, T. 14 S., R. 12 W.

Ap—0 to 9 inches; very dark grayish brown (10YR 3/2) silt loam, dark brown (10YR 4/3) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular and tubular pores; strongly acid (pH 5.2); clear smooth boundary.

A—9 to 18 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular and tubular pores; very strongly acid (pH 5.0); clear smooth boundary.

Bw—18 to 32 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; moderate very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual smooth boundary.

BC—32 to 51 inches; brown (10YR 4/3) silt loam, light yellowish brown (10YR 6/4) dry; weak very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual smooth boundary.

C—51 to 60 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; very strongly acid (pH 4.8).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick.

The Ap and A horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bw and BC horizons have hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 to 6 when moist or dry. They are silt loam or silty clay loam. They have 20 to 35 percent clay.

The C horizon is loam, silt loam, or silty clay loam. It has 0 to 15 percent gravel and 20 to 35 percent clay.

Nekoma Series

The Nekoma series consists of deep, well drained soils that formed in silty and loamy recent alluvium over stratified, loamy and sandy alluvium. These soils are on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Nekoma silt loam, in an area of Nekoma-Fluvaquents complex, 0 to 3 percent slopes, about 50 feet east of Feagles Creek and 50 feet north of a road, at an elevation of about 200 feet, NW¼SW¼ sec. 8, T. 12 S., R. 8 W.

Ap—0 to 8 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; moderately acid (pH 6.0); abrupt smooth boundary.
A—8 to 13 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; moderately acid (pH 6.0); gradual smooth boundary.
Bw—13 to 19 inches; dark yellowish brown (10YR 4/4) fine sandy loam, pale brown (10YR 6/3) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and nonplastic; common very fine roots; many very fine irregular pores; moderately acid (pH 5.8); gradual smooth boundary.
C1—19 to 34 inches; brown (10YR 4/3) fine sandy loam, pale brown (10YR 6/3) dry; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few very fine roots; many very fine irregular pores; strongly acid (pH 5.4); abrupt smooth boundary.
C2—34 to 48 inches; dark yellowish brown (10YR 4/4) very fine sandy loam, pale brown (10YR 6/3) dry; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; moderately acid (pH 5.6); clear smooth boundary.
C3—48 to 54 inches; yellowish brown (10YR 5/4) very fine sandy loam, very pale brown (10YR 7/3) dry; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; moderately acid (pH 5.8); clear smooth boundary.
C4—54 to 60 inches; dark yellowish brown (10YR 4/4) fine sandy loam, pale brown (10YR 6/3) dry; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; moderately acid (pH 5.8).

The mean annual soil temperature is 50 to 53 degrees F. The umbric epipedon is 10 to 20 inches thick.

The Ap and A horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist or dry.

The Bw horizon has value of 3 to 5 when moist and 5 to 7 when dry and chroma of 3 to 6 when moist or dry. It is fine sandy loam, loam, or silt loam. It has 5 to 15 percent clay.

The C horizon has value of 3 to 6 when moist and 5 to 7 when dry and chroma of 3 to 6 when moist or dry. It is stratified loamy fine sand to very fine sandy loam. It has 5 to 15 percent clay.

Nelscott Series

The Nelscott series consists of moderately well drained soils that formed in medium textured eolian material over stratified marine sediments. These soils are moderately deep to an ortstein pan. They are on marine terraces. Slopes are 3 to 50 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Nelscott loam, 3 to 12 percent slopes, along a powerline southeast of Southbeach PUD shops, about 1,200 feet west and 200 feet south of the northeast corner of sec. 20, T. 11 S., R. 11 W.

Oi—1 inch to 0; partially decomposed leaves, needles, twigs, cones, and moss.
A—0 to 8 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) and brown (10YR 5/3) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many very fine irregular pores; very strongly acid (pH 4.8); clear smooth boundary.
AB—8 to 15 inches; very dark grayish brown (10YR 3/2) and dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; hard, friable, firm, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many very fine tubular pores; very strongly acid (pH 5.0); clear wavy boundary.
Bw—15 to 29 inches; brown (10YR 4/3) silty clay loam, very pale brown (10YR 7/3) dry; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; weakly smeary; few very fine roots; many very fine tubular pores; few fine yellowish brown (10YR 5/6) stains and few fine gray (10YR 6/1) mottles in the lower 3 inches; very strongly acid (pH 4.6); clear wavy boundary.
2E—29 to 36 inches; light brownish gray (2.5Y 6/2) loamy fine sand, light gray (2.5Y 7/2) dry, common coarse brown (10YR 5/3) and brownish yellow (10YR 6/6) stains; massive to weak medium subangular blocky structure; hard, firm to brittle, nonsticky and nonplastic; few very fine tubular pores; strongly acid (pH 5.2); abrupt wavy boundary.
2Bsm—36 to 48 inches; variegated grayish brown (10YR 5/2), yellowish brown (10YR 5/6), and reddish brown (5YR 4/4), moderately cemented fine sand that has pockets of weakly cemented fine sand; massive; extremely hard, extremely firm,

nonsticky and nonplastic; few very fine tubular pores; strongly acid (pH 5.4); gradual wavy boundary.

2C—48 to 60 inches; variegated light brownish gray (2.5Y 6/2), yellowish brown (10YR 5/6), and brown (7.5YR 4/4) fine sand; massive; loose, nonsticky and nonplastic; common fine irregular pores; thin, weakly cemented bands; strongly acid (pH 5.2).

The mean annual soil temperature is 50 to 52 degrees F. Depth to the iron-cemented layer is 24 to 40 inches.

The A and AB horizons have hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. They have 0 to 10 percent fine concretions.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 to 7 when dry, and chroma of 3 to 6 when moist or dry. It is loam, clay loam, or silty clay loam. It has 18 to 30 percent clay.

The 2E horizon has hue of 10YR or 2.5Y, value of 5 or 6 when moist and 6 to 8 when dry, and chroma of 1 to 3 when moist or dry. It is fine sand or loamy fine sand. It has 1 to 5 percent clay.

The 2Bsm horizon has variegated colors, hue of 10YR to 2.5YR, value of 3 to 5 when moist or dry, and chroma of 2 to 8 when moist or dry. It is weakly cemented to strongly cemented.

The 2C horizon has variegated colors, hue of 7.5YR to 2.5Y, value of 3 to 6 when moist and 5 to 8 when dry, and chroma of 2 to 6 when moist or dry. It is stratified fine sand to silt loam. It has 1 to 10 percent clay.

Neotsu Series

The Neotsu series consists of moderately deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 90 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Neotsu silt loam, in an area of Klootchie-Neotsu silt loams, 3 to 30 percent slopes, near Ball Mountain, on a ridge about 70 feet north of Forest Service Road 17, at an elevation of about 1,480 feet, SE¼NW¼NW¼ sec. 32, T. 7 S., R. 10 W.

Oi—1 inch to 0; needles, leaves, twigs, roots, and moss.

A1—0 to 5 inches; very dark brown (10YR 2/2) silt loam, very dark grayish brown (10YR 3/2) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; many very fine concretions; very strongly acid (pH 4.6); clear smooth boundary.

A2—5 to 12 inches; very dark brown (10YR 2/2) silt loam, very dark grayish brown (10YR 3/2) dry; moderate very fine subangular blocky and moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine tubular and irregular pores; extremely acid (pH 4.4); clear smooth boundary.

Bw1—12 to 18 inches; dark yellowish brown (10YR 3/4) silt loam, dark yellowish brown (10YR 4/4) dry; common dark brown (10YR 3/3) organic coatings on peds; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine tubular pores; extremely acid (pH 4.4); clear smooth boundary.

Bw2—18 to 26 inches; dark yellowish brown (10YR 4/4) loam, light yellowish brown (10YR 6/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few very fine roots; many very fine tubular pores; about 5 percent gravel and 5 percent soft basalt rock fragments; extremely acid (pH 4.2); clear wavy boundary.

BC—26 to 33 inches; dark yellowish brown (10YR 4/4) gravelly loam, brownish yellow (10YR 6/6) dry; weak very fine subangular blocky structure; slightly hard, slightly sticky and slightly plastic; weakly smeary; few very fine roots; many very fine irregular pores; about 20 percent gravel and 35 percent soft basalt rock fragments; extremely acid (pH 4.4); clear wavy boundary.

Cr—33 inches; weathered and highly fractured igneous rock.

The mean annual soil temperature is 49 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has hue of 10YR to 5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist or dry. It has 0 to 15 percent gravel and 0 to 10 percent soft rock fragments.

The Bw horizon has hue of 10YR to 5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It is loam, gravelly loam, silt loam, gravelly silt loam, silty clay loam, or gravelly silty clay loam. It has 0 to 25 percent gravel, 0 to 15 percent soft rock fragments, and 18 to 30 percent clay.

The BC horizon has hue of 10YR to 5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 6 when moist or dry. It has 15 to 35 percent gravel, 0 to 5 percent cobbles, 15 to 40 percent soft rock fragments, and 18 to 25 percent clay.

Neskowin Series

The Neskowin series consists of moderately deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes of headlands. Slopes are 5 to 99 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Neskowin silt loam, in an area of Neskowin-Salander silt loams, 5 to 35 percent slopes, on a 10 percent, northwest-facing slope, at an elevation of about 770 feet, about 2,000 feet west and 1,400 feet south of the northeast corner of sec. 3, T. 15 S., R. 12 W.

Oi—1 inch to 0; moss, needles, and twigs.
A1—0 to 4 inches; black (5YR 2/1) silt loam, dark brown (7.5YR 3/2) dry; strong very fine granular structure; very friable, nonsticky and nonplastic; weakly smeary; common fine roots, many fine irregular pores; about 5 percent gravel; common 1- to 2-millimeter concretions; very strongly acid (pH 4.6); clear wavy boundary.
A2—4 to 19 inches; dark reddish brown (5YR 2/2) silt loam, dark brown (7.5YR 3/3) dry; strong fine subangular blocky and granular structure; very friable, slightly sticky and slightly plastic; moderately smeary; common fine roots; many fine tubular and irregular pores; about 5 percent gravel and 5 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.
Bw—19 to 23 inches; dark brown (7.5YR 3/2) silt loam, brown (10YR 4/3) dry; moderate fine subangular blocky structure; friable, slightly sticky and slightly plastic; moderately smeary; common fine roots; many fine irregular and tubular pores; about 5 percent gravel and 5 percent cobbles; very strongly acid (pH 5.0); clear wavy boundary.
R—23 inches; basalt.

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 20 to 30 inches thick. The depth to bedrock is 20 to 40 inches.

The A horizon has hue of 10YR to 5YR, value of 2 or 3 when moist or dry, and chroma of 1 to 3 when moist or dry. It has 0 to 10 percent gravel and 0 to 5 percent cobbles.

The Bw horizon has hue of 10YR to 5YR, value of 2 to 4 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist and 2 to 4 when dry. It is silt loam, silty clay loam, or clay loam. It has 0 to 10 percent gravel, 0 to 5 percent cobbles, and 15 to 35 percent clay.

Nestucca Series

The Nestucca series consists of deep, somewhat poorly drained soils that formed in silty recent alluvium. These soils are on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Nestucca silt loam, 0 to 2 percent slopes, on the east side of Highway 229, about 2.5 miles north of its junction with Highway 20, NW¼SW¼ sec. 29, T. 10 S., R. 10 W.

A1—0 to 5 inches; dark brown (10YR 3/3) silt loam, grayish brown (10YR 5/2) dry; weak very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; very strongly acid (pH 4.8); clear smooth boundary.
A2—5 to 14 inches; very dark grayish brown (10YR 3/2) silt loam, grayish brown (10YR 5/2) dry; weak fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; very strongly acid (pH 4.8); clear smooth boundary.
Bg—14 to 32 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; common fine distinct yellowish red (5YR 4/6) mottles; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; very strongly acid (pH 4.8); gradual smooth boundary.
Cg—32 to 60 inches; dark gray (N 4/0) clay loam, light gray (10YR 6/1) dry; many fine and medium prominent yellowish red (5YR 5/6) mottles; massive; hard, firm, very sticky and very plastic; few very fine roots; few very fine tubular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 14 to 20 inches thick.

The A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 1 to 3 when moist or dry.

The Bg horizon has hue of 10YR to 5Y, value of 4 or 5 when moist and 5 to 7 when dry, and chroma of 1 or 2 when moist or dry. It is silt loam or silty clay loam. It has 25 to 35 percent clay.

The Cg horizon is silty clay, clay loam, or loam. It has 20 to 45 percent clay.

Netarts Series

The Netarts series consists of deep, well drained soils that formed in sandy eolian material. These soils are on stabilized dunes. Slopes are 3 to 30 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Netarts fine sand, 12 to 30 percent slopes, on a long, narrow dune, at an elevation of about 50 feet, in the west half of sec. 20, T. 11 S., R. 11 W.

Oi—7 to 5 inches; loose leaves, needles, twigs, moss, lichens, rotten wood, and bark.

Oe—5 inches to 0; moderately decomposed organic matter; many very fine common fine and few medium roots; about 20 percent fine sand grains.

E—0 to 5 inches; light gray (10YR 6/1) fine sand, light gray (10YR 7/1) dry; few fine brown (7.5YR 4/4) stains; single grain, loose, very friable, nonsticky and nonplastic; few medium and common fine and very fine roots; extremely acid (pH 4.4); clear wavy boundary.

Bs—5 to 28 inches; variegated dark brown (7.5YR 3/4) and brown (7.5YR 4/4) fine sand, brown (7.5YR 4/4) and strong brown (7.5YR 4/6) dry; weakly massive or single grain; 20 to 40 percent moderately cemented iron nodules and intermittent lenses; brittle to loose, nonsticky and nonplastic; few fine and very fine roots; many fine irregular pores; very strongly acid (pH 4.6); clear irregular boundary.

BCs—28 to 39 inches; variegated dark yellowish brown (10YR 3/4) and brown (10YR 4/3) fine sand; yellowish brown (10YR 5/4), brown (10YR 5/3), and dark yellowish brown (10YR 4/4) dry; single grain; 10 to 20 percent weakly cemented nodules and intermittent lenses; weakly brittle to loose, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; strongly acid (pH 5.2); clear wavy boundary.

C—39 to 60 inches; variegated light yellowish brown (10YR 6/4), grayish brown (10YR 5/2), and light brownish gray (10YR 6/2) fine sand, very pale brown (10YR 7/3), light gray (10YR 7/2), and pale brown (10YR 6/3) dry; single grain; loose, nonsticky and nonplastic; many very fine irregular pores; strongly acid (pH 5.1).

The mean annual soil temperature is 50 to 52 degrees F.

The E horizon has hue of 2.5Y or 10YR, value of 4 to 6 when moist, and chroma of 1 or 2 when moist.

The Bs and BCs horizons are variegated and have hue of 2.5Y to 5YR, value of 3 to 6 when moist, and chroma of 2 to 6 when moist. It is loamy fine sand, sand, or fine sand. It has 1 to 5 percent clay.

The C horizon is variegated and has hue of 2.5Y or 10YR, value of 5 or 6 when moist and 6 or 7 when dry, and chroma of 2 to 6 when moist or dry.

Peavine Series

The Peavine series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on ridgetops, benches, and side slopes in mountainous areas. Slopes are 3 to 50 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Peavine silty clay loam, 30 to 50 percent slopes, on a 50 percent, southwest-facing slope, at an elevation of about 400 feet, SE¼SE¼NW¼ sec. 15, T. 8 W., R. 12 S.

Oi—1 inch to 0; needles, leaves, twigs, roots, and moss.

A1—0 to 3 inches; dark brown (10YR 3/3) silty clay loam, brown (10YR 4/3) dry; strong medium and fine granular structure; slightly hard, friable, sticky and plastic; common fine and very fine roots; many very fine irregular pores; strongly acid (pH 5.4); clear wavy boundary.

A2—3 to 7 inches; dark brown (7.5YR 3/3) silty clay loam, brown (7.5YR 4/4) dry; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; common fine and very fine roots; many very fine tubular pores; strongly acid (pH 5.2); gradual wavy boundary.

Bt1—7 to 13 inches; reddish brown (5YR 4/4) and yellowish red (5YR 4/6) silty clay, yellowish red (5YR 5/6) dry; moderate fine subangular blocky structure; hard, firm, very sticky and plastic; common fine and very fine roots; many very fine tubular pores; many faint clay films on faces of peds and in pores; very strongly acid (pH 5.0); clear wavy boundary.

Bt2—13 to 21 inches; yellowish red (5YR 4/6) clay, yellowish red (5YR 5/6) dry; moderate fine subangular blocky structure; hard, very firm, very sticky and very plastic; few fine and very fine roots; common very fine tubular pores; many distinct clay films on faces of peds and in pores; very strongly acid (pH 5.0); clear irregular boundary.

BCt—21 to 37 inches; yellowish red (5YR 4/6) clay, reddish yellow (5YR 6/6) dry; weak fine subangular blocky structure; hard, firm, very sticky and plastic; few fine and very fine roots; common very fine tubular pores; common faint clay films on faces of peds and in pores; about 20 percent soft cobble-size and 15 percent soft gravel-size rock fragments;

very strongly acid (pH 4.8); abrupt irregular boundary.
Cr—37 inches; fractured and weathered sandstone.

The mean annual soil temperature is 49 to 52 degrees F. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has hue of 10YR to 5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 to 4 when moist or dry. It has 30 to 40 percent clay.

The Bt and BCt horizons have hue of 5YR or 2.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 4 to 8 when moist or dry. It is silty clay or clay. It has 0 to 35 percent soft rock fragments and 45 to 60 percent clay.

Preacher Series

The Preacher series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on ridgetops, benches, and side slopes in mountainous areas. Slopes are 5 to 90 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Preacher loam, in an area of Preacher-Bohannon complex, 5 to 35 percent slopes, on a ridgetop with an 18 percent, south-facing slope, at an elevation of about 1,350 feet, NE¼NE¼SE¼ sec. 29, T. 7 S., R. 9 W.

Oi—3 inches to 0; needles, leaves, twigs, and moss.
A1—0 to 7 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; moderate medium granular structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many fine irregular pores; about 5 percent soft rock fragments; few 1- to 2-millimeter concretions; strongly acid (pH 5.5); clear wavy boundary.
A2—7 to 15 inches; very dark grayish brown (10YR 3/2) loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure parting to fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; less than 5 percent soft rock fragments; strongly acid (pH 5.5); clear wavy boundary.
Bw1—15 to 28 inches; dark yellowish brown (10YR 4/4) clay loam, light yellowish brown (10YR 6/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; less than 5 percent soft rock fragments; strongly acid (pH 5.4); gradual wavy boundary.
Bw2—28 to 45 inches; dark yellowish brown (10YR 4/4) clay loam, light yellowish brown (10YR 6/4) dry; moderate medium and fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; less than 5 percent soft rock fragments; strongly acid (pH 5.2); clear wavy boundary.
C—45 to 54 inches; yellowish brown (10YR 5/4) loam, very pale brown (10YR 7/4) dry; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; about 15 percent soft rock fragments; very strongly acid (pH 4.8); abrupt wavy boundary.
Cr—54 inches; fractured, partially weathered, stratified sandstone and siltstone.

The mean annual soil temperature is 48 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to weathered bedrock is 40 to 60 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist and 2 to 4 when dry. It has 0 to 15 percent soft rock fragments.

The B horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 3 to 6 when dry, and chroma of 3 to 6 when moist or dry. It is loam or clay loam. It has 0 to 20 percent soft rock fragments and 25 to 35 percent clay.

The C horizon has value of 4 or 5 when moist and 6 or 7 when dry. It is sandy loam, loam, or clay loam. It has 10 to 80 percent soft rock fragments and 7 to 30 percent clay.

Quillamook Series

The Quillamook series consists of deep, well drained soils that formed in silty alluvium. These soils are on stream terraces. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Quillamook silt loam, 0 to 3 percent slopes, at an elevation of about 115 feet, about 1,500 feet south and 900 feet east of the northwest corner of sec. 9, T. 10 S., R. 10 W.

Ap—0 to 10 inches; black (10YR 2/1) silt loam, very dark gray (10YR 3/1) dry; moderate very fine subangular blocky structure parting to very fine granular; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine roots; many very fine irregular pores; very strongly acid (pH 5.0); clear smooth boundary.
A1—10 to 21 inches; very dark brown (10YR 2/2) silt loam, very dark grayish brown (10YR 3/2) dry;

moderate very fine subangular blocky structure parting to very fine granular; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary; many very fine roots; many very fine continuous tubular and many very fine irregular pores; very strongly acid (pH 4.8); gradual smooth boundary.

A2—21 to 34 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; moderately smeary, many very fine roots; many very fine continuous tubular pores; very strongly acid (pH 4.8) clear wavy boundary.

Bw—34 to 58 inches; dark yellowish brown (10YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few very fine roots; many very fine continuous tubular pores; very strongly acid (pH 4.8); abrupt smooth boundary.

2C—58 to 60 inches; dark yellowish brown (10YR 4/6, 3/6) loamy sand, light yellowish brown (10YR 6/4) and yellowish brown (10YR 5/6) dry; massive; soft, loose, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; very strongly acid (pH 4.6).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 20 to 35 inches thick.

The A horizon has value of 2 when moist and 3 to 5 when dry and chroma of 1 or 2 when moist and 1 to 3 when dry.

The Bw horizon has value of 4 or 5 when moist and 5 or 6 when dry and chroma of 4 to 6 when moist or dry. It is silt loam or silty clay loam. It has 18 to 30 percent clay.

The 2C horizon has value of 3 to 5 when moist and 5 or 6 when dry and chroma of 4 to 6 when moist or dry.

Reedsport Series

The Reedsport series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 85 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Reedsport loam, in an area of Reedsport-Tolovana complex, 60 to 85 percent slopes, on a southwest-facing slope, at an elevation of about 400 feet, NE¼NW¼ sec. 16, T. 12 S., R. 11 W.

Oi—2 inches to 0; needles, leaves, twigs, roots, and moss.

A1—0 to 6 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many fine irregular pores; about 5 percent gravel and 15 percent soft rock fragments, mostly 2 to 10 millimeters; strongly acid (pH 5.1); gradual wavy boundary.

A2—6 to 14 inches; very dark grayish brown (10YR 3/2) loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular and irregular pores; about 5 percent gravel and 20 percent soft rock fragments; strongly acid (pH 5.1); gradual wavy boundary.

Bw1—14 to 24 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few fine roots; many very fine tubular and irregular pores; about 5 percent gravel and 40 percent soft rock fragments; very strongly acid (pH 4.8); clear wavy boundary.

Bw2—24 to 32 inches; brown (10YR 4/3) clay loam, pale brown (10YR 6/3) dry; moderate very fine subangular blocky structure; hard, firm, sticky and plastic; few fine roots; common very fine tubular pores; about 10 percent gravel and 60 percent soft rock fragments; very strongly acid (pH 4.6); abrupt wavy boundary.

Cr—32 inches; fractured, partially weathered sandstone and siltstone.

The mean annual soil temperature is 49 to 52 degrees F. The umbric epipedon is 20 to 30 inches thick. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has value of 2 or 3 when moist and 3 to 5 when dry and chroma of 2 or 3 when moist or dry. It has 5 to 10 percent gravel and 0 to 20 percent soft rock fragments.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 2 or 3 when moist and 3 or 4 when dry. It is loam or clay loam. It has 5 to 25 percent gravel, 0 to 5 percent cobbles, 15 to 65 percent soft rock fragments, and 20 to 35 percent clay.

Sach Series

The Sach series consists of moderately deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on ridgetops and side

slopes in mountainous areas. Slopes are 3 to 60 percent. The mean annual precipitation is about 100 inches, and the mean annual air temperature is about 45 degrees F.

Typical pedon of Sach gravelly loam, on the east side of a saddle south of Rocky Point, between Bald Mountain and Lindsey Ridge, on a broad ridge with an 18 percent, southeast-facing slope, at an elevation of about 2,500 feet, NW¼NE¼ sec. 16, T. 7 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, twigs, roots, and moss.

A—0 to 10 inches; dark brown (7.5YR 3/2) gravelly loam, brown (7.5YR 5/2) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; many very fine concretions; about 15 percent gravel; very strongly acid (pH 4.6); clear wavy boundary.

Bw—10 to 19 inches; brown (10YR 4/3) gravelly silt loam, pale brown (10YR 6/3) dry; common dark brown (10YR 3/3) organic coatings on peds; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine tubular pores; about 20 percent gravel; very strongly acid (pH 4.6); clear wavy boundary.

BC—19 to 27 inches; light yellowish brown (10YR 6/4 and (2.5Y 6/4) very gravelly loam, very pale brown (10YR 7/4) dry; weak very fine subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; few very fine roots; many very fine irregular pores; about 50 percent gravel; extremely acid (pH 4.4); abrupt wavy boundary.

2Cr—27 inches; weathered and highly fractured shale.

The mean annual soil temperature is 43 to 46 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to weathered bedrock is 20 to 40 inches.

The A horizon has hue of 10YR to 7.5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist or dry. It has about 15 to 20 percent gravel, 0 to 5 percent cobbles, and 0 to 10 percent soft rock fragments.

The Bw horizon has hue of 10YR to 7.5YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 3 or 4 when moist or dry. It is gravelly loam, gravelly silt loam, or gravelly silty clay loam. It has 20 to 30 percent gravel, 0 to 5 percent cobbles, 0 to 10 percent soft rock fragments, and 18 to 30 percent clay.

The BC horizon has hue of 10YR to 2.5Y, value of 4 to 6 when moist and 6 to 8 when dry, and chroma of 4 to 6 when moist or dry. It is very gravelly loam or very gravelly clay loam. It has about 35 to 55 percent gravel, 0 to 10 percent cobbles, 0 to 25 percent soft rock fragments, and 18 to 35 percent clay.

Salander Series

The Salander series consists of deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in areas of headlands. Slopes are 5 to 65 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Salander silt loam, in an area of Neskowin-Salander silt loams, 5 to 35 percent slopes, on a 10 percent, north-facing slope, at an elevation of about 750 feet, NE¼NE¼ sec. 3, T. 15 S., R. 12 W.

Oi—2 inches to 0; needles, leaves, and twigs.

A1—0 to 3 inches; black (5YR 2/1) silt loam, dark brown (7.5YR 3/2) dry; strong very fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many fine irregular pores; about 5 percent gravel; few fine concretions; very strongly acid (pH 4.6); clear wavy boundary.

A2—3 to 14 inches; dark reddish brown (5YR 2/2) silt loam, dark brown (7.5YR 3/2) dry; moderate fine and very fine subangular blocky structure parting to very fine granular; soft, friable, slightly sticky and slightly plastic; weakly smeary; common fine and very fine roots; many fine and very fine irregular pores; about 5 percent gravel; very strongly acid (pH 4.8); clear wavy boundary.

AB—14 to 28 inches; dark brown (7.5YR 3/2) silt loam, dark brown (7.5YR 3/3) dry; moderate very fine subangular blocky and granular structure; soft, friable, slightly sticky and slightly plastic; moderately smeary; common fine and very fine roots; many very fine irregular and tubular pores; about 5 percent gravel; strongly acid (pH 5.0); gradual wavy boundary.

Bw1—28 to 42 inches; dark brown (7.5YR 3/3) silt loam, dark brown (10YR 4/3) dry; moderate medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few fine roots; many fine tubular pores; about 5 percent gravel and 5 percent cobbles; strongly acid (pH 5.1); abrupt wavy boundary.

Bw2—42 to 60 inches; dark brown (7.5YR 3/3) silty clay loam, brown (10YR 4/3) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; weakly smeary; few fine roots; many fine tubular pores; about 5 percent gravel; very strongly acid (pH 4.8).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is more than 20 inches thick.

The A horizon has hue of 10YR, 7.5YR, or 5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 1 or 2 when moist and 2 or 3 when dry. It has 0 to 15 percent gravel and 0 to 20 percent soft rock fragments.

The Bw horizon has hue of 10YR, 7.5YR, or 5YR, value of 3 or 4 when moist and 4 or 5 when dry, and chroma of 3 or 4 when moist or dry. It is silt loam, silty clay loam, or loam. It has 0 to 35 percent gravel, 0 to 10 percent cobbles, 0 to 20 percent soft rock fragments, and 18 to 30 percent clay. It is gravelly at a depth of more than 40 inches.

Siletz Series

The Siletz series consists of deep, well drained soils that formed in silty over loamy alluvium. These soils are on stream terraces. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Siletz silt loam, 0 to 3 percent slopes, in a field of hay about 60 feet west of a buried cable junction box south of a turn in a driveway, at an elevation of about 200 feet, NE¼SW¼NW¼ sec. 33, T. 9 S., R. 9 W.

Ap—0 to 7 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; weak medium and fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; very strongly acid (pH 4.8); abrupt smooth boundary.

A—7 to 14 inches; very dark brown (10YR 2/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure; hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine continuous tubular pores; very strongly acid (pH 4.8); clear smooth boundary.

Bw1—14 to 22 inches; dark brown (7.5YR 4/4) silt loam, light yellowish brown (10YR 6/4) dry; weak fine and moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine exped tubular pores; very strongly acid (pH 5.0); gradual smooth boundary.

Bw2—22 to 31 inches; dark brown (7.5YR 3/4) loam, very pale brown (10YR 7/4) dry; weak medium and moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; few very fine roots; many very fine exped tubular pores; about 5 percent fine gravel; very strongly acid (pH 4.8); gradual smooth boundary.

2Bw3—31 to 42 inches; brown (7.5YR 4/4) very fine sandy loam, very pale brown (10YR 7/4) dry; weak medium and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine exped tubular pores; about 5 percent fine gravel; very strongly acid (pH 4.6); abrupt smooth boundary.

2C1—42 to 55 inches; variegated dark yellowish brown (10YR 3/4, 4/4) and very dark grayish brown (10YR 3/2) extremely gravelly loamy sand; yellowish brown (10YR 5/4), dark yellowish brown (10YR 4/6), and dark brown (10YR 3/3) dry; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine irregular pores; about 65 percent fine and very fine gravel; very strongly acid (pH 4.8); abrupt smooth boundary.

3C2—55 to 63 inches; dark yellowish brown (10YR 4/6) fine sandy loam, light yellowish brown (10YR 6/4) dry; massive; slightly hard, friable (weakly brittle), slightly sticky and slightly plastic; few very fine roots; many very fine irregular pores; about 5 percent fine gravel; very strongly acid (pH 5.0).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick.

The A horizon has value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 when moist and 2 or 3 when dry. It has 0 to 5 percent gravel.

The Bw and 2Bw horizons have hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 to 7 when dry, and chroma of 4 when moist or dry. They are silt loam, loam, or very fine sandy loam. They have 0 to 15 percent gravel and 10 to 18 percent clay.

The 2C horizon, if it occurs, is variegated and has hue of 10YR, value of 3 to 6 when moist or dry, and chroma of 2 to 6 when moist or dry. It is extremely gravelly loamy sand or extremely gravelly sand. It has 60 to 75 percent gravel and 5 to 15 percent clay.

The 3C horizon has hue of 10YR, value of 3 to 6 when moist or dry, and chroma of 4 to 6 when moist or dry. It is fine sandy loam or gravelly fine sandy loam. It has 0 to 25 percent gravel and 5 to 8 percent clay.

Slickrock Series

The Slickrock series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on side slopes in mountainous areas. Slopes are 35 to 60 percent. The mean annual precipitation is about 85 inches, and the

mean annual air temperature is about 50 degrees F.

Typical pedon of Slickrock gravelly loam, in an area of Preacher-Bohannon-Slickrock complex, 35 to 60 percent slopes, about 0.1 mile northeast on Forest Service Road 50 from its junction with Road 220 and downslope 150 feet northwest of the road, at an elevation of about 900 feet, NE¼NW¼ sec. 16, T. 12 S., R. 10 W.

Oi—1 inch to 0; moss, needles, leaves, and twigs.
A—0 to 14 inches; very dark grayish brown (10YR 3/2) gravelly loam, grayish brown (10YR 5/2) dry; moderate fine and very fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine irregular pores; about 20 percent gravel; strongly acid (pH 5.4); clear wavy boundary.
Bw—14 to 39 inches; dark brown (10YR 3/3) gravelly loam, brown (10YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; many very fine tubular pores; about 15 percent gravel and 5 percent cobbles; strongly acid (pH 5.2); gradual wavy boundary.
BC—39 to 53 inches; dark brown (10YR 3/3) and dark yellowish brown (10YR 4/4) very cobbly loam, brown (10YR 5/3) and light yellowish brown (10YR 6/4) dry; weak, fine, and very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; about 25 percent gravel and 15 percent cobbles; very strongly acid (pH 4.8); abrupt irregular boundary.
2Cr—53 inches; fractured, partially weathered sandstone.

The mean annual soil temperature is 48 to 52 degrees F. The umbric epipedon is more than 20 inches thick. The depth to weathered bedrock is 40 to 60 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry. It has 15 to 25 percent gravel, 0 to 5 percent cobbles, and 0 to 15 percent soft rock fragments.

The Bw horizon has hue of 10YR or 7.5YR, value of 2 to 4 when moist and 4 to 6 when dry, and chroma of 2 to 4 when moist or dry. It is gravelly loam, gravelly clay loam, cobbly loam, or cobbly clay loam. It has 10 to 25 percent gravel, 0 to 20 percent cobbles, 0 to 5 percent stones, 0 to 15 percent soft rock fragments, and 20 to 35 percent clay.

The BC horizon has hue of 10YR or 7.5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist or dry. It is very cobbly loam or very cobbly clay loam. It has 15 to 30 percent gravel, 15 to 35 percent cobbles, 0 to 15 percent stones, 0 to 15 percent soft rock fragments, and 15 to 30 percent clay.

Templeton Series

The Templeton series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on broad tops and side slopes of hilly uplands. Slopes are 5 to 60 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Templeton silt loam, in an area of Templeton-Fendall silt loams, 5 to 35 percent slopes, about 0.5 mile southeast of Fern Ridge Cemetery, on the divide between Collins Creek and the South Fork of Beaver Creek, at an elevation of about 480 feet, NW¼NW¼SE¼ sec. 32, T. 12 S., R. 11 W.

Oi—3 inches to 0; needles, twigs, cones, leaves, moss, and roots.
A1—0 to 4 inches; very dark brown (7.5YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; common medium rounded iron concretions and common medium rounded iron-manganese concretions; very strongly acid (pH 4.6); gradual smooth boundary.
A2—4 to 10 inches; very dark brown (10YR 2/2) silt loam, grayish brown (10YR 5/2) dry; moderate very fine subangular blocky structure parting to very fine granular; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular and tubular pores; common medium rounded iron concretions and common medium rounded iron-manganese concretions; very strongly acid (pH 4.6); gradual smooth boundary.
A3—10 to 17 inches; dark brown (10YR 3/3) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine tubular and irregular pores; common medium rounded iron concretions and common medium rounded iron-manganese concretions; very strongly acid (pH 4.8); clear smooth boundary.
BA—17 to 31 inches; dark yellowish brown (10YR 3/4) silt loam, yellowish brown (10YR 5/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; common very fine roots; many very fine continuous tubular pores; very

strongly acid (pH 4.8); gradual smooth boundary.
Bw1—31 to 43 inches; dark brown (7.5YR 3/4) silty clay loam, yellowish brown (10YR 5/4) dry; moderate very fine and fine subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; many very fine continuous tubular pores; very strongly acid (pH 4.6); gradual smooth boundary.
Bw2—43 to 55 inches; brown (7.5YR 4/4) silty clay loam, strong brown (7.5YR 5/6) dry; moderate fine subangular blocky structure; slightly hard, friable, sticky and plastic; few very fine roots; common very fine continuous tubular pores; about 10 percent soft siltstone fragments; very strongly acid (pH 4.6); clear smooth boundary.
Cr—55 inches; fractured and partially weathered siltstone.

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick. The depth to weathered bedrock is 40 to 60 inches.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 2 or 3 when moist or dry.

The BA horizon, if it occurs, has hue of 10YR or 7.5YR, value of 3 when moist and 4 or 5 when dry, and chroma of 4 when moist or dry. It is silt loam or silty clay loam. It has 0 to 15 percent soft rock fragments and 25 to 35 percent clay.

The Bw horizon has hue of 10YR or 7.5YR, value of 3 to 5 when moist and 5 or 6 when dry, and chroma of 4 to 8 when moist and 4 to 6 when dry. It is silty clay loam or silt loam. It has 0 to 30 percent soft rock fragments and 25 to 35 percent clay.

Tolovana Series

The Tolovana series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 85 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 50 degrees F.

Typical pedon of Tolovana silt loam, in an area of Tolovana-Reedsport complex, 35 to 60 percent slopes, about 200 feet east of Forest Service Road 240, about 0.1 mile north of its junction with Forest Service Road 244, on a 55 percent, east-facing slope, at an elevation of about 550 feet, SE¼SE¼NE¼ sec. 12, T. 12 S., R. 11 W.

Oi—1 inch to 0; needles, leaves, twigs, and moss.
A—0 to 7 inches; black (10YR 2/1) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 10 percent soft sandstone fragments; very strongly acid (pH 4.8); clear wavy boundary.
AB—7 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular and tubular pores; about 10 percent soft sandstone fragments; very strongly acid (pH 5.0); gradual wavy boundary.
Bw—18 to 32 inches; dark brown (10YR 3/3) brown to dark brown (10YR 4/3) silt loam, yellowish brown (10YR 5/4) dry; moderate very fine and fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine continuous tubular pores; about 5 percent gravel and 10 percent soft sandstone fragments; very strongly acid (pH 5.0); clear wavy boundary.
2BC—32 to 46 inches; yellowish brown (10YR 5/4) cobbly clay loam, brownish yellow (10YR 6/6) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine continuous pores; about 15 percent gravel, 10 percent cobbles, and 20 percent soft sandstone fragments; very strongly acid (pH 4.8); clear wavy boundary.
2C—46 to 60 inches; yellowish brown (10YR 5/4) cobbly clay loam, brownish yellow (10YR 6/6) dry; massive; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine continuous tubular pores; about 15 percent gravel, 10 percent cobbles, and 35 percent soft sandstone fragments; very strongly acid (pH 4.6).

The mean annual soil temperature is 49 to 52 degrees F. The umbric epipedon is 20 to 36 inches thick. The depth to bedrock is more than 60 inches.

The A and AB horizons have hue of 7.5YR to 10YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 1 to 3 when moist and 2 or 3 when dry. They have 0 to 10 percent gravel and 0 to 15 percent soft rock fragments.

The Bw horizon has hue of 7.5YR or 10YR, value of 3 or 4 when moist and 4 to 6 when dry, and chroma of 3 or 4 when moist or dry. It is silt loam or clay loam. It has 0 to 10 percent gravel, 0 to 15 percent soft rock fragments, and 20 to 35 percent clay.

The 2BC and 2C horizons have value of 4 or 5 when moist and 5 or 6 when dry and chroma of 3 to 6 when

moist or dry. They are gravelly loam, cobbly loam, or cobbly clay loam. They have 5 to 25 percent gravel, 0 to 10 percent cobbles, 10 to 40 percent soft rock fragments, and 20 to 35 percent clay.

Treharne Series

The Treharne series consists of deep, moderately well drained soils that formed in silty alluvium. These soils are in depressional areas on stream terraces. Slopes are 0 to 3 percent. The mean annual precipitation is about 75 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Treharne silt loam, 0 to 3 percent slopes, south of Big Elk Creek and east of a gravel road, on a 1 percent slope, at an elevation of about 320 feet, SE¼NW¼ sec. 23, T. 12 S., R. 8 W.

Ap—0 to 8 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; very strongly acid (pH 4.8); clear smooth boundary.

A—8 to 18 inches; very dark grayish brown (10YR 3/2) silt loam, brown (10YR 5/3) dry; moderate very fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; very strongly acid (pH 4.8); gradual smooth boundary.

Bt1—18 to 24 inches; brown (10YR 4/3) silty clay loam, brown (10YR 5/3) dry; few fine prominent strong brown (7.5YR 4/6) mottles; moderate very fine and fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; few faint clay films on faces of peds; very strongly acid (pH 5.0); gradual smooth boundary.

Bt2—24 to 38 inches; brown (10YR 4/3) silty clay loam, light yellowish brown (10YR 6/4) dry; common fine prominent strong brown (7.5YR 4/6) and distinct (10YR 6/2) mottles; moderate fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; many very fine tubular pores; few faint clay films on faces of peds; very strongly acid (pH 5.0); clear wavy boundary.

C—38 to 60 inches; brown (10YR 4/3) silty clay loam, light yellowish brown (10YR 6/4) dry; many fine prominent strong brown (7.5YR 4/6) and distinct light brownish gray (10YR 6/2) mottles; massive; hard, firm, sticky and plastic; many very fine tubular pores; very strongly acid (pH 4.8).

The mean annual soil temperature is 50 to 53 degrees F. The umbric epipedon is 10 to 20 inches thick.

The Ap and A horizons have value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry.

The Bt horizon has value of 4 or 5 when moist and 5 to 7 when dry and chroma of 2 to 6 when moist or dry. It is silt loam or silty clay loam. It has 18 to 35 percent clay.

The C horizon has hue of 5Y to 10YR, value of 4 or 5 when moist and 5 to 7 when dry, and chroma of 1 to 4 when moist. It is silt loam, silty clay loam, or silty clay. It has 18 to 45 percent clay.

Valsetz Series

The Valsetz series consists of moderately deep, well drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 90 percent. The mean annual precipitation is about 150 inches, and the mean annual air temperature is about 44 degrees F.

Typical pedon of Valsetz cobbly loam, in an area of Valsetz-Yellowstone complex, 3 to 30 percent slopes, at an elevation of about 3,000 feet, NE¼SE¼ sec. 3, T. 7 S., R. 9 W.

Oi—1 inch to 0; needles, leaves, and twigs.

A—0 to 5 inches; dark reddish brown (5YR 3/3) cobbly loam, brown (7.5YR 5/4) dry; moderate very fine granular structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 5 percent stones, 10 percent cobbles, and 15 percent gravel; very strongly acid (pH 4.8); clear wavy boundary.

Bw1—5 to 14 inches; reddish brown (5YR 4/4) very cobbly loam, brown (7.5YR 5/4) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine tubular and irregular pores; about 5 percent stones, 15 percent cobbles, and 25 percent gravel; very strongly acid (pH 5.0): clear wavy boundary.

Bw2—14 to 24 inches; brown (7.5YR 4/4) extremely cobbly loam, yellowish brown (10YR 5/4) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, sticky and slightly plastic; weakly smeary; few very fine roots; many very fine tubular and irregular pores; about 10 percent stones, 25 percent cobbles, and 40 percent gravel; very strongly acid (pH 4.8); clear wavy boundary.

BC—24 to 36 inches; strong brown (7.5YR 5/6)

extremely cobbly loam, light yellowish brown (10YR 6/4) dry; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine tubular and irregular pores; about 15 percent stones, 30 percent cobbles, and 30 percent gravel; very strongly acid (pH 4.6); abrupt irregular boundary.

2R—36 inches; fractured basic igneous rock.

The mean annual soil temperature is 43 to 45 degrees F. The depth to bedrock is 20 to 40 inches.

The A horizon has hue of 7.5YR or 5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist. It has 5 to 15 percent gravel, 10 to 30 percent cobbles, and 0 to 10 percent stones.

The Bw and BC horizons have hue of 7.5YR or 5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 4 to 6 when moist or dry. They are very cobbly loam, very cobbly clay loam, or extremely cobbly loam. They have 15 to 50 percent cobbles, 0 to 25 percent stones, 20 to 50 percent gravel, and 20 to 30 percent clay.

Wadecreek Series

The Wadecreek series consists of deep, moderately well drained soils that formed in silty and clayey alluvium. These soils are on terraces. Slopes are 3 to 12 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Wadecreek silt loam, 3 to 12 percent slopes, at an elevation of about 375 feet, about 2,200 feet east and 700 feet south of the northwest corner of sec. 5, T. 10 S., R. 9 W.

Oi—2 inches to 0; decomposing needles, leaves, twigs, and moss.

A1—0 to 4 inches; dark reddish brown (5YR 2/2) silt loam, dark brown (7.5YR 3/3) dry; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many very fine irregular pores; strongly acid (pH 5.4); clear wavy boundary.

A2—4 to 9 inches; dark brown (7.5YR 3/2) silt loam, brown (7.5YR 4/3) dry; moderate fine subangular blocky and granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; many very fine tubular and many very fine irregular pores; strongly acid (pH 5.4); clear wavy boundary.

BA—9 to 19 inches; dark brown (7.5YR 3/3) silty clay loam, brown (7.5YR 5/3) dry; moderate fine and very fine subangular blocky structure; slightly hard, friable, sticky and plastic; common very fine roots; many very fine tubular pores; strongly acid (pH 5.4); clear smooth boundary.

Bt1—19 to 30 inches; dark yellowish brown (10YR 4/4) silty clay loam, yellowish brown (10YR 5/4) dry; moderate fine subangular blocky structure; hard, firm, very sticky and very plastic; common very fine roots; many very fine tubular pores; few faint clay films on faces of peds; about 5 percent rounded gravel in the lower part; very strongly acid (pH 4.6); clear smooth boundary.

Bt2—30 to 38 inches; yellowish brown (10YR 5/4) and grayish brown (10YR 5/2) silty clay loam, light yellowish brown (10YR 6/4) and pale brown (10YR 6/3) dry; moderate medium and fine subangular blocky structure; hard, firm, very sticky and very plastic; few very fine roots; many very fine tubular pores; few faint clay films on faces of peds; very strongly acid (pH 4.6); clear smooth boundary.

Bt3—38 to 48 inches; yellowish brown (10YR 5/6) silty clay, brownish yellow (10YR 6/6) dry; many fine and very fine distinct light yellowish brown (10YR 6/4) and light gray (10YR 7/2) mottles; moderate medium and fine subangular blocky structure; very hard, very firm, very sticky and very plastic; few very fine roots; common very fine tubular pores; common faint clay films on faces of peds; very strongly acid (pH 4.6); abrupt smooth boundary.

BC—48 to 55 inches; yellowish brown (10YR 5/6) and strong brown (7.5YR 4/6) silty clay loam, brownish yellow (10YR 6/6) and strong brown (7.5YR 5/8) dry; many distinct fine and very fine yellowish red (5YR 4/6) mottles; weak fine subangular blocky structure; slightly hard, firm, sticky and plastic; common very fine tubular pores; extremely acid (pH 4.4); clear smooth boundary.

2C—55 to 60 inches; yellowish brown (10YR 5/4) and light gray (10YR 7/2) loam, brownish yellow (10YR 6/6) and very pale brown (10YR 8/3) dry; many fine distinct strong brown (7.5YR 5/6) mottles; massive; slightly hard, friable, slightly sticky and slightly plastic; many very fine tubular pores; extremely acid (pH 4.4).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches.

The A and BA horizons have hue of 10YR, 7.5YR, or 5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 1 to 3 when moist or dry. They are silt loam or silty clay loam. They have 18 to 35 percent clay.

The Bt horizon has hue of 10YR or 7.5YR, value of 3 to 5 when moist and 5 or 6 when dry, and chroma of 2 to 6 when moist or dry. It is silty clay or silty clay loam.

It has 0 to 15 percent gravel and 35 to 50 percent clay.

The BC and 2C horizons have hue of 10YR or 7.5YR, value of 4 to 7 when moist and 6 to 8 when dry, and chroma of 2 to 8 when moist or dry. They are loam, clay loam, or silty clay loam. They have 0 to 15 percent gravel and 15 to 35 percent clay.

Waldport Series

The Waldport series consists of deep, excessively drained soils that formed in sandy eolian material. These soils are on recently stabilized dunes. Slopes are 0 to 30 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Waldport fine sand, 0 to 30 percent slopes, on a sand dune west of Highway 101, north of the Bayshore entrance, at an elevation of about 120 feet, SW¼NW¼ sec. 18, T. 13 S., R. 11 W.

Oi—3 to 2 inches; loose litter of needles, leaves, and twigs.

Oe—2 inches to 0; moderately decomposed organic matter; 20 percent sand grains.

A—0 to 7 inches; dark grayish brown (10YR 4/2) fine sand, light gray (10YR 6/1) dry; few fine brownish yellow (10YR 6/6) stains; single grain; loose, very friable, nonsticky and nonplastic; many very fine roots; many fine irregular pores; very strongly acid (pH 4.8); gradual smooth boundary.

C1—7 to 23 inches; pale brown (10YR 6/3) fine sand, light gray (10YR 7/1) and very pale brown (10YR 7/3) dry; single grain; loose, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; strongly acid (pH 5.2); gradual wavy boundary.

C2—23 to 60 inches; light brownish gray (10YR 6/2) and light gray (10YR 7/1) fine sand, light gray (10YR 7/1, 7/2) dry; single grain; loose, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; very strongly acid (pH 5.0).

The mean annual soil temperature is 50 to 52 degrees F.

The A horizon has hue of 10YR or 2.5Y, value of 2 to 4 when moist and 5 or 6 when dry, and chroma of 1 or 2 when moist or dry.

The C horizon has hue of 10YR, 2.5Y, or 5Y, value of 3 to 6 when moist and 4 to 7 when dry, and chroma of 1 to 4 when moist or dry.

Winema Series

The Winema series consists of deep, well drained soils that formed in colluvium weathered from sedimentary rock. These soils are on the broad tops and side slopes of hilly uplands. Slopes are 3 to 35 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Winema silt loam, in an area of Winema-Fendall silt loams, 3 to 15 percent slopes, on a 7 percent, southeast-facing slope, at an elevation of about 135 feet, about 2,800 feet north and 600 feet east of the southwest corner of sec. 36, T. 6 S., R. 11 W.

Ap—0 to 6 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; strongly acid (pH 5.2); clear smooth boundary.

A—6 to 18 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; moderate very fine granular and subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine and very fine roots; many very fine irregular pores; very strongly acid (pH 5.0); clear smooth boundary.

AB—18 to 25 inches; very dark brown (10YR 2/2) silty clay loam, very dark grayish brown (10YR 3/2) dry; moderate very fine subangular blocky structure; hard, firm, sticky and plastic; common very fine roots; common very fine tubular pores; very strongly acid (pH 4.8); clear smooth boundary.

Bw1—25 to 35 inches; dark yellowish brown (10YR 3/4) silty clay, dark yellowish brown (10YR 4/4) dry; moderate fine and very fine subangular blocky structure; hard, firm, very sticky and plastic; common very fine roots; common very fine tubular pores; very strongly acid (pH 4.6); clear irregular boundary.

Bw2—35 to 44 inches; dark yellowish brown (10YR 4/4) silty clay loam, yellowish brown (10YR 5/6) dry; moderate fine subangular blocky structure; hard, firm, very sticky and plastic; common very fine roots; common very fine tubular pores; very strongly acid (pH 4.6); gradual smooth boundary.

BC—44 to 54 inches; dark yellowish brown (10YR 4/6) silty clay loam, yellowish brown (10YR 5/8) dry; weak fine and very fine subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; common very fine tubular pores; about 20 percent soft siltstone fragments; very strongly acid (pH 4.6); abrupt wavy boundary.

Cr—54 inches; fractured and partially weathered siltstone.

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 20 to 30 inches

thick. The depth to bedrock is 40 to 60 inches.

The Ap and A horizons have value of 2 or 3 when moist and 3 when dry and chroma of 1 or 2 when moist or dry.

The AB horizon, if it occurs, has value of 2 or 3 when moist and 3 when dry and chroma of 2 or 3 when moist or dry.

The Bw horizon has value of 3 or 4 when moist and 4 or 5 when dry and chroma of 4 to 6 when moist or dry. It is silty clay loam or silty clay. It has 35 to 50 percent clay.

The BC horizon has value of 4 to 6 when moist or dry and chroma of 4 to 6 when moist and 4 to 8 when dry. It is silty clay loam or silty clay. It has 0 to 60 percent soft rock fragments and 35 to 50 percent clay.

Wolfer Series

The Wolfer series consists of deep, somewhat excessively drained soils that formed in silty over sandy and gravelly alluvium. These soils are on river terraces with slopes of 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Wolfer silt loam, 0 to 3 percent slopes, in a pasture east of a paved road, at an elevation of about 260 feet, SW¼SW¼ sec. 20, T. 9 S., R. 9 W.

A1—0 to 9 inches; very dark brown (10YR 2/2) silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; weakly smeary; many very fine irregular pores; many very fine roots; about 10 percent gravel; very strongly acid (pH 4.8); clear smooth boundary.

A2—9 to 19 inches; very dark brown (10YR 2/2) gravelly silt loam, dark grayish brown (10YR 4/2) dry; moderate very fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; weakly smeary; many very fine irregular pores; many very fine roots; about 15 percent gravel and 5 percent cobbles; very strongly acid (pH 4.8); clear wavy boundary.

Bw—19 to 29 inches; dark brown (7.5YR 3/4) very gravelly loam, pale brown (10YR 6/3) dry; moderate very fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many fine continuous tubular pores; common very fine roots; about 30 percent gravel and 10 percent cobbles; very strongly acid (pH 5.0); clear wavy boundary.

2C1—29 to 38 inches; variegated brown (7.5YR 4/4), strong brown (7.5YR 5/6), dark brown (10YR 3/3), and yellowish brown (10YR 5/4) extremely gravelly loamy sand, brown (10YR 5/3) and light yellowish brown (10YR 6/4) dry; single grain; loose, nonsticky and nonplastic; many fine and very fine irregular pores; about 60 percent gravel and 10 percent cobbles; strongly acid (pH 5.2); gradual wavy boundary.

2C2—38 to 60 inches; variegated dark brown (10YR 3/3) and yellowish brown (10YR 5/4) extremely gravelly loamy coarse sand, pale brown (10YR 6/3) and light yellowish brown (10YR 6/4) dry; single grain; loose, nonsticky and nonplastic; many fine and very fine irregular pores; about 65 percent gravel and 5 percent cobbles; strongly acid (pH 5.4).

The mean annual soil temperature is about 50 to 52 degrees F. The umbric epipedon is 12 to 20 inches thick.

The A horizon has hue of 10YR or 7.5YR, value of 2 or 3 when moist and 4 or 5 when dry, and chroma of 1 or 2 when moist or dry. It is silt loam or gravelly silt loam. It has 5 to 25 percent gravel and 0 to 5 percent cobbles.

The Bw horizon has hue of 7.5YR or 10YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist or dry. It is gravelly loam, very gravelly loam, or very gravelly sandy loam. It has 15 to 35 percent gravel, 0 to 15 percent cobbles, and 5 to 15 percent clay.

The 2C horizon has hue of 7.5YR or 10YR, value of 3 to 5 when moist or dry, and chroma of 3 or 4 when moist or dry. It is extremely gravelly sand, extremely gravelly loamy sand, extremely gravelly loamy coarse sand, or extremely gravelly coarse sand. It has 50 to 60 percent gravel and 0 to 15 percent cobbles.

Yachats Series

The Yachats series consists of deep, well drained soils that formed in loamy and sandy recent alluvium. These soils are in the lower areas on flood plains. Slopes are 0 to 3 percent. The mean annual precipitation is about 85 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Yachats very fine sandy loam, 0 to 3 percent slopes, about 50 feet northeast of the Yachats River, on the lower part of the flood plain, at an elevation of about 30 feet, SW¼NW¼NE¼ sec. 36, T. 14 S., R. 12 W.

Ap—0 to 7 inches; dark brown (10YR 3/3) very fine sandy loam, brown (10YR 5/3) dry; weak fine subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots;

many very fine irregular pores; strongly acid (pH 5.5); abrupt smooth boundary.
A—7 to 14 inches; dark brown (10YR 3/3) fine sandy loam, brown (10YR 5/3) dry; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; strongly acid (pH 5.5); abrupt smooth boundary.
Bw—14 to 22 inches; brown (10YR 4/3) loam, yellowish brown (10YR 5/4) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots; many very fine irregular pores parting to many fine continuous tubular pores; strongly acid (pH 5.5); gradual smooth boundary.
C1—22 to 31 inches; brown (10YR 4/3) fine sandy loam, yellowish brown (10YR 5/4) dry; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine continuous tubular pores; strongly acid (pH 5.4); gradual smooth boundary.
C2—31 to 60 inches; brown (10YR 4/3) loamy fine sand, light yellowish brown (10YR 6/4) dry; massive; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine continuous tubular pores; strongly acid (pH 5.4).

The mean annual soil temperature is 50 to 52 degrees F. The umbric epipedon is 10 to 20 inches thick.

The Ap and A horizons have value of 2 or 3 when moist and 4 or 5 when dry and chroma of 2 or 3 when moist or dry.

The Bw horizon has value of 4 or 5 when moist and 5 when dry and chroma of 3 or 4 when moist or dry. It is loam or fine sandy loam. It has 5 to 15 percent clay.

The C horizon has value of 4 or 5 when moist and 5 or 6 when dry and chroma of 3 or 4 when moist or dry. It has 5 to 10 percent clay.

Yaquina Series

The Yaquina series consists of deep, somewhat poorly drained soils that formed in sandy eolian and alluvial material. These soils are in stabilized interdune areas associated with low marine terraces along the Pacific Ocean. Slopes are 0 to 3 percent. The mean annual precipitation is about 70 inches, and the mean annual air temperature is about 51 degrees F.

Typical pedon of Yaquina fine sand, 0 to 3 percent slopes, about 400 feet west of Highway 101 and about 30 feet south of the access road to South Beach Campground, at an elevation of about 20 feet, NW¼SW¼ sec. 20, T. 11 S., R. 11 W.

Oi—2 inches to 0; needles, leaves, and twigs.
E—0 to 6 inches; gray (10YR 6/1) fine sand, light gray (10YR 7/1) dry; single grain; loose; many fine and very fine roots; many very fine irregular pores; very strongly acid (pH 4.6); clear wavy boundary.
Bs1—6 to 14 inches; brown (10YR 5/3) fine sand, pale brown (10YR 6/3) dry; many light brownish gray sand grains; single grain; loose; common fine roots; many very fine irregular pores; common 2- to 20-millimeter weakly cemented strong brown and brown nodules; very strongly acid (pH 4.8); clear wavy boundary.
Bs2—14 to 24 inches; brown (10YR 5/3) fine sand, pale brown (10YR 6/3) dry; few faint medium yellowish brown (10YR 5/4) and brown (10YR 4/3) mottles; single grain; loose; few fine roots; many very fine irregular pores; many 2- to 20-millimeter weakly cemented strong brown and brown nodules; very strongly acid (pH 4.8); gradual wavy boundary.
BC—24 to 35 inches; grayish brown (10YR 5/2) fine sand, light brownish gray (10YR 6/2) dry; common faint medium and coarse yellowish brown (10YR 5/4) and brown (10YR 4/3) mottles; single grain; loose; many very fine irregular pores; few 2- to 20-millimeter yellowish brown and brown soft nodules; very strongly acid (pH 4.8); gradual wavy boundary.
C—35 to 60 inches; variegated grayish brown (2.5Y 5/2) and light olive brown (2.5Y 5/6) fine sand, light brownish gray (2.5Y 6/2) and yellowish brown (2.5YR 6/4) dry; single grain; loose; very strongly acid (pH 4.8).

The mean annual soil temperature is 50 to 52 degrees F.

The E horizon has value of 4 to 6 when moist and chroma of 1 or 2 when moist or dry.

The Bs and BC horizons have hue of 5Y to 5YR, value of 4 or 5 when moist and 5 or 6 when dry, and chroma of 2 or 3 when moist or dry. They are fine sand or sand.

The C horizon has value of 4 to 6 when moist and 6 or 7 when dry and chroma of 1 to 6 when moist or dry. It is fine sand or sand.

Yellowstone Series

The Yellowstone series consists of shallow, somewhat excessively drained soils that formed in colluvium derived from volcanic material. These soils are on ridgetops and side slopes in mountainous areas. Slopes are 3 to 90 percent. The mean annual precipitation is about 150 inches, and the mean annual air temperature is about 44 degrees F.

Typical pedon of Yellowstone stony loam, in an area of Valsetz-Yellowstone complex, 3 to 30 percent slopes,

on a broad ridgetop with a 10 percent, east-facing slope northwest of a rock quarry, at an elevation of about 3,000 feet, SE¼NW¼ sec. 22, T. 7 S., R. 9 W.

Oi—1/2 inch to 0; needles, leaves, and twigs.
A—0 to 10 inches; dark reddish brown (5YR 3/2) stony loam, reddish brown (5YR 5/3) dry; moderate very fine granular structure; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; many very fine roots; many very fine irregular pores; about 15 percent gravel, 5 percent cobbles, and 10 percent stones; very strongly acid (pH 4.8); clear wavy boundary.
C—10 to 18 inches; dark reddish brown (5YR 3/4) extremely cobbly loam, light brown (7.5YR 6/4) dry; massive; slightly hard, friable, slightly sticky and slightly plastic; weakly smeary; common very fine roots; many very fine tubular and irregular pores; about 30 percent gravel, 25 percent cobbles, and 15 percent stones; very strongly acid (pH 5.0); abrupt irregular boundary.
R—18 inches; fractured igneous rock.

The mean annual soil temperature is 43 to 45 degrees F. The umbric epipedon is 10 to 16 inches thick and extends to bedrock in some pedons. The depth to bedrock is 10 to 20 inches.

The A horizon has hue of 10YR to 5YR, value of 2 or 3 when moist and 3 to 5 when dry, and chroma of 2 or 3 when moist or dry. It has 10 to 20 percent stones, 0 to 10 percent cobbles, and 10 to 15 percent gravel.

The C horizon has hue of 10YR to 5YR, value of 3 or 4 when moist and 5 or 6 when dry, and chroma of 3 or 4 when moist or dry. It is very stony sandy loam, extremely stony sandy loam, or extremely cobbly loam. It has 15 to 35 percent stones, 15 to 35 percent cobbles, 10 to 30 percent gravel, and 5 to 15 percent clay.

Formation of the Soils

Soil consists of layers of mineral and organic materials. The formation of soil results from the interaction of five basic factors—climate, living organisms, parent material, topography, and time. The physical and chemical processes that result from the interaction of these factors determine the characteristics and properties of a soil. The influence of any one of these factors varies from place to place, but the interaction of all the factors determines the type of soil that forms.

The soils in this survey area have been greatly influenced by climate. Moist marine air moving inland from the Pacific Ocean moderates the temperature of the air and soil in winter and summer. The result is a long but cool growing season along the coastal area, called the isomesic zone or fog belt. Farther inland, the moderating influence of moist marine air diminishes, causing wider extremes in the temperatures of the air and soil and a shorter but warmer growing season.

The characteristics of the parent material greatly influence the kinds of soil that form. Soils that formed in colluvium derived from volcanic material commonly have low bulk density, high liquid limit, low plasticity, and high cation exchange capacity. Some of the soils that formed in colluvium derived from marine sediment such as siltstone exhibit some of those same properties in the surface layer, but most of the marine-sediment soils are dominated by lower liquid limit, higher plasticity, and lower cation exchange capacity. The period of time parent material has been in place influences the kinds of soil that have formed. Soils formed in recent alluvium on flood plains generally have the characteristics of minimal profile development: a weak umbric epipedon, a thin cambic horizon, and an irregular decrease in content of organic carbon. Soils formed in older alluvium on terraces have the characteristics common to stronger profile development: an umbric epipedon, an argillic horizon, and a regular decrease in content of organic carbon.

Climate and Living Organisms

Temperature and moisture influence the chemical and physical nature of soils by influencing the weathering of minerals and material in a soil horizon and the transport of material from one horizon to another. The kind of vegetation that grows in an area and its rate of growth, the activity and abundance of insects, animals, soil microbes, and fungi, and the rate of accumulation and decay of organic matter are all influenced by climate.

Living organisms are an active factor in soil formation, and the changes they bring about depend on the life processes peculiar to each organism. The kinds of organisms that live on and in the soil are determined by climate, topography, age of the soil, and parent material.

Plants actively influence soil formation by providing a root system and cover for holding soil particles together to resist erosion. Leaves, twigs, roots, and the remains of entire plants that accumulate on the surface of soils are decomposed by the actions of animals, insects, and micro-organisms, which helps to return valuable organic matter to soils. Plant roots also widen cracks in the underlying rock, allowing water to penetrate. The uprooting of trees by wind mixes soil layers, loosens the underlying material, and brings weathered rock and other mineral material to the surface.

Organisms such as insects, fungi, earthworms, micro-organisms, and burrowing animals accelerate the decomposition of organic matter by breaking down the remains of plants. Insects, micro-organisms, and earthworms feed on plant remains at the surface and on organic matter in the upper few inches of soil and slowly but continually alter the physical and chemical properties of organic matter and aid in mixing it with mineral material. Small animals burrow into the soil seeking shelter, which results in the mixing of soil layers.

Three major climatic zones are in the survey area: (1) areas that have cool, wet winters and cool, moist summers; (2) areas that have cold, wet winters and warm, moist summers; and (3) areas that have cold, wet winters and cool, moist summers.

The isomesic zone, or coastal fog belt, has cool, wet winters and cool, moist summers. Fog belt is a general term for the area that in summer is influenced by fog, low clouds, and cool, moist marine air. The belt extends

roughly from the Pacific Ocean to as much as 15 miles inland along rivers and low-lying areas. Elevation of the isomesic zone ranges from sea level to 1,800 feet. The soils in this zone have a udic moisture regime and an isomesic temperature regime (*16*). The native vegetation is within the Picea sitchensis zone (*6*). The plant community consists primarily of conifers such as Sitka spruce, western hemlock, Douglas-fir, western redcedar, and, in areas adjacent to the Pacific Ocean, shore pine. Red alder is the most abundant hardwood in more recently disturbed areas. Abundant moisture and modified air and soil temperatures in the fog belt result in a cool, long growing season that promotes a large accumulation of organic matter. The high rainfall presents and environment for nearly continuous leaching, which has promoted extensive leaching of bases and results in low base saturation in the soils. Conifers absorb the bases but do not readily return them to the soil, resulting in a low base status in the soils. Fulvudands such as Klootchie soils and Humitropepts such as Templeton soils formed in these conditions.

In the eastern part of the county, winters are cool and wet and summers are warm and moist. Elevations range from 25 to 1,800 feet. Soils in this area have a udic moisture regime and a mesic temperature regime (*16*). The native vegetation is within the Tsuga heterophylla zone (*6*). The plant community is primarily conifers but includes western hemlock, Douglas-fir, and western redcedar. Red alder and bigleaf maple are the most abundant hardwood species. Precipitation generally is high in winter. The moderating effects of the cool, moist marine air on the temperatures of the air and soil are less direct. The growing season is somewhat shorter and warmer than that in the isomesic zone, and the soils dry out more in summer. Organic matter accumulations are thick enough to allow an umbric epipedon to form in most of the soils, but the percentage of organic matter is less than that in the soils of the fog belt. The high precipitation in winter results in extensive leaching of bases and in low base saturation. Haplumbrepts such as Preacher soils and Hapludands such as Hemcross soils formed in these conditions. Along the Benton County line, precipitation decreases to the smallest amount in this zone. Accumulation of organic matter is less, and more organic matter is lost through oxidation. The precipitation, however, is sufficient to leach bases, resulting in generally low base saturation in the soils. An argillic horizon is on older stable slopes of the sedimentary mountainous areas, and Haplohumults such as Apt soils and Palehumults such as Honeygrove soils formed.

At elevations above 1,800 feet, winters are cold and wet while summers are cool and moist. Soils that formed in these areas have a udic moisture regime and a frigid or cryic temperature regime (*16*). The native vegetation is transitional from the Tsuga heterophylla to the Abies amabalis zones (*6*) and is primarily conifers such as western hemlock, Douglas-fir, Pacific silver fir, and noble fir. The dominance of noble and Pacific silver firs increases with increasing elevation. Precipitation is high in winter, and snow may cover the area for short periods between December and March. In summer the soils at the higher elevations dry out for brief periods. The growing season in this area is short. Timber growth is slower, and damage to trees by wind, snow, and ice is common. Hapludands such as Caterl soils and Haplocryands such as Valsetz soils formed in this area.

Geomorphic Surfaces and Soil Development

Geomorphologists and others (*3, 10, 12*) have identified, studied, and mapped coastal and valley geomorphic surfaces. These surfaces range in age from recent Holocene to early Pleistocene and represent a sequence of landscape development. The sequence of the surfaces in the survey area, using the coastal marine names and the comparable stream valley surface names, in the order of their age from the youngest to the oldest is as follows: late Holocene flood plains and dunes or Horseshoe and Ingram; Tenmile or Winkle; Whiskey Run or Senecal; Pioneer or Dolph; and Seven Devils or Eola (fig. 9). Also described, but not considered a geomorphic surface, is the Looney geomorphic map unit, which consists of steep, broken topography of the Coast Range.

Late Holocene flood plains and dunes or Horseshoe and Ingram surface. In this survey area the late Holocene flood plains mainly consist of the generally broad tidal flood plains at the mouths of major streams and narrow beaches along the Pacific Ocean. These flood plains have low relief and include the stream channels and associated features, such as point bar deposits, channel fillings, abandoned meanders, and tidal flats. Unless protected by dikes and tide gates, these areas are subject to frequent inundation by high tides. Isomesic Aeric Tropic Fluvaquents such as Coquille soils typify soils formed in the sediments of the late Holocene flood plains. These soils express a very thin darkening of the surface layer and no development of a cambic horizon. The Horseshoe surface is the lower of two flood plains in the alluvial valleys. It is generally considered in the annual flood plain. Isomesic Fluventic Humitropepts such as Yachats soils and mesic Fluventic Haplumbrepts such as Nekoma soils typify soils formed on these low flood plains in alluvial valleys. Flooding is frequent, and minimal soil formation

Figure 9.—Ingram geomorphic surface in the foreground, Winkle in the middle area, and Senecal in the background.

has occurred. These soils have minimal darkening of the surface layer by organic matter and a thin, weak cambic horizon. The Ingram surface, or higher flood plain, consists of an undulating topography with bar and channel relief. Flooding is less frequent, and the soils have had time to form a somewhat stronger umbric epipedon and cambic horizon. Isomesic Aeric Tropaquepts such as Nestucca soils and mesic Fluventic Haplumbrepts such as Kirkendall soils typify soils formed on the higher flood plains. The dunes are mainly isomesic Typic Tropopsamments such as the Waldport soils. These soils formed in recently stabilized eolian sandy material of late-Holocene-age dunes. Waldport soils exhibit a thin darkening of the surface layer by organic matter accumulation.

Tenmile or Winkle surface. Along the western edge of the survey area, the sediments of the Tenmile surface consist of deep, sandy material that has been stabilized long enough for the formation of a weak spodic horizon. Spodosols such as the Yaquina soils have formed. Two terrace levels are on the Winkle surface of the alluvial valleys of the survey area. These terraces are well expressed along the Siletz River. Alluvium of the lower terrace consists of deep, medium stratified to moderately coarse textured material. Typic Humitropepts such as Logsden soils have formed an umbric epipedon and cambic horizon in this material. The higher terrace consists of medium to coarse textured alluvium derived from volcanic sources higher in the watershed. Isomesic Alic Pachic Melanudands such as Quillamook soils formed in this material. Quillamook soils have a thick, dark umbric epipedon and a cambic horizon and have the soil characteristics of high water-holding capacity, high organic-carbon content, high cation-exchange capacity (when buffered to pH of 7 or more), low bulk density, and high phosphate retention. Farther east in the survey area, the Winkle surface is dominated by one terrace level and has deep, medium textured alluvium derived from surrounding sandstone and siltstone mountains. In this area, Mesic Ultic Hapludalfs such as Eilertsen soils have formed under slightly warmer and drier summer

conditions. Eilertsen soils have formed an umbric epipedon and an argillic horizon.

Whiskey Run or Senecal surface. Sediments of the coastal Whiskey Run surface consist of deep, sandy material that has been stabilized by vegetation. A weak spodic horizon is typified by the Netarts soils formed in this material. Along the alluvial valleys, the Senecal surface consists of deep, fine to medium textured material. The formation of an umbric epipedon and a moderate to strong cambic horizon typify soils formed along the cooler coastal valleys of the survey area, for example, isomesic Aquic Humitropepts such as Chitwood soils. The formation of an umbric epipedon and an argillic horizon typify soils formed on the Senecal surface in the slightly warmer and drier inland valleys. Mesic Typic Haplohumults such as Elsie soils have formed in this area.

The Pioneer or Dolph surface. The coastal Pioneer surface appears to have several terrace levels and a variety of landforms. Sediments of the Pioneer surface consist of coarse textured to fine textured material. Bandon soils formed in old stabilized dune sand and have a strong spodic horizon with an ortstein layer. Nelscott soils formed dominantly on broad dissected marine terrace areas of the Pioneer surface where loamy textured wind- or water-deposited materials overlie the ortstein layer. Isomesic, ortstein, and shallow Sideric Tropaquods such as Depoe soils have formed in depressional areas and have an ortstein layer near the surface of the soil. Other soils formed on the Pioneer surface include Gleneden and Lint. Gleneden soils (isomesic Aquic Humitropepts) formed in fine textured alluvium. Lint soils (isomesic Alic Fulvudands) formed in medium textured material on the higher terrace levels of the Pioneer surface. Lint soils have an umbric epipedon and a cambic horizon and have the soil characteristics of high water-holding capacity, low bulk density, high cation-exchange capacity, and high organic-carbon content. The Dolph surface consists of dissected remnants of high terraces along major stream systems in the survey area. Isomesic Aquic Palehumults such as Bentilla soils and mesic Typic Palehumults such as McCurdy soils have formed. These soils are typified by an umbric epipedon and a thick, fine textured argillic horizon. Bentilla soils formed in the cooler coastal valleys, and McCurdy soils formed in the warmer interior valleys of the survey area. Grindbrook soils (isomesic Aquic Humitropepts) formed in medium textured material in the cooler coastal valley area and do not have an argillic horizon. They appear to have formed in more recent material resulting from modification of the Dolph surface and, as yet, have not had sufficient time to form an argillic horizon.

Seven Devils or Eola surface. This surface consists of erosional remnants of the oldest stable geomorphic surface in the area. Soils associated with the Seven Devils surface have been included into stable slope soils of the Looney unit. The Seven Devils surface is typified by Andic Humitropepts. Isomesic Andic Humitropepts such as Templeton soils that are in these positions have developed an umbric epipedon and a thick cambic horizon. In the slightly warmer and drier area of the survey area to the east, mesic Typic Haplohumults such as the Apt soils typify the soils associated with the Eola surface. These soils have formed in fine textured material and have an umbric epipedon and an argillic horizon. Blachly soils (mesic Umbric Dystrochepts) have formed at higher elevations and in areas of greater precipitation. These soils have formed an ochric epipedon and a thick strong reddish cambic horizon.

Looney unit. The Looney unit has no particular age connotation; therefore, it is not considered to be a geomorphic surface. The terrain of the Looney unit is completely dissected and is dominantly steeply sloping. Slope exceeds 100 percent in some areas. Steep, broken topography mapped as the Looney unit may join any other two surfaces, or it may make up large areas of mountainous terrain so thoroughly dissected that no geomorphic surfaces are recognizable. Erosion is active on much of the unit, and there are some areas of mass soil movement. Occasional remnants of some of the oldest geomorphic surfaces are in the unit (*3*).

The variability in age makes the Looney unit useful for geomorphic mapping of mountainous terrain. The Looney unit could be subdivided into several smaller geomorphic units if it were mapped at a larger scale. Three significant gradient breaks are apparent, and they correspond to stable, metastable, and active slopes (11). Small alluvial valleys are also included in this unit. Soils in the Looney unit have formed in colluvium derived dominantly from sandstone, siltstone, basalt breccia, and pillow basalt flows (*13*).

At elevations of 1,800 feet or less the Looney unit can be separated into two temperature zones, the coastal mountainous area (isomesic zone) and the interior mountainous area (mesic zone). In the coastal mountainous area (isomesic zone), the Looney unit is typified by Alic Fulvudands and Andic Humitropepts. These soils have developed an umbric epipedon and a cambic horizon. Templeton, Tolovana, Neskowin, and Klootchie soils represent soils that have formed in this area. Templeton soils (isomesic Andic Humitropepts) formed in colluvium from siltstone. Tolovana soils (isomesic Alic Fulvudands) have formed in colluvium from sandstone and have a thick umbric epipedon. Neskowin soils (isomesic Alic Fulvudands) have formed in colluvium from basalt along headland areas, and

Klootchie soils (isomesic Alic Fulvudands) have formed in colluvium from breccia in volcanic mountainous areas. To the east, in the interior coastal mountainous area (mesic zone), the Looney unit is typified by Andic Haplumbrepts and Alic Hapludands. These soils have developed an umbric epipedon and a cambic horizon. Bohannon, Preacher, Formader, Hemcross, and Klistan soils represent soils that have formed in the interior coastal mountainous area. Bohannon and Preacher soils (mesic Andic Haplumbrepts) have formed in colluvium dominantly from sandstone. Formader, Hemcross, and Klistan soils (mesic Alic Hapludands) have formed in colluvium from basalt and related materials in volcanic mountainous areas.

At elevations of 1,800 to 2,800 feet (frigid zone), the Looney unit is typified by frigid Alic Hapludands such as Caterl, Laderly, and Murtip soils that have formed in colluvium from basalt and related materials and Sach soils that have formed in colluvium from siltstone or shale bedrock. These soils have formed an umbric epipedon and a cambic horizon.

At elevations of 2,800 to 3,350 feet (cryic zone), the Looney unit is typified by the Valsetz soils (Typic Haplocryands) and the Yellowstone soils (Lithic Haplocryands). Valsetz soils have formed an ochric epipedon and a weak cambic horizon. Yellowstone soils are shallow to bedrock and have formed only an umbric epipedon.

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alkali (sodic) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Alluvial cone. The material washed down the sides of mountains and hills by ephemeral streams and deposited at the mouth of gorges in the form of a moderately steep, conical mass descending equally in all directions from the point of issue.

Alluvial fan. The fanlike deposit of a stream where it issues from a gorge upon a plain or of a tributary stream near or at its junction with its main stream.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal-unit-month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Arroyo. The flat-floored channel of an ephemeral stream, commonly with very steep to vertical banks cut in alluvium.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as—Inches

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	More than 12

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hillsides. Back slopes in profile are commonly steep, are linear, and may or may not include cliff segments.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Bajada. A broad alluvial slope extending from the base of a mountain range out into a basin and formed by coalescence of separate alluvial fans.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters

thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bench. A platform-type, nearly level to gently sloping erosional surface formed on resistant strata where valleys are in alternating strong and weak layers.

Bench terrace. A raised, level or nearly level strip of earth constructed on or nearly on a contour, supported by a barrier of rocks or similar material, and designed to make the soil suitable for tillage and to prevent accelerated erosion.

Bisequum. Two sequences of soil horizons, each of which consists of an illuvial horizon and the overlying eluvial horizons.

Blowout. A shallow depression from which all or most of the soil material has been removed by wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.

Bottom land. The normal flood plain of a stream, subject to flooding.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. The steep to very steep broken land at the border of an upland summit that is dissected by ravines.

Breast height. An average height of 4 ½ feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Broad-base terrace. A ridge-type terrace built to control erosion by diverting runoff along the contour at a nonscouring velocity. The terrace is 10 to 20 inches high and 15 to 30 feet wide and has gently sloping sides, a rounded crown, and a dish-shaped channel along the upper side. It may be nearly level or have a grade toward one or both ends.

Brush management. Use of mechanical, chemical, or biological methods to reduce or eliminate competition of woody vegetation to allow understory grasses and forbs to recover, or to make conditions favorable for reseeding. It increases production of forage, which reduces erosion. Brush management may improve the habitat for some species of wildlife.

Butte. An isolated small mountain or hill with steep or precipitous sides and a top variously flat, rounded, or pointed that may be a residual mass isolated by erosion or an exposed volcanic neck.

Cable yarding. A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, felled trees generally are reeled in while one end is lifted or the entire log is suspended.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

Caliche. A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of a standard crushed limestone, expressed as a ratio. First standardized in California. A soil having a CBR of 16 supports 16 percent of the load that would be supported by standard crushed limestone, per unit area, with the same degree of distortion.

Canopy. The leafy crown of trees or shrubs. (See Crown.)

Canyon. A long, deep, narrow, very steep sided valley with high, precipitous walls in an area of high local relief.

Capillary water. Water held as a film around soil particles and in tiny spaces between particles. Surface tension is the adhesive force that holds capillary water in the soil.

Catena. A sequence, or "chain," of soils on a landscape that formed in similar kinds of parent material but have different characteristics as a result of differences in relief and drainage.

Cation. An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.

Cation-exchange capacity. The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity, but is more precise in meaning.

Catsteps. Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil. A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches

along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation by use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.

Cirque. Semicircular, concave, bowllike areas that have steep faces primarily resulting from glacial ice and snow abrasion.

Clay. As a soil separate, the mineral soil particles less than 0.002 millimeter, in diameter. As a soil textural class, soil material that is 40 percent or more clay, less than 45 percent sand, and less than 40 percent silt.

Clay film. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay skin.

Clay skin. A thin coating of oriented clay on the surface of a soil aggregate or lining pores or root channels. Synonyms: clay coating, clay film.

Claypan. A slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.

Climax plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Coarse fragments. Mineral or rock particles larger than 2 millimeters in diameter.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.5 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Complex slope. Irregular or variable slope. Planning or constructing terraces, diversions, and other water-control measures on a complex slope is difficult.

Complex, soil. A map unit of two or more kinds of soil or miscellaneous areas in such an intricate pattern or so small in area that it is not practical to map them separately at the selected scale of mapping. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas.

Compressible (in tables). Excessive decrease in volume of soft soil under load.

Concretions. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Congeliturbate. Soil material disturbed by frost action.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. If soil improving crops and practices used in the system more than offset the soil depleting crops and deteriorating practices, then it is a good conservation cropping system. Cropping systems are needed on all tilled soils. Soil improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are—

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coppice dune. A small dune of fine-grained soil material stabilized around shrubs or small trees.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosive. High risk of corrosion to uncoated steel or deterioration of concrete.

Cover crop. A close-growing crop grown primarily to improve and protect the soil between periods of regular crop production, or a crop grown between trees and vines in orchards and vineyards.

Crop residue management. Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.

Cropping system. Growing crops using a planned system of rotation and management practices.

Cross-slope farming. Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.

Crown. The upper part of a tree or shrub, including the living branches and their foliage.

Cuesta. An asymmetric, homoclinal ridge capped by resistant rock layers of slight to moderate dip.

Culmination of the mean annual increment (CMAI). The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.

Cutbanks cave (in tables). The walls of excavations tend to cave in or slough.

Decreasers. The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.

Deferred grazing. Postponing grazing or arresting grazing for a prescribed period.

Delta. A body of alluvium whose surface is nearly flat and fan shaped, deposited at or near the mouth of a river or stream where it enters a body of relatively quiet water, generally a sea or lake.

Dense layer (in tables). A very firm, massive layer that has a bulk density of more than 1.8 grams per cubic centimeter. Such a layer affects the ease of digging and can affect filling and compacting.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Desert pavement. A layer of gravel or coarser fragments on a desert soil surface that was emplaced by upward movement of fragments from underlying sediment or remains after finer particles have been removed by running water or wind.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and low water holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and low water holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have intermediate water holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless artificial drainage is provided. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the

profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless artificial drainage is provided. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. They are wet enough to prevent the growth of important crops (except rice) unless artificially drained.

Drainage, surface. Runoff, or surface flow of water, from an area.

Draw. A small stream valley, generally more open and with broader bottom land than a ravine or gulch.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of the activities of man or other animals or of a catastrophe in nature; for example, fire that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and produced by erosion or faulting. Synonym: scarp.

Esker (geology). A narrow, winding ridge of stratified gravelly and sandy drift deposited by a stream flowing in a tunnel beneath a glacier.

Excess alkali (in tables). Excess exchangeable sodium in the soil. The resulting poor physical properties restrict the growth of plants.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Excess lime (in tables). Excess carbonates in the soil that restrict the growth of some plants.

Excess salts (in tables). Excess water-soluble salts in the soil that restrict the growth of most plants.

Excess sulfur (in tables). Excessive amount of sulfur in the soil. The sulfur causes extreme acidity if the soil is drained, and the growth of most plants is restricted.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

Fan terrace. A relict alluvial fan, no longer a site of active deposition, incised by younger and lower alluvial surfaces.

Fast intake (in tables). The rapid movement of water into the soil.

Fertility, soil. The quality that enables a soil to provide plant nutrients, in adequate amounts and in proper balance, for the growth of specified plants when light, moisture, temperature, tilth, and other growth factors are favorable.

Fibric soil material (peat). The least decomposed of all

organic soil material. Peat contains a large amount of well preserved fiber that is readily identifiable according to botanical origin. Peat has the lowest bulk density and the highest water content at saturation of all organic soil material.

Field moisture capacity. The moisture content of a soil, expressed as a percentage of the ovendry weight, after the gravitational, or free, water has drained away; the field moisture content 2 or 3 days after a soaking rain; also called *normal field capacity, normal moisture capacity,* or *capillary capacity.*

Fill slope. A sloping surface consisting of excavated soil material from a road cut. It commonly is on the downhill side of the road.

Fine textured soil. Sandy clay, silty clay, and clay.

Firebreak. Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of men and equipment in fire fighting. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothill. A steeply sloping upland that has relief of as much as 1,000 feet (or 300 meters) and fringes a mountain range or high-plateau escarpment.

Foot slope. The inclined surface at the base of a hill.

Forb. Any herbaceous plant not a grass or a sedge.

Forest cover. All trees and other woody plants (underbrush) covering the ground in a forest.

Forest type. A stand of trees similar in composition and development because of given physical and biological factors by which it may be differentiated from other stands.

Fragile (in tables). A soil that is easily damaged by use or disturbance.

Fragipan. A loamy, brittle subsurface horizon low in porosity and content of organic matter and low or moderate in clay but high in silt or very fine sand. A fragipan appears cemented and restricts roots. When dry, it is hard or very hard and has a higher bulk density than the horizon or horizons above. When moist, it tends to rupture suddenly under pressure rather than to deform slowly.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Gilgai. Commonly a succession of microbasins and microknolls in nearly level areas or of microvalleys and microridges parallel with the slope. Typically, the microrelief of Vertisols—clayey soils having a high coefficient of expansion and contraction with changes in moisture content.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Graded stripcropping. Growing crops in strips that grade toward a protected waterway.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of underlying material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage.

Hard rock. Rock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Hemic soil material (mucky peat). Organic soil material intermediate in degree of decomposition between the less decomposed fibric material and the more decomposed sapric material.

High-residue crops. Crops such as small grain and corn used for grain. If properly managed, residue from these crops can be used to control erosion until the next crop in the rotation is established. These crops return large amounts of organic matter to the soil.

Hill. A natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well-defined outline; hillsides generally have slopes of more than 15 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an upper case letter represents the major horizons. Numbers or lower case letters that follow represent subdivisions of the major horizons. An explanation of the subdivisions is given in the *Soil Survey Manual*. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

R layer.—Consolidated rock beneath the soil. The rock commonly underlies a C horizon, but it can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that increase in amount as the more desirable plants

are reduced by close grazing. Increasers commonly are the shorter plants and the less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake in inches per hour is expressed as follows:

Less than 0.2	Very low
0.2 to 0.4	Low
0.4 to 0.75	Moderately low
0.75 to 1.25	Moderate
1.25 to 1.75	Moderately high
1.75 to 2.5	High
More than 2.5	Very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are—

Border.—Water is applied at the upper end of a strip in which the lateral flow of water is controlled by small earth ridges called border dikes, or borders.

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

Controlled flooding.—Water is released at intervals from closely spaced field ditches and distributed uniformly over the field.

Corrugation.—Water is applied to small, closely spaced furrows or ditches in fields of close-growing crops or in orchards so that it flows in only one direction.

Drip (or trickle).—Water is applied slowly and under low pressure to the surface of the soil or into the soil through such applicators as emitters, porous tubing, or perforated pipe.

Furrow.—Water is applied in small ditches made by cultivation implements. Furrows are used for tree and row crops.

Sprinkler.—Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Subirrigation.—Water is applied in open ditches or tile lines until the water table is raised enough to wet the soil.

Wild flooding.—Water, released at high points, is allowed to flow onto an area without controlled distribution.

Kame (geology). An irregular, short ridge or hill of stratified glacial drift.

Karst (topography). The relief of an area underlain by limestone that dissolves in differing degrees, thus forming numerous depressions or small basins.

Knoll. A small, low, rounded hill rising above adjacent landforms.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.5 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Leaching. The removal of soluble material from soil or other material by percolating water.

Light textured soil. Sand and loamy sand.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by wind.

Low-residue crops. Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

Low strength. The soil is not strong enough to support loads.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mechanical treatment. Use of mechanical equipment

for seeding, brush management, and other management practices.

Medium textured soil. Very fine sandy loam, loam, silt loam, or silt.

Mesa. A broad, nearly flat topped and commonly isolated upland mass characterized by summit widths that are more than the heights of bounding erosional scarps.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.

Mineral soil. Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.

Minimum tillage. Only the tillage essential to crop production and prevention of soil damage.

Miscellaneous area. An area that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, and fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, and silty clay loam.

Moraine (geology). An accumulation of earth, stones, and other debris deposited by a glacier. Some types are terminal, lateral, medial, and ground.

Morphology, soil. The physical makeup of the soil, including the texture, structure, porosity, consistence, color, and other physical, mineral, and biological properties of the various horizons, and the thickness and arrangement of those horizons in the soil profile.

Mottling, soil. Irregular spots of different colors that vary in number and size. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few, common,* and *many*; size—*fine, medium,* and *coarse*; and contrast—*faint, distinct,* and *prominent.* The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).

Mountain. A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range.

Muck. Dark colored, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. Sedimentary rock formed by induration of silt and clay in approximately equal amounts.

Munsell notation. A designation of color by degrees of the three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color in hue of 10YR, value of 6, and chroma of 4.

Narrow-base terrace. A terrace no more than 4 to 8 feet wide at the base. A narrow-base terrace is similar to a broad-base terrace, except for the width of the ridge and channel.

Neutral soil. A soil having a pH value between 6.6 and 7.3. (See Reaction, soil.)

Nutrient, plant. Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.

Observed rooting depth. Depth to which roots have been observed to penetrate.

Open space. A relatively undeveloped green or wooded area provided mainly within an urban area to minimize feelings of congested living.

Organic matter. Plant and animal residue in the soil in various stages of decomposition.

Outwash plain. A landform of mainly sandy or coarse textured material of glaciofluvial origin. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Pan. A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan, fragipan, claypan, plowpan,* and *traffic pan.*

Parent material. The unconsolidated organic and mineral material in which soil forms.

Peat. Unconsolidated material, largely undecomposed organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil." A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permafrost. Layers of soil, or even bedrock, occurring in arctic or subarctic regions, in which a temperature below freezing has existed continuously for a long time.

Permeability. The quality of the soil that enables water to move downward through the profile. Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	Less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	More than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management. For example, slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Pitting (in tables). Pits caused by melting around ice. They form on the soil after plant cover is removed.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plateau. An extensive upland mass with relatively flat summit area that is considerably elevated (more than 100 meters) above adjacent lowlands and separated from them on one or more sides by escarpments.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plinthite. The sesquioxide-rich, humus-poor, highly weathered mixture of clay with quartz and other diluents. It commonly appears as red mottles, usually in platy, polygonal, or reticulate patterns. Plinthite changes irreversibly to an ironstone hardpan or to irregular aggregates on repeated wetting and drying, especially if it is exposed also to heat from the sun. In a moist soil, plinthite can be cut with a spade. It is a form of laterite.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

Poor outlets (in tables). Refers to areas where surface or subsurface drainage outlets are difficult or expensive to install.

Poorly graded. Refers to a coarse grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.

Post and piling outlet. A market location where posts and pilings are bought, processed, and sold.

Potential native plant community. The plant community on a given site that will be established if present environmental conditions continue to prevail and the site is properly managed. (See climax plant community.)

Potential rooting depth (effective rooting depth). Depth to which roots could penetrate if the content of moisture in the soil were adequate. The soil has no properties restricting the penetration of roots to this depth.

Prescribed burning. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This increases the vigor and reproduction of the key plants and promotes the accumulation of litter and mulch necessary to conserve soil and water.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Range site. An area of rangeland where climate, soil,

and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degree of acidity or alkalinity is expressed as—pH

Extremely acid	Below 4.5
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Red beds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered, or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep sided channel resulting from accelerated erosion. A rill generally is a few inches deep and not wide enough to be an obstacle to farm machinery.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a diameter of 2 millimeters or more; for example, gravel, cobbles, stones, and boulders.

Root zone. The part of the soil that can be penetrated by plant roots.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Runoff. The precipitation discharged into stream channels from an area. The water that flows off the surface of the land without sinking into the soil is called surface runoff. Water that enters the soil before reaching surface streams is called ground-water runoff or seepage flow from ground water.

Saline soil. A soil containing soluble salts in an amount that impairs growth of plants. A saline soil does not contain excess exchangeable sodium.

Salty water (in tables.) Water that is too salty for consumption by livestock.

Sand. As a soil separate, individual rock or mineral fragments from 0.05 millimeter to 2.0 millimeters in diameter. Most sand grains consist of quartz. As a soil textural class, a soil that is 85 percent or more sand and not more than 10 percent clay.

Sandstone. Sedimentary rock containing dominantly sand-size particles.

Sapric soil material (muck). The most highly decomposed of all organic soil material. Muck has the least amount of plant fiber, the highest bulk density, and the lowest water content at saturation of all organic soil material.

Saprolite (soil science). Unconsolidated residual material underlying the soil and grading to hard bedrock below.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and runoff water.

Shrink-swell (in tables). The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silica-sesquioxide ratio. The ratio of the number of

molecules of silica to the number of molecules of alumina and iron oxide. The more highly weathered soils or their clay fractions in warm-temperate, humid regions, and especially those in the tropics, generally have a low ratio.

Silt. As a soil separate, individual mineral particles that range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into 5 to 7 production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that show the average height of dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks, prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is silty or clayey, is slippery when wet, and is low in productivity.

Slippage (in tables). Soil mass susceptible to movement downslope when loaded, excavated, or wet.

Slope. The inclination of the land surface from the horizontal. Percentage of slope is the vertical distance divided by horizontal distance, then multiplied by 100. Thus, a slope of 20 percent is a drop of 20 feet in 100 feet of horizontal distance.

Small stones (in tables). Rock fragments less than 3 inches (7.5 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher), or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium absorption ratio (SAR) of a saturation extract, or the ratio of Na^{+} to $Ca^{++} + Mg^{++}$. The degrees of sodicity are—SAR

Slight	Less than 13:1
Moderate	13-30:1
Strong	More than 30:1

Soft rock. Rock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes of separates recognized in the United States are as follows:Millimeters

Very coarse sand	2.0 to 1.0
Coarse sand	1.0 to 0.5
Medium sand	0.5 to 0.25
Fine sand	0.25 to 0.10
Very fine sand	0.10 to 0.05
Silt	0.05 to 0.002
Clay	Less than 0.002

Solum. The upper part of a soil profile, above the C horizon, in which the processes of soil formation are active. The solum in soil consists of the A, E, and B horizons. Generally, the characteristics of the material in these horizons are unlike those of the underlying material. The living roots and plant and animal activities are largely confined to the solum.

Stone line. A concentration of coarse fragments in a soil. Generally it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 6 to 15 inches (15 to 38 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind and water erosion.

Structure, soil. The arrangement of primary soil particles into compound particles or aggregates. The principal forms of soil structure are—*platy* (laminated), *prismatic* (vertical axis of aggregates longer than horizontal), *columnar* (prisms with rounded tops), *blocky* (angular or subangular), and *granular*. *Structureless* soils are either *single grained* (each grain by itself, as in dune sand) or *massive* (the particles adhering without any regular cleavage, as in many hardpans).

Stubble mulch. Stubble or other crop residue left on the soil or partly worked into the soil. It protects the soil from wind and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subsoil. Technically, the B horizon; roughly, the part of the solum below plow depth.

Subsoiling. Tilling a soil below normal plow depth, ordinarily to shatter a hardpan or claypan.

Substratum. The part of the soil below the solum.

Subsurface layer. Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.

Summer fallow. The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.

Surface layer. The soil ordinarily moved in tillage, or its equivalent in uncultivated soil, ranging in depth from 4 to 10 inches (10 to 25 centimeters). Frequently designated as the "plow layer," or the "Ap horizon."

Tail water. The water just downstream of a structure.

Talus. Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep, rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.

Taxadjuncts. Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.

Terminal moraine. A belt of thick glacial drift that generally marks the termination of important glacial advances.

Terrace. An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.

Terrace (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.

Texture, soil. The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand, loamy sand, sandy loam, loam, silt loam, silt, sandy clay loam, clay loam, silty clay loam, sandy clay, silty clay,* and *clay.* The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."

Thin layer (in tables). Otherwise suitable soil material too thin for the specified use.

Till plain. An extensive flat to undulating area underlain by glacial till.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toe slope. The outermost inclined surface at the base of a hill; part of a foot slope.

Too arid (in tables). The soil is dry most of the time, and vegetation is difficult to establish.

Topsoil. The upper part of the soil, which is the most favorable material for plant growth. It is ordinarily rich in organic matter and is used to topdress roadbanks, lawns, and land affected by mining.

Toxicity (in tables). Excessive amount of toxic substances, such as sodium or sulfur, that severely hinder establishment of vegetation or severely restrict plant growth.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, are in soils in extremely small amounts. They are essential to plant growth.

Tuff. A compacted deposit that is 50 percent or more volcanic ash and dust.

Unstable fill (in tables). Risk of caving or sloughing on banks of fill material.

Upland (geology). Land at a higher elevation, in

general, than the alluvial plain or stream terrace; land above the lowlands along streams.

Valley fill. In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.

Variant, soil. A soil having properties sufficiently different from those of other known soils to justify a new series name, but occurring in such a limited geographic area that creation of a new series is not justified.

Variegation. Refers to patterns of contrasting colors assumed to be inherited from the parent material rather than to be the result of poor drainage.

Varve. A sedimentary layer or a lamina or sequence of laminae deposited in a body of still water within a year. Specifically, a thin pair of graded glaciolacustrine layers seasonally deposited, usually by meltwater streams, in a glacial lake or other body of still water in front of a glacier.

Water bars. Smooth, shallow ditches or depressional areas that are excavated at an angle across a sloping road. They are used to reduce the downward velocity of water and divert it off and away from the road surface. Water bars can easily be driven over if constructed properly.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an ovendry basis, at which a plant (specifically sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The action of uprooting and tipping over trees by the wind.

Yarding. Moving logs from a cutting area to a landing or loading area.

Tables

TABLE 1.--TEMPERATURE AND PRECIPITATION

(Recorded in the period 1951-86 at Newport and Tidewater in Lincoln County and 1978-93 at Laurel Mountain in Polk County)

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
NEWPORT:											
January----	50.0	37.4	43.7	64	19	147	11.28	5.55	16.25	18	0.6
February---	52.4	38.5	45.5	68	24	162	8.69	5.67	11.43	15	.0
March------	53.0	38.3	45.6	68	27	176	8.49	5.36	11.32	15	.0
April------	54.8	39.5	47.2	72	30	214	5.06	2.97	6.92	11	.0
May--------	58.4	43.4	50.9	78	33	334	3.31	1.78	4.66	8	.0
June-------	61.8	47.7	54.7	77	38	437	2.68	1.37	3.83	6	.0
July-------	64.2	49.5	56.8	81	40	517	.90	.30	1.44	2	.0
August-----	64.9	49.6	57.3	79	40	531	1.32	.34	2.10	3	.0
September--	65.1	48.0	56.6	90	37	490	2.82	1.05	4.29	5	.0
October----	61.1	44.7	52.9	83	33	398	6.11	3.24	8.63	10	.0
November---	54.9	41.2	48.1	70	26	246	10.41	5.99	14.34	16	.0
December---	50.8	38.3	44.5	62	20	163	12.05	7.48	16.16	17	.5
Yearly:											
Average---	57.6	43.0	50.3	---	---	---	---	---	---	---	---
Extreme---	100.0	1.0	---	92	15	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,816	73.11	57.80	82.81	126	1.1
TIDEWATER:											
January----	49.5	36.2	42.9	64	18	132	15.26	8.03	21.61	18	.6
February---	54.0	38.1	46.1	71	24	180	12.27	8.44	15.79	16	.6
March------	56.2	38.4	47.3	75	27	230	11.62	7.44	15.41	16	.1
April------	59.9	39.9	49.9	81	30	298	6.70	3.93	9.17	13	.0
May--------	65.1	44.1	54.6	88	34	449	4.01	2.27	5.56	9	.0
June-------	69.4	48.6	59.0	89	39	573	2.53	1.10	3.75	6	.0
July-------	74.0	51.7	62.8	94	42	706	.74	.18	1.31	2	.0
August-----	75.2	51.9	63.6	93	42	725	1.24	.28	2.18	3	.0
September--	73.9	49.8	61.8	95	38	645	3.10	1.44	4.85	5	.0
October----	66.1	45.7	55.9	86	32	478	6.90	3.63	9.76	10	.0
November---	55.5	40.6	48.1	71	25	251	13.32	7.94	18.13	16	.2
December---	50.0	37.5	43.7	63	20	148	16.03	10.11	21.39	18	.5
Yearly:											
Average---	62.4	43.5	53.0	---	---	---	---	---	---	---	---
Extreme---	106.0	5.0	---	99	14	---	---	---	---	---	---
Total-----	---	---	---	---	---	4,814	93.72	81.19	103.95	132	2.0

See footnote at end of table.

TABLE 1.--TEMPERATURE AND PRECIPITATION--Continued

Month	Temperature						Precipitation				
				2 years in 10 will have--				2 years in 10 will have--			
	Average daily maximum	Average daily minimum	Average	Maximum temperature higher than--	Minimum temperature lower than--	Average number of growing degree days*	Average	Less than--	More than--	Average number of days with 0.10 inch or more	Average snowfall
	°F	°F	°F	°F	°F	Units	In	In	In		In
LAUREL MOUNTAIN:											
January----	39.9	29.5	34.7	60	10	34	15.27	6.56	22.68	16	18.0
February---	39.6	30.0	34.8	60	9	35	14.64	8.00	20.49	14	20.7
March------	42.1	31.6	36.9	61	21	44	11.77	6.74	16.24	15	15.0
April------	45.6	33.0	39.3	71	24	86	8.18	4.61	11.36	12	14.1
May--------	51.8	37.1	44.4	79	27	168	5.35	2.09	8.09	9	2.0
June-------	57.7	42.8	50.2	82	32	312	4.17	1.79	6.19	7	.0
July-------	64.0	47.8	55.9	85	37	507	1.43	.51	2.19	3	.0
August-----	66.1	49.7	57.9	86	39	554	1.56	.30	2.53	3	.0
September--	60.8	45.9	53.3	83	34	391	4.12	.86	6.65	6	.0
October----	54.3	41.1	47.7	78	27	251	8.10	3.06	12.31	9	.6
November---	42.5	32.9	37.7	62	18	51	16.73	9.17	23.40	17	8.3
December---	39.5	29.6	34.6	61	5	35	17.42	10.37	23.72	15	19.9
Yearly:											
Average---	50.3	37.6	44.0	---	---	---	---	---	---	---	---
Extreme---	92.0	-11.0	---	88	-1	---	---	---	---	---	---
Total-----	---	---	---	---	---	2,469	108.73	86.45	124.42	126	98.6

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

TABLE 2.--FREEZE DATES IN SPRING AND FALL

(Recorded in the period 1951-86 at Newport and Tidewater in Lincoln County and 1978-93 at Laurel Mountain in Polk County)

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
NEWPORT:			
Last freezing temperature in spring:			
1 year in 10 later than--	Feb. 13	Mar. 26	May 13
2 years in 10 later than--	Jan. 30	Mar. 12	May 1
5 years in 10 later than--	Dec. 24	Feb. 9	Apr. 9
First freezing temperature in fall:			
1 year in 10 earlier than--	Dec. 1	Nov. 9	Oct. 18
2 years in 10 earlier than--	Dec. 19	Nov. 23	Oct. 29
5 years in 10 earlier than--	Feb. 10	Dec. 25	Nov. 18
TIDEWATER:			
Last freezing temperature in spring:			
1 year in 10 later than--	Feb. 22	Mar. 21	May 9
2 years in 10 later than--	Feb. 7	Mar. 8	Apr. 28
5 years in 10 later than--	Jan. 2	Feb. 11	Apr. 5
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 25	Nov. 6	Oct. 21
2 years in 10 earlier than--	Dec. 8	Nov. 16	Oct. 30
5 years in 10 earlier than--	Jan. 11	Dec. 7	Nov. 16

TABLE 2.--FREEZE DATES IN SPRING AND FALL--Continued

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
LAUREL MOUNTAIN:			
Last freezing temperature in spring:			
1 year in 10 later than--	Apr. 9	May 9	June 4
2 years in 10 later than--	Mar. 28	May 4	May 31
5 years in 10 later than--	Mar. 7	Apr. 25	May 24
First freezing temperature in fall:			
1 year in 10 earlier than--	Nov. 8	Oct. 25	Oct. 7
2 years in 10 earlier than--	Nov. 15	Nov. 1	Oct. 12
5 years in 10 earlier than--	Nov. 27	Nov. 14	Oct. 23

TABLE 3.--GROWING SEASON

(Recorded in the period 1951-86 at Newport and Tidewater in Lincoln County and 1978-93 at Laurel Mountain in Polk County)

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	Days	Days
NEWPORT:			
9 years in 10	318	245	170
8 years in 10	365	267	189
5 years in 10	365	316	223
2 years in 10	365	365	258
1 year in 10	365	365	277
TIDEWATER:			
9 years in 10	293	238	179
8 years in 10	323	259	195
5 years in 10	>365	303	224
2 years in 10	>365	>365	253
1 year in 10	>365	>365	268
LAUREL MOUNTAIN:			
9 years in 10	222	172	134
8 years in 10	236	182	140
5 years in 10	264	202	151
2 years in 10	291	222	163
1 year in 10	306	232	169

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1E	Apt-McDuff silty clay loams, 5 to 30 percent slopes	16,650	3.4
1F	Apt-McDuff silty clay loams, 30 to 50 percent slopes	4,555	0.9
2E	Astoria silt loam, 5 to 30 percent slopes	3,070	0.6
3C	Bandon fine sandy loam, 3 to 12 percent slopes	1,130	0.2
3E	Bandon fine sandy loam, 12 to 50 percent slopes	2,485	0.5
4A	Beaches, 1 to 3 percent slopes	1,720	0.3
5C	Bentilla silty clay loam, 3 to 12 percent slopes	1,945	0.4
6E	Blachly silty clay loam, 5 to 35 percent slopes	2,020	0.4
6F	Blachly silty clay loam, 35 to 50 percent slopes	780	0.2
7H	Bohannon-Preacher complex, 60 to 90 percent slopes	35,600	7.2
8A	Brallier mucky peat, 0 to 1 percent slopes	580	0.1
9A	Brenner silt loam, 0 to 2 percent slopes	970	0.2
10G	Caterl-Laderly gravelly loams, 30 to 65 percent slopes	2,125	0.4
11B	Chitwood silt loam, 0 to 7 percent slopes	1,555	0.3
12A	Coquille silt loam, 0 to 1 percent slopes	3,210	0.7
13A	Coquille silt loam, 0 to 1 percent slopes, protected	1,690	0.3
14B	Depoe loam, 0 to 7 percent slopes	1,660	0.3
15B	Eilertsen silt loam, 0 to 5 percent slopes	5,720	1.2
16C	Elsie silt loam, 3 to 12 percent slopes	1,145	0.2
17A	Euchre silt loam, 0 to 3 percent slopes	1,005	0.2
18G	Fendall-Templeton silt loams, 35 to 60 percent slopes	24,210	4.9
19E	Fendall-Winema silt loams, 15 to 35 percent slopes	2,570	0.5
20E	Formader-Hemcross complex, 3 to 35 percent slopes	5,755	1.2
20G	Formader-Hemcross complex, 35 to 60 percent slopes	11,160	2.3
21H	Formader-Klistan-Hemcross complex, 60 to 80 percent slopes	24,070	4.9
22C	Gleneden silty clay loam, 2 to 12 percent slopes	1,515	0.3
23C	Grindbrook silt loam, 2 to 12 percent slopes	1,820	0.4
24H	Harslow-Rock outcrop complex, 60 to 90 percent slopes	2,750	0.6
25A	Hebo silty clay loam, 0 to 3 percent slopes	840	0.2
26E	Hembre silt loam, 3 to 35 percent slopes	1,025	0.2
26G	Hembre silt loam, 35 to 60 percent slopes	745	0.2
27A	Histic Cryaquepts, 0 to 3 percent slopes	225	*
28E	Honeygrove silty clay loam, 3 to 30 percent slopes	1,285	0.3
29E	Kilowan clay loam, 5 to 35 percent slopes	2,500	0.5
29G	Kilowan clay loam, 35 to 60 percent slopes	1,865	0.4
30A	Kirkendall silt loam, 0 to 3 percent slopes	675	0.1
31G	Klistan-Harslow very gravelly loams, 20 to 60 percent slopes	2,675	0.5
32E	Klootchie-Neotsu silt loams, 3 to 30 percent slopes	5,860	1.2
32G	Klootchie-Neotsu silt loams, 30 to 60 percent slopes	12,075	2.4
33B	Knappa silt loam, 2 to 7 percent slopes	1,275	0.3
34E	Laderly-Murtip complex, 3 to 30 percent slopes	475	0.1
35E	Lint silt loam, 5 to 25 percent slopes	2,860	0.6
36A	Logsden silt loam, 0 to 3 percent slopes	3,125	0.6
37C	McCurdy silt loam, 3 to 12 percent slopes	425	0.1
38C	Meda loam, 3 to 12 percent slopes	820	0.2
39E	Murtip-Caterl complex, 5 to 35 percent slopes	1,690	0.3
39G	Murtip-Caterl complex, 35 to 60 percent slopes	2,295	0.5
40A	Nehalem silt loam, 0 to 3 percent slopes	2,825	0.6
41A	Nekoma-Fluvaquents complex, 0 to 3 percent slopes	3,200	0.6
42C	Nelscott loam, 3 to 12 percent slopes	6,525	1.3
42E	Nelscott loam, 12 to 50 percent slopes	2,795	0.6
43H	Neotsu-Necanicum complex, 60 to 90 percent slopes	7,145	1.4
44H	Neskowin-Rock outcrop complex, 20 to 99 percent slopes	675	0.1
45E	Neskowin-Salander silt loams, 5 to 35 percent slopes	2,695	0.5
45G	Neskowin-Salander silt loams, 35 to 65 percent slopes	8,815	1.8
46A	Nestucca silt loam, 0 to 2 percent slopes	3,385	0.7
47C	Netarts fine sand, 3 to 12 percent slopes	260	0.1
47E	Netarts fine sand, 12 to 30 percent slopes	310	0.1
48E	Peavine silty clay loam, 3 to 30 percent slopes	1,075	0.2
48F	Peavine silty clay loam, 30 to 50 percent slopes	285	0.1
49E	Preacher-Bohannon complex, 5 to 35 percent slopes	22,810	4.6
50G	Preacher-Bohannon-Slickrock complex, 35 to 60 percent slopes	88,380	17.9
51A	Quillamook silt loam, 0 to 3 percent slopes	1,500	0.3

See footnote at end of table.

TABLE 4.--ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
52H	Reedsport-Tolovana complex, 60 to 85 percent slopes	8,740	1.8
53E	Sach gravelly loam, 3 to 30 percent slopes	830	0.2
53G	Sach gravelly loam, 30 to 60 percent slopes	720	0.1
54A	Siletz silt loam, 0 to 3 percent slopes	720	0.1
55E	Templeton-Fendall silt loams, 5 to 35 percent slopes	20,600	4.2
56E	Tolovana-Reedsport complex, 3 to 35 percent slopes	17,750	3.6
56G	Tolovana-Reedsport complex, 35 to 60 percent slopes	61,715	12.5
57A	Treharne silt loam, 0 to 3 percent slopes	345	0.1
58E	Urban land-Bandon complex, 12 to 50 percent slopes	405	0.1
59C	Urban land-Nelscott complex, 0 to 12 percent slopes	970	0.2
60C	Urban land-Waldport complex, 0 to 12 percent slopes	585	0.1
61E	Valsetz-Yellowstone complex, 3 to 30 percent slopes	3,835	0.8
61G	Valsetz-Yellowstone complex, 30 to 60 percent slopes	2,830	0.6
61H	Valsetz-Yellowstone complex, 60 to 90 percent slopes	2,265	0.5
62C	Wadecreek silt loam, 3 to 12 percent slopes	930	0.2
63E	Waldport fine sand, 0 to 30 percent slopes	875	0.2
64C	Winema-Fendall silt loams, 3 to 15 percent slopes	1,190	0.2
65A	Wolfer silt loam, 0 to 3 percent slopes	770	0.2
66A	Yachats very fine sandy loam, 0 to 3 percent slopes	925	0.2
67A	Yaquina fine sand, 0 to 3 percent slopes	415	0.1
	Water	7,045	1.4
	Total	493,340	100.0

* Less than 0.1 percent.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF PASTURE AND HAY

(Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil)

Soil name and map symbol	Land capability		Pasture		Grass-legume hay	
	N	I	N	I	N	I
			AUM*	AUM*	Tons	Tons
1E**:						
Apt	VIe	---	---	---	---	---
McDuff	VIe	---	---	---	---	---
1F**:						
Apt	VIe	---	---	---	---	---
McDuff	VIe	---	---	---	---	---
2E Astoria	VIe	---	---	---	---	---
3C Bandon	IIIe	---	3	---	---	---
3E Bandon	VIe	---	---	---	---	---
4A** Beaches	VIIIw	---	---	---	---	---
5C Bentilla	IIIe	---	6	---	---	---
6E, 6F Blachly	VIe	---	---	---	---	---
7H**:						
Bohannon	VIIe	---	---	---	---	---
Preacher	VIIe	---	---	---	---	---
8A Brallier	Vw	---	---	---	---	---
9A Brenner	IIIw	---	8	---	---	---
10G**:						
Caterl	VIe	---	---	---	---	---
Laderly	VIe	---	---	---	---	---
11B Chitwood	IIIe	---	10	---	---	---
12A Coquille	VIw	---	---	---	---	---
13A Coquille	IVw	---	9	---	---	---
14B Depoe	VIw	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF PASTURE AND HAY--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay	
	N	I	N	I	N	I
			AUM*	AUM*	Tons	Tons
15B---------- Eilertsen	IIc	IIc	15	18	3.0	4.5
16C---------- Elsie	IVe	---	14	---	2.5	---
17A---------- Euchre	IIIw	---	8	---	---	---
18G**:						
Fendall----------	VIe	---	---	---	---	---
Templeton----------	VIe	---	---	---	---	---
19E**:						
Fendall----------	VIe	---	---	---	---	---
Winema----------	IVe	---	---	---	---	---
20E**, 20G**:						
Formader----------	VIe	---	---	---	---	---
Hemcross----------	VIe	---	---	---	---	---
21H**:						
Formader----------	VIIe	---	---	---	---	---
Klistan----------	VIIe	---	---	---	---	---
Hemcross----------	VIIe	---	---	---	---	---
22C---------- Gleneden	IIIe	---	6	---	---	---
23C---------- Grindbrook	IIIe	---	10	---	---	---
24H**:						
Harslow----------	VIIe	---	---	---	---	---
Rock outcrop--------	VIIIs	---	---	---	---	---
25A---------- Hebo	IVw	---	6	---	---	---
26E, 26G---------- Hembre	VIe	---	---	---	---	---
27A---------- Histic Cryaquepts	Vw	---	---	---	---	---
28E---------- Honeygrove	VIe	---	---	---	---	---
29E, 29G---------- Kilowan	VIe	---	---	---	---	---
30A---------- Kirkendall	IIw	IIw	15	18	3.0	4.5

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF PASTURE AND HAY--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay	
	N	I	N	I	N	I
			AUM*	AUM*	Tons	Tons
31G**:						
Klistan	VIe	---	---	---	---	---
Harslow	VIe	---	---	---	---	---
32E**, 32G**:						
Klootchie	VIe	---	---	---	---	---
Neotsu	VIe	---	---	---	---	---
33B	IIe	---	14	---	3.0	---
Knappa						
34E**:						
Laderly	VIe	---	---	---	---	---
Murtip	VIe	---	---	---	---	---
35E	IVe	---	9	---	---	---
Lint						
36A	IIc	---	14	---	3.0	---
Logsden						
37C	IIIe	---	8	---	3.0	---
McCurdy						
38C	IIIe	---	8	---	---	---
Meda						
39E**, 39G**:						
Murtip	VIe	---	---	---	---	---
Caterl	VIe	---	---	---	---	---
40A	IIIw	---	12	---	3.0	---
Nehalem						
41A**:						
Nekoma	IIIw	IIIw	13	15	3.0	4.0
Fluvaquents	VIw	---	---	---	---	---
42C	IIIe	---	9	---	---	---
Nelscott						
42E	VIe	---	---	---	---	--
Nelscott						
43H**:						
Neotsu	VIIe	---	---	---	---	---
Necanicum	VIIe	---	---	---	---	---
44H**:						
Neskowin	VIe	---	---	---	---	---
Rock outcrop	VIIIs	---	---	---	---	---
45E**, 45G**:						
Neskowin	VIe	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF PASTURE AND HAY--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay	
	N	I	N	I	N	I
			AUM*	AUM*	Tons	Tons
45E**, 45G**:						
Salander	VIe	---	---	---	---	---
46A Nestucca	IIIw	---	8	---	3.0	---
47C, 47E Netarts	VIe	---	---	---	---	---
48E, 48F Peavine	VIe	---	---	---	---	---
49E**:						
Preacher	VIe	---	---	---	---	---
Bohannon	VIe	---	---	---	---	---
50G**:						
Preacher	VIe	---	---	---	---	---
Bohannon	VIe	---	---	---	---	---
Slickrock	VIe	---	---	---	---	---
51A Quillamook	IIc	---	14	---	3.0	---
52H**:						
Reedsport	VIIe	---	---	---	---	---
Tolovana	VIIe	---	---	---	---	---
53E, 53G Sach	VIe	---	---	---	---	---
54A Siletz	IIc	---	13	---	3.0	---
55E**:						
Templeton	VIe	---	---	---	---	---
Fendall	VIe	---	---	---	---	---
56E**, 56G**:						
Tolovana	VIe	---	---	---	---	---
Reedsport	VIe	---	---	---	---	---
57A Treharne	IIc	IIc	11	16	3.0	4.0
58E**:						
Urban land	VIIIs	---	---	---	---	---
Bandon	VIe	---	---	---	---	---
59C**:						
Urban land	VIIIs	---	---	---	---	---
Nelscott	IIIe	---	---	---	---	---

See footnotes at end of table.

TABLE 5.--LAND CAPABILITY CLASSES AND YIELDS PER ACRE OF PASTURE AND HAY--Continued

Soil name and map symbol	Land capability		Pasture		Grass-legume hay	
	N	I	N	I	N	I
			AUM*	AUM*	Tons	Tons
60C**:						
Urban land	VIIIs	---	---	---	---	---
Waldport	VIIe	---	---	---	---	---
61E**:						
Valsetz	VIs	---	---	---	---	---
Yellowstone	VIs	---	---	---	---	---
61G**:						
Valsetz	VIs	---	---	---	---	---
Yellowstone	VIIs	---	---	---	---	---
61H**:						
Valsetz	VIIs	---	---	---	---	---
Yellowstone	VIIs	---	---	---	---	---
62C---------- Wadecreek	IIIe	---	10	---	---	---
63E---------- Waldport	VIIe	---	---	---	---	---
64C**:						
Winema	IIIe	---	10	---	---	---
Fendall	VIe	---	8	---	---	---
65A---------- Wolfer	IIIs	---	4	---	1.5	---
66A---------- Yachats	IIIw	---	13	---	---	---
67A---------- Yaquina	IVw	---	3	---	---	---

* Animal-unit-month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 6.--WOODLAND MANAGEMENT

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Management concerns								
	Seedling mortality	Plant competition	Windthrow hazard	Equipment limitation	Fire damage hazard	Cut and fill erosion hazard	Sheet and rill erosion hazard	Soil displacement	Soil compaction
1E*:									
Apt	Slight	Moderate	Slight	Moderate	Slight	Moderate	Slight	Moderate	Severe.
McDuff	Slight	Severe	Moderate	Moderate	Slight	Moderate	Moderate	Moderate	Severe.
1F*:									
Apt	Slight	Moderate	Slight	Severe	Slight	Severe	Moderate	Moderate	Severe.
McDuff	Slight	Severe	Moderate	Severe	Slight	Severe	Severe	Moderate	Severe.
2E---Astoria	Slight	Severe	Slight	Moderate	Slight	Slight	Slight	Moderate	Moderate.
3C---Bandon	Slight	Severe	Severe	Moderate	Moderate	Slight	Slight	Moderate	Moderate.
3E---Bandon	Slight	Severe	Severe	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
5C---Bentilla	Slight	Severe	Moderate	Moderate	Slight	Slight	Slight	Moderate	Severe.
6E---Blachly	Slight	Severe	Slight	Moderate	Moderate	Slight	Slight	Moderate	Severe.
6F---Blachly	Slight	Severe	Slight	Severe	Moderate	Moderate	Moderate	Severe	Severe.
7H*:									
Bohannon	Slight	Severe	Moderate	Severe	Severe	Severe	Severe	Moderate	Moderate.
Preacher	Slight	Severe	Slight	Severe	Slight	Severe	Severe	Moderate	Moderate.
10G*:									
Caterl	Slight	Moderate	Slight	Severe	Moderate	Moderate	Moderate	Moderate	Moderate.
Laderly	Moderate	Moderate	Moderate	Severe	Moderate	Moderate	Severe	Severe	Moderate.
11B---Chitwood	Slight	Severe	Severe	Severe	Slight	Slight	Slight	Moderate	Severe.
15B---Eilertsen	Slight	Severe	Slight	Slight	Slight	Slight	Slight	Moderate	Moderate.
16C---Elsie	Slight	Severe	Slight	Slight	Slight	Slight	Slight	Moderate	Moderate.
18G*:									
Fendall	Slight	Severe	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Severe.
Templeton	Slight	Severe	Slight	Severe	Moderate	Moderate	Severe	Moderate	Moderate.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT--Continued

Soil name and map symbol	Management concerns								
	Seedling mortality	Plant competition	Windthrow hazard	Equipment limitation	Fire damage hazard	Cut and fill erosion hazard	Sheet and rill erosion hazard	Soil displacement	Soil compaction
19E*:									
Fendall	Slight	Severe	Moderate	Moderate	Slight	Moderate	Moderate	Moderate	Severe.
Winema	Slight	Severe	Slight	Moderate	Slight	Moderate	Moderate	Moderate	Moderate.
20E*:									
Formader	Slight	Severe	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate.
Hemcross	Slight	Severe	Slight	Moderate	Moderate	Slight	Slight	Moderate	Moderate.
20G*:									
Formader	Slight	Severe	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
Hemcross	Slight	Severe	Slight	Severe	Moderate	Moderate	Moderate	Moderate	Moderate.
21H*:									
Formader	Slight	Severe	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
Klistan	Moderate	Severe	Slight	Severe	Moderate	Severe	Severe	Slight	Slight.
Hemcross	Slight	Severe	Slight	Severe	Moderate	Severe	Severe	Moderate	Moderate.
22C---------- Gleneden	Slight	Severe	Severe	Moderate	Slight	Slight	Slight	Moderate	Severe.
23C---------- Grindbrook	Slight	Severe	Moderate	Severe	Slight	Slight	Slight	Moderate	Moderate.
24H*:									
Harslow	Moderate	Severe	Moderate	Severe	Moderate	Severe	Severe	Moderate	Slight.
Rock outcrop.									
26E---------- Hembre	Slight	Severe	Slight	Moderate	Slight	Slight	Slight	Moderate	Severe.
26G---------- Hembre	Slight	Severe	Slight	Severe	Moderate	Moderate	Severe	Moderate	Severe.
28E---------- Honeygrove	Slight	Moderate	Slight	Moderate	Moderate	Slight	Slight	Moderate	Severe.
29E---------- Kilowan	Slight	Severe	Moderate	Moderate	Moderate	Slight	Moderate	Moderate	Severe.
29G---------- Kilowan	Slight	Severe	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Severe.
31G*:									
Klistan	Moderate	Severe	Slight	Severe	Moderate	Severe	Moderate	Slight	Slight.
Harslow	Moderate	Severe	Moderate	Severe	Moderate	Severe	Severe	Moderate	Slight.
32E*:									
Klootchie	Slight	Severe	Slight	Moderate	Moderate	Slight	Moderate	Moderate	Moderate.
Neotsu	Slight	Severe	Moderate	Moderate	Moderate	Slight	Moderate	Moderate	Moderate.
32G*:									
Klootchie	Slight	Severe	Slight	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
Neotsu	Slight	Severe	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Moderate.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT--Continued

Soil name and map symbol	Management concerns								
	Seedling mortality	Plant competition	Windthrow hazard	Equipment limitation	Fire damage hazard	Cut and fill erosion hazard	Sheet and rill erosion hazard	Soil displacement	Soil compaction
33B---------- Knappa	Slight	Severe	Slight	Moderate	Slight	Slight	Slight	Moderate	Severe.
34E*:									
Leaderly------	Moderate	Moderate	Moderate	Moderate	Moderate	Slight	Slight	Severe	Moderate.
Murtip--------	Slight	Moderate	Slight	Moderate	Slight	Slight	Moderate	Moderate	Moderate.
35E---------- Lint	Slight	Severe	Slight	Moderate	Slight	Slight	Slight	Moderate	Moderate.
37C---------- McCurdy	Slight	Severe	Moderate	Moderate	Slight	Slight	Slight	Moderate	Severe.
39E*:									
Murtip--------	Slight	Moderate	Slight	Moderate	Slight	Slight	Moderate	Moderate	Moderate.
Caterl--------	Slight	Moderate	Slight	Severe	Moderate	Slight	Slight	Moderate	Moderate.
39G*:									
Murtip--------	Slight	Moderate	Slight	Severe	Slight	Moderate	Severe	Moderate	Moderate.
Caterl--------	Slight	Moderate	Slight	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
42C---------- Nelscott	Slight	Severe	Moderate	Moderate	Moderate	Slight	Slight	Moderate	Moderate.
42E---------- Nelscott	Slight	Severe	Moderate	Severe	Moderate	Moderate	Moderate	Moderate	Moderate.
43H*:									
Neotsu--------	Slight	Severe	Moderate	Severe	Moderate	Severe	Severe	Moderate	Moderate.
Necanicum-----	Slight	Severe	Slight	Severe	Moderate	Severe	Severe	Moderate	Moderate.
44H*:									
Neskowin------	Slight	Severe	Moderate	Severe	Moderate	Severe	Severe	Moderate	Severe.
Rock outcrop.									
45E*:									
Neskowin------	Slight	Severe	Moderate	Moderate	Moderate	Slight	Moderate	Moderate	Moderate.
Salander------	Slight	Severe	Slight	Moderate	Slight	Slight	Moderate	Moderate	Moderate.
45G*:									
Neskowin------	Slight	Severe	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
Salander------	Slight	Severe	Slight	Severe	Moderate	Moderate	Severe	Moderate	Moderate.
48E---------- Peavine	Slight	Moderate	Moderate	Moderate	Moderate	Slight	Moderate	Moderate	Severe.
48F---------- Peavine	Slight	Moderate	Moderate	Severe	Moderate	Moderate	Severe	Moderate	Severe.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT--Continued

Soil name and map symbol	Management concerns								
	Seedling mortality	Plant competition	Windthrow hazard	Equipment limitation	Fire damage hazard	Cut and fill erosion hazard	Sheet and rill erosion hazard	Soil displacement	Soil compaction
49E*:									
Preacher	Slight	Severe	Slight	Moderate	Slight	Slight	Slight	Moderate	Moderate.
Bohannon	Slight	Severe	Moderate	Moderate	Moderate	Slight	Slight	Moderate	Moderate.
50G*:									
Preacher	Slight	Severe	Slight	Severe	Slight	Moderate	Moderate	Moderate	Moderate.
Bohannon	Slight	Severe	Moderate	Severe	Moderate	Moderate	Moderate	Moderate	Moderate.
Slickrock	Slight	Severe	Slight	Severe	Moderate	Moderate	Moderate	Moderate	Severe.
52H*:									
Reedsport	Slight	Severe	Moderate	Severe	Moderate	Severe	Severe	Severe	Moderate.
Tolovana	Slight	Severe	Slight	Severe	Moderate	Severe	Severe	Moderate	Moderate.
53E---------- Sach	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate	Moderate.
53G---------- Sach	Moderate	Moderate	Moderate	Severe	Moderate	Severe	Severe	Moderate	Moderate.
55E*:									
Templeton	Slight	Severe	Slight	Moderate	Slight	Slight	Slight	Moderate	Moderate.
Fendall	Slight	Severe	Moderate	Moderate	Slight	Moderate	Moderate	Moderate	Severe.
56E*:									
Tolovana	Slight	Severe	Slight	Moderate	Moderate	Slight	Slight	Moderate	Moderate.
Reedsport	Slight	Severe	Moderate	Moderate	Moderate	Slight	Slight	Severe	Moderate.
56G*:									
Tolovana	Slight	Severe	Slight	Severe	Moderate	Moderate	Moderate	Moderate	Moderate.
Reedsport	Slight	Severe	Moderate	Severe	Moderate	Moderate	Moderate	Severe	Moderate.
61E*:									
Valsetz	Moderate	Moderate	Moderate	Moderate	Severe	Slight	Moderate	Moderate	Moderate.
Yellowstone	Moderate	Moderate	Severe	Moderate	Moderate	Slight	Moderate	Severe	Severe.
61G*:									
Valsetz	Moderate	Moderate	Moderate	Severe	Severe	Moderate	Severe	Moderate	Moderate.
Yellowstone	Moderate	Moderate	Severe	Severe	Moderate	Moderate	Severe	Severe	Severe.
61H*:									
Valsetz	Moderate	Moderate	Moderate	Severe	Severe	Severe	Severe	Moderate	Moderate.
Yellowstone	Moderate	Moderate	Severe	Severe	Moderate	Severe	Severe	Severe	Severe.
62C---------- Wadecreek	Slight	Severe	Moderate	Moderate	Slight	Slight	Slight	Moderate	Severe.

See footnote at end of table.

TABLE 6.--WOODLAND MANAGEMENT--Continued

Soil name and map symbol	Management concerns								
	Seedling mortality	Plant competition	Windthrow hazard	Equipment limitation	Fire damage hazard	Cut and fill erosion hazard	Sheet and rill erosion hazard	Soil displacement	Soil compaction
64C*:									
Winema	Slight	Severe	Slight	Slight	Slight	Slight	Slight	Moderate	Moderate.
Fendall	Slight	Severe	Moderate	Slight	Slight	Slight	Slight	Moderate	Severe.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 7.--WOODLAND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that information was not available)

Soil name and map symbol	Common trees	Potential productivity*							
		Site index (50-year)	Annual growth	CMAI age	Site index (100-year)	Total yield	CMAI age	Annual growth	CMAI age
			Cu ft/ac	Yrs		Bd ft/ac	Yrs	Cu ft/ac	Yrs
1E**, 1F**:									
Apt	Douglas-fir	135	203	90	176	95,500	100	187	60
McDuff	Douglas-fir	124	182	90	156	78,800	100	165	60
2E	Douglas-fir	122	178	90	164	85,200	100	174	60
Astoria	Western hemlock	124	---	---	173	96,810	70	279	50
3C, 3E	Sitka spruce	---	---	---	142	---	---	205	70
Bandon	Western hemlock	95	---	---	135	79,040	80	209	50
5C	Western hemlock	124	---	---	180	116,000	80	292	50
Bentilla	Douglas-fir	129	191	90	167	87,800	100	178	60
6E, 6F	Douglas-fir	127	188	90	168	88,700	100	179	60
Blachly									
7H**:									
Bohannon	Douglas-fir	118	171	90	160	81,800	100	170	60
Preacher	Douglas-fir	128	190	90	172	92,100	100	183	60
10G**:									
Caterl	Douglas-fir	110	154	90	140	69,410	110	145	60
	Western hemlock	78	---	---	115	69,480	90	170	50
Laderly	Douglas-fir	85	107	90	106	46,800	150	92	60
11B	Western hemlock	91	---	---	128	74,000	80	196	50
Chitwood	Sitka spruce	---	---	---	132	---	---	181	70
15B	Douglas-fir	137	209	90	179	88,380	90	190	60
Eilertsen									
16C	Douglas-fir	143	220	90	186	93,960	90	196	60
Elsie									
18G**:									
Fendall	Western hemlock	133	---	---	178	114,400	80	288	50
	Douglas-fir	127	188	90	161	82,700	100	171	60
Templeton	Western hemlock	113	---	---	162	101,600	80	258	50
	Douglas-fir	121	176	90	165	86,100	100	176	60
	Sitka spruce	---	---	---	167	---	---	252	70
19E**:									
Fendall	Western hemlock	133	---	---	178	114,400	80	288	50
	Douglas-fir	127	188	90	161	82,700	100	171	60
Winema	Western hemlock	125	---	---	177	113,600	80	287	50
	Douglas-fir	121	176	90	166	87,000	100	177	60
20E**, 20G**:									
Formander	Douglas-fir	124	182	90	162	83,500	100	172	60
Hemcross	Douglas-fir	131	195	90	170	90,400	100	181	60

See footnotes at end of table.

TABLE 7.--WOODLAND PRODUCTIVITY--Continued

Soil name and map symbol	Common trees	Potential productivity*							
		Site index (50-year)	Annual growth	CMAI age	Site index (100-year)	Total yield	CMAI age	Annual growth	CMAI age
			Cu ft/ac	Yrs		Bd ft/ac	Yrs	Cu ft/ac	Yrs
21H**:									
Formander	Douglas-fir	124	182	90	162	83,500	100	172	60
Klistan	Douglas-fir	127	188	90	166	87,000	100	177	60
Hemcross	Douglas-fir	131	195	90	170	90,400	100	181	60
22C	Sitka spruce	---	---	---	163	---	---	245	70
Gleneden	Western hemlock	104	---	---	146	88,640	80	230	50
23C	Western hemlock	123	---	---	170	94,990	70	274	50
Grindbrook	Douglas-fir	136	207	90	167	87,800	100	178	60
24H**:									
Harslow	Douglas-fir	112	158	90	147	69,500	100	154	60
Rock outcrop.									
26E, 26G	Douglas-fir	127	188	90	166	87,800	100	177	60
Hembre									
28E	Douglas-fir	133	199	90	170	90,400	100	181	60
Honeygrove									
29E, 29G	Douglas-fir	134	201	90	171	91,200	100	182	60
Kilowan									
31G**:									
Klistan	Douglas-fir	127	188	90	166	87,000	100	177	60
Harslow	Douglas-fir	112	158	90	147	69,500	100	154	60
32E**, 32G**:									
Klootchie	Western hemlock	104	---	---	150	92,960	80	238	50
	Douglas-fir	109	152	90	157	79,000	100	167	60
Neotsu	Douglas-fir	109	152	90	148	70,500	100	156	60
33B	Western hemlock	120	---	---	168	93,380	70	270	50
Knappa	Douglas-fir	125	184	90	170	90,400	100	181	60
34E**:									
Laderly	Douglas-fir	85	107	90	106	46,800	150	92	60
Murtip	Douglas-fir	111	156	90	149	71,400	100	157	60
	Western hemlock	100	---	---	140	72,030	70	218	50
35E	Western hemlock	107	---	---	158	98,560	80	251	50
Lint	Sitka spruce	---	---	---	158	---	---	237	70
	Douglas-fir	106	147	90	137	66,110	110	140	60
37C	Douglas-fir	140	214	90	184	92,430	90	194	60
McCurdy									
39E**, 39G**:									
Murtip	Douglas-fir	111	156	90	149	71,400	100	157	60
	Western hemlock	100	---	---	140	72,030	70	218	50
Caterl	Douglas-fir	110	154	90	140	69,410	110	145	60
	Western hemlock	78	---	---	115	69,480	90	170	50

See footnotes at end of table.

TABLE 7.--WOODLAND PRODUCTIVITY--Continued

Soil name and map symbol	Common trees	Potential productivity*							
		Site index (50-year)	Annual growth	CMAI age	Site index (100-year)	Total yield	CMAI age	Annual growth	CMAI age
			Cu ft/ac	Yrs		Bd ft/ac	Yrs	Cu ft/ac	Yrs
42C, 42E	Sitka spruce	---	---	---	141	---	---	203	70
Nelscott	Western hemlock	89	---	---	129	93,800	80	198	50
43H**:									
Neotsu	Douglas-fir	109	152	90	149	70,500	100	156	60
Necanicum	Western hemlock	100	---	---	140	72,030	70	218	50
	Douglas-fir	111	156	90	157	79,000	100	167	60
44H**:									
Neskowin	Sitka spruce	---	---	---	138	---	---	195	70
	Western hemlock	93	---	---	133	77,760	80	205	50
Rock outcrop.									
45E**, 45G**:									
Neskowin	Sitka spruce	---	---	---	138	---	---	195	70
	Western hemlock	93	---	---	133	77,760	80	205	50
Salander	Sitka spruce	---	---	---	167	---	---	252	70
	Western hemlock	99	---	---	151	93,680	80	240	50
48E, 48F	Douglas-fir	135	203	90	174	93,800	100	185	60
Peavine									
49E**:									
Preacher	Douglas-fir	128	190	90	172	92,100	100	183	60
Bohannon	Douglas-fir	118	171	90	160	81,800	100	170	60
50G**:									
Preacher	Douglas-fir	128	190	90	172	92,100	100	183	60
Bohannon	Douglas-fir	118	171	90	160	81,800	100	170	60
Slickrock	Douglas-fir	136	207	90	194	100,260	90	203	60
52H**:									
Reedsport	Western hemlock	115	---	---	165	104,000	80	264	50
	Douglas-fir	115	163	90	152	74,300	100	161	60
Tolovana	Western hemlock	121	---	---	172	96,180	70	278	50
	Douglas-fir	125	184	90	171	91,200	100	182	60
53E, 53G	Douglas-fir	99	134	90	135	63,910	110	138	60
Sach	Western hemlock	82	---	---	123	68,960	80	186	50
	Noble fir	---	---	---	125	---	---	---	---
55E**:									
Templeton	Western hemlock	113	---	---	162	101,600	80	258	50
	Douglas-fir	121	176	90	165	86,100	100	176	60
	Sitka spruce	---	---	---	167	---	---	252	70
Fendall	Western hemlock	133	---	---	178	114,400	80	288	50
	Douglas-fir	127	188	90	161	82,700	100	171	60
56E**, 56G**:									
Tolovana	Western hemlock	121	---	---	172	96,180	70	278	50
	Douglas-fir	125	184	90	171	91,200	100	182	60
Reedsport	Western hemlock	115	---	---	165	104,000	80	264	50
	Douglas-fir	115	163	90	152	74,300	100	161	60

See footnotes at end of table.

TABLE 7.--WOODLAND PRODUCTIVITY--Continued

Soil name and map symbol	Common trees	Potential productivity*							
		Site index (50-year)	Annual growth	CMAI age	Site index (100-year)	Total yield	CMAI age	Annual growth	CMAI age
			Cu ft/ac	Yrs		Bd ft/ac	Yrs	Cu ft/ac	Yrs
61E**, 61G**, 61H**:									
Valsetz	Western hemlock	76	---	---	109	63,900	90	158	60
	Noble fir	---	---	---	107	---	---	---	
Yellowstone	Western hemlock	---	---	---	100	60,000	100	142	60
	Noble fir	---	---	---	94	---	---	---	---
62C	Western hemlock	119	---	---	170	94,990	70	274	50
Wadecreek	Douglas-fir	134	201	90	173	93,000	100	184	60
64C**:									
Winema	Western hemlock	125	---	---	177	113,600	80	287	50
	Douglas-fir	121	176	90	166	87,000	100	177	60
Fendall	Western hemlock	133	---	---	178	114,400	80	288	50
	Douglas-fir	127	188	90	161	82,700	100	171	60

* All yield data based on fully stocked, even-aged stands. CMAI means culmination of mean annual increment. The Scribner rule is used for yields in board-feet per acre.

** See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 8.--RECREATIONAL DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated)

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1E*:					
Apt	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
McDuff	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
1F*:					
Apt	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
McDuff	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
2E Astoria	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
3C Bandon	Slight	Slight	Severe: slope.	Slight	Moderate: cemented pan.
3E Bandon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
4A* Beaches	Severe: flooding, ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding, flooding.	Severe: ponding, too sandy.	Severe: ponding, droughty, flooding.
5C Bentilla	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Slight	Slight.
6E Blachly	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
6F Blachly	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
7H*:					
Bohannon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Preacher	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
8A Brallier	Severe: flooding, ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding, flooding.	Severe: ponding, excess humus.	Severe: ponding, flooding, excess humus.
9A Brenner	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
10G*:					
Caterl	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Laderly	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
11B Chitwood	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
12A Coquille	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding, flooding.	Severe: ponding.	Severe: ponding, flooding.
13A Coquille	Severe: flooding, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.
14B Depoe	Severe: ponding, cemented pan.	Severe: ponding, cemented pan.	Severe: ponding, cemented pan.	Severe: ponding.	Severe: ponding, cemented pan.
15B Eilertsen	Slight	Slight	Moderate: slope.	Slight	Slight.
16C Elsie	Slight	Slight	Severe: slope.	Slight	Slight.
17A Euchre	Severe: wetness.	Moderate: wetness, percs slowly.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
18G*:					
Fendall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Templeton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
19E*:					
Fendall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Winema	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
20E*:					
Formader	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
20G*:					
Formader	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
20G*:					
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
21H*:					
Formader	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Klistan	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22C Gleneden	Severe: percs slowly.	Severe: percs slowly.	Severe: slope, percs slowly.	Moderate: wetness.	Moderate: wetness.
23C Grindbrook	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Severe: erodes easily.	Slight.
24H*:					
Harslow	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
25A Hebo	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.
26E Hembre	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
26G Hembre	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
27A Histic Cryaquepts	Severe: ponding, excess humus.	Severe: ponding, excess humus.	Severe: excess humus, ponding.	Severe: ponding, excess humus.	Severe: ponding, excess humus.
28E Honeygrove	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
29E Kilowan	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
29G Kilowan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
30A Kirkendall	Severe: flooding.	Slight	Moderate: flooding.	Slight	Moderate: flooding.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
31G*:					
Klistan	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: small stones, slope.
Harslow	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope, small stones.	Severe: slope.	Severe: small stones, slope.
32E*:					
Klootchie	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Neotsu	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
32G*:					
Klootchie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Neotsu	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
33B Knappa	Slight	Slight	Moderate: slope.	Severe: erodes easily.	Slight.
34E*:					
Laderly	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
Murtip	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
35E Lint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: erodes easily.	Severe: slope.
36A Logsden	Severe: flooding.	Slight	Slight	Slight	Slight.
37C McCurdy	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.
38C Meda	Slight	Slight	Severe: slope.	Slight	Moderate: droughty.
39E*:					
Murtip	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Caterl	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
39G*:					
Murtip	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
39G*:					
Caterl	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
40A	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Nehalem					
41A*:					
Nekoma	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
Fluvaquents	Severe: flooding, wetness.	Severe: wetness.	Severe: wetness, flooding.	Severe: wetness.	Severe: wetness, flooding.
42C	Moderate: wetness.	Moderate: wetness.	Severe: slope.	Slight	Moderate: cemented pan.
Nelscott					
42E	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Nelscott					
43H*:					
Neotsu	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Necanicum	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
44H*:					
Neskowin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope.	Severe: slope, depth to rock.
45E*:					
Neskowin	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Salander	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
45G*:					
Neskowin	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Salander	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
46A	Severe: flooding, wetness.	Moderate: flooding, wetness, percs slowly.	Severe: wetness, flooding.	Moderate: wetness, flooding.	Severe: flooding.
Nestucca					
47C	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty.
Netarts					

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
47E Netarts	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: slope.
48E Peavine	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
48F Peavine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
49E*: Preacher	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Bohannon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
50G*: Preacher	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Bohannon	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
Slickrock	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
51A Quillamook	Slight	Slight	Slight	Slight	Slight.
52H*: Reedsport	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
53E Sach	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Moderate: slope.	Severe: slope.
53G Sach	Severe: slope.	Severe: slope.	Severe: slope, small stones.	Severe: slope.	Severe: slope.
54A Siletz	Slight	Slight	Slight	Slight	Slight.
55E*: Templeton	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
Fendall	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
56E*: Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
56E*:					
Reedsport	Severe: slope.	Severe: slope.	Severe: slope.	Moderate: slope.	Severe: slope.
56G*:					
Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Reedsport	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
57A	Moderate: wetness.	Moderate: wetness.	Moderate: wetness.	Slight	Slight.
Treharne					
58E*:					
Urban land.					
Bandon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
59C*:					
Urban land.					
Nelscott	Moderate: wetness.	Moderate: wetness.	Severe: slope.	Slight	Moderate: cemented pan.
60C*:					
Urban land.					
Waldport	Severe: too sandy.	Severe: too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Moderate: droughty.
61E*:					
Valsetz	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Moderate: large stones, slope.	Severe: slope.
Yellowstone	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Moderate: slope.	Severe: slope, depth to rock.
61G*:					
Valsetz	Severe: slope.	Severe: slope.	Severe: large stones, slope, small stones.	Severe: slope.	Severe: slope.
Yellowstone	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, depth to rock.
61H*:					
Valsetz	Severe: slope.	Severe: slope.	Severe: slope, large stones, small stones.	Severe: slope, large stones, small stones.	Severe: slope.
Yellowstone	Severe: slope, depth to rock.	Severe: slope, depth to rock.	Severe: slope, small stones.	Severe: slope.	Severe: slope, depth to rock.

See footnote at end of table.

TABLE 8.--RECREATIONAL DEVELOPMENT--Continued

Soil name and map symbol	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
62C Wadecreek	Moderate: wetness, percs slowly.	Moderate: wetness, percs slowly.	Severe: slope.	Slight	Slight.
63E Waldport	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: slope, too sandy.	Severe: too sandy.	Severe: slope.
64C*: Winema	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope.
Fendall	Moderate: slope, percs slowly.	Moderate: slope, percs slowly.	Severe: slope.	Slight	Moderate: slope, depth to rock.
65A Wolfer	Slight	Slight	Moderate: small stones.	Slight	Slight.
66A Yachats	Severe: flooding.	Moderate: flooding.	Severe: flooding.	Moderate: flooding.	Severe: flooding.
67A Yaquina	Severe: ponding, too sandy.	Severe: ponding, too sandy.	Severe: too sandy, ponding.	Severe: ponding, too sandy.	Severe: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 9.--BUILDING SITE DEVELOPMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1E*, 1F*:						
Apt	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
McDuff	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
2E---------- Astoria	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
3C---------- Bandon	Severe: cutbanks cave.	Slight---------	Moderate: cemented pan.	Moderate: slope.	Slight---------	Moderate: cemented pan.
3E---------- Bandon	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
4A*---------- Beaches	Severe: cutbanks cave, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: ponding, flooding.	Severe: ponding, droughty, flooding.
5C---------- Bentilla	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
6E, 6F---------- Blachly	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
7H*:						
Bohannon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Preacher	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
8A---------- Brallier	Severe: excess humus, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, flooding, ponding.	Severe: subsides, ponding, flooding.	Severe: ponding, flooding, excess humus.
9A---------- Brenner	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
10G*:						
Caterl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
10G*:						
Laderly	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
11B--- Chitwood	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Severe: low strength.	Moderate: wetness.
12A--- Coquille	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding, flooding.	Severe: ponding, flooding.
13A--- Coquille	Severe: ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: low strength, ponding.	Severe: ponding.
14B--- Depoe	Severe: cemented pan, cutbanks cave, ponding.	Severe: ponding, cemented pan.	Severe: ponding, cemented pan.	Severe: ponding, cemented pan.	Severe: cemented pan, ponding.	Severe: ponding, cemented pan.
15B--- Eilertsen	Slight---	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell.	Severe: low strength.	Slight.
16C--- Elsie	Slight---	Slight---	Slight---	Moderate: slope.	Severe: low strength.	Slight.
17A--- Euchre	Severe: cutbanks cave, wetness.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Moderate: wetness.	Moderate: wetness.
18G*:						
Fendall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Templeton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
19E*:						
Fendall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Winema	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
20E*, 20G*:						
Formader	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
21H*:						
Formader	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Klistan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
22C						
Gleneden	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Moderate: wetness.
23C						
Grindbrook	Severe: wetness.	Moderate: wetness.	Severe: wetness.	Moderate: wetness, slope.	Severe: low strength.	Slight.
24H*:						
Harslow	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Rock outcrop	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
25A						
Hebo	Severe: ponding.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: ponding, shrink-swell.	Severe: shrink-swell, low strength, ponding.	Severe: ponding.
26E, 26G						
Hembre	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
27A						
Histic Cryaquepts	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding, frost action.	Severe: ponding, excess humus.
28E						
Honeygrove	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
29E, 29G						
Kilowan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
30A						
Kirkendall	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Moderate: flooding.
31G*:						
Klistan	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.
Harslow	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: small stones, slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
32E*, 32G*:						
Klootchie	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Neotsu	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
33B---------- Knappa	Slight	Moderate: shrink-swell.	Moderate: shrink-swell.	Moderate: shrink-swell, slope.	Severe: low strength.	Slight.
34E*:						
Laderly	Severe: depth to rock, slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Severe: slope.	Severe: slope.
Murtip	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
35E---------- Lint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
36A---------- Logsden	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Moderate: low strength, flooding.	Slight.
37C---------- McCurdy	Severe: wetness.	Severe: shrink-swell.	Severe: wetness, shrink-swell.	Severe: shrink-swell.	Severe: shrink-swell, low strength.	Slight.
38C---------- Meda	Slight	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
39E*, 39G*:						
Murtip	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Caterl	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
40A---------- Nehalem	Moderate: wetness, flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: low strength, flooding.	Severe: flooding.
41A*:						
Nekoma	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
Fluvaquents	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: wetness, flooding.	Severe: wetness, flooding.
42C---------- Nelscott	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: shrink-swell, low strength.	Moderate: cemented pan.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
42E--Nelscott	Severe: cutbanks cave, wetness, slope.	Severe: slope.	Severe: wetness, slope.	Severe: slope.	Severe: slope.	Severe: slope.
43H*:						
Neotsu	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Necanicum	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
44H*:						
Neskowin	Severe: depth to rock, slope.	Severe: low strength, slope.	Severe: depth to rock, slope.	Severe: slope, low strength.	Severe: slope.	Severe: slope.
Rock outcrop	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
45E*, 45G*:						
Neskowin	Severe: depth to rock, slope.	Severe: low strength, slope.	Severe: depth to rock, slope.	Severe: slope, low strength.	Severe: slope.	Severe: slope.
Salander	Severe: excess humus, slope.	Severe: low strength, slope.	Severe: slope.	Severe: slope, low strength.	Severe: slope.	Severe: slope.
46A--Nestucca	Severe: wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: low strength, flooding.	Severe: flooding.
47C--Netarts	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
47E--Netarts	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
48E, 48F--Peavine	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
49E*:						
Preacher	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Bohannon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
50G*:						
Preacher	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Bohannon	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
50G*:						
Slickrock	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
51A---------- Quillamook	Severe: cutbanks cave, excess humus.	Severe: low strength.	Slight---------	Severe: low strength.	Moderate: low strength.	Slight.
52H*:						
Reedsport	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
53E, 53G---------- Sach	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
54A---------- Siletz	Severe: cutbanks cave.	Slight---------	Slight---------	Slight---------	Slight---------	Slight.
55E*:						
Templeton	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Fendall	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
56E*, 56G*:						
Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: low strength, slope.	Severe: slope.
Reedsport	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
57A---------- Treharne	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: low strength.	Slight.
58E*:						
Urban land.						
Bandon	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
59C*:						
Urban land.						
Nelscott	Severe: cutbanks cave, wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Moderate: shrink-swell, low strength.	Moderate: cemented pan.
60C*:						
Urban land.						

See footnote at end of table.

TABLE 9.--BUILDING SITE DEVELOPMENT--Continued

Soil name and map symbol	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
60C*:						
Waldport	Severe: cutbanks cave.	Slight	Slight	Moderate: slope.	Slight	Moderate: droughty.
61E*, 61G*, 61H*:						
Valsetz	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: depth to rock, slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.	Severe: slope, large stones.
Yellowstone	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.	Severe: depth to rock, slope.	Severe: slope, depth to rock.
62C---------- Wadecreek	Severe: wetness.	Moderate: wetness, shrink-swell.	Severe: wetness.	Moderate: wetness, shrink-swell, slope.	Severe: low strength.	Slight.
63E---------- Waldport	Severe: cutbanks cave, slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.
64C*:						
Winema	Moderate: too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope.
Fendall	Moderate: depth to rock, too clayey, slope.	Moderate: shrink-swell, slope.	Moderate: depth to rock, slope, shrink-swell.	Severe: slope.	Severe: low strength.	Moderate: slope, depth to rock.
65A---------- Wolfer	Severe: cutbanks cave.	Slight	Slight	Slight	Slight	Slight.
66A---------- Yachats	Severe: cutbanks cave.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.	Severe: flooding.
67A---------- Yaquina	Severe: cutbanks cave, ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Severe: ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 10.--SANITARY FACILITIES

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "good," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1E*, 1F*:					
Apt	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
McDuff	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
2E Astoria	Severe: slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
3C Bandon	Severe: cemented pan.	Severe: seepage, cemented pan, slope.	Severe: seepage.	Severe: cemented pan.	Poor: cemented pan.
3E Bandon	Severe: cemented pan, slope.	Severe: seepage, cemented pan, slope.	Severe: seepage, slope.	Severe: cemented pan, slope.	Poor: cemented pan, slope.
4A* Beaches	Severe: flooding, ponding, poor filter.	Severe: seepage, flooding, ponding.	Severe: flooding, seepage, ponding.	Severe: flooding, seepage, ponding.	Poor: seepage, too sandy, ponding.
5C Bentilla	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
6E, 6F Blachly	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
7H*:					
Bohannon	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Preacher	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: slope.	Poor: hard to pack, slope.
8A Brallier	Severe: subsides, flooding, ponding.	Severe: flooding, excess humus, ponding.	Severe: flooding, ponding, excess humus.	Severe: flooding, ponding.	Poor: ponding, excess humus.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
9A Brenner	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
10G*:					
Caterl	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: seepage, small stones, slope.
Laderly	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
11B Chitwood	Severe: wetness, percs slowly.	Moderate: slope.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey, wetness.
12A Coquille	Severe: flooding, ponding, percs slowly.	Severe: flooding, ponding.	Severe: flooding, ponding.	Severe: flooding, ponding.	Poor: ponding.
13A Coquille	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding.	Severe: ponding.	Poor: ponding.
14B Depoe	Severe: cemented pan, ponding.	Severe: seepage, cemented pan, ponding.	Severe: cemented pan, seepage, ponding.	Severe: cemented pan, ponding.	Poor: cemented pan, seepage, too sandy.
15B Eilertsen	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight	Fair: too clayey.
16C Elsie	Moderate: percs slowly.	Severe: slope.	Moderate: too clayey.	Slight	Fair: too clayey.
17A Euchre	Severe: wetness, percs slowly.	Severe: seepage, wetness.	Severe: seepage, wetness.	Severe: seepage, wetness.	Poor: seepage, wetness.
18G*:					
Fendall	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
Templeton	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope, thin layer.
19E*:					
Fendall	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
19E*:					
Winema	Severe: percs slowly, slope.	Severe: slope.	Severe: depth to rock, slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
20E*, 20G*:					
Formader	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, slope.
21H*:					
Formader	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
Klistan	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Hemcross	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, slope.
22C	Severe: wetness, percs slowly.	Severe: slope.	Severe: wetness, too clayey.	Moderate: wetness.	Poor: too clayey, hard to pack.
23C	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
24H*:					
Harslow	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, small stones.
Rock outcrop	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
25A	Severe: ponding, percs slowly.	Severe: ponding.	Severe: ponding, too clayey.	Severe: ponding.	Poor: too clayey, hard to pack, ponding.
26E, 26G	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: slope.
27A	Severe: ponding, percs slowly.	Severe: excess humus, ponding.	Severe: ponding.	Severe: ponding.	Poor: small stones, ponding.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
28E---------- Honeygrove	Severe: percs slowly, slope.	Severe: slope.	Severe: slope, too clayey.	Severe: slope.	Poor: too clayey, hard to pack, slope.
29E, 29G---------- Kilowan	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
30A---------- Kirkendall	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
31G*:					
Klistan----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: small stones, slope.
Harslow----------	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, seepage, small stones.
32E*, 32G*:					
Klootchie----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
Neotsu----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
33B---------- Knappa	Moderate: percs slowly.	Moderate: seepage, slope.	Moderate: too clayey.	Slight----------	Fair: too clayey.
34E*:					
Laderly----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, large stones.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
Murtip----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
35E---------- Lint	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, slope.
36A---------- Logsden	Moderate: flooding, percs slowly.	Severe: seepage.	Severe: seepage.	Moderate: flooding.	Fair: too clayey.
37C---------- McCurdy	Severe: wetness, percs slowly.	Severe: slope, wetness.	Severe: wetness, too clayey.	Severe: wetness.	Poor: too clayey.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
38C---------- Meda	Severe: poor filter.	Severe: seepage, slope.	Severe: seepage.	Severe: seepage.	Poor: seepage, small stones.
39E*, 39G*:					
Murtip----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: hard to pack, slope.
Caterl----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: seepage, small stones, slope.
40A---------- Nehalem	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Fair: too clayey, wetness.
41A*:					
Nekoma----------	Severe: flooding, poor filter.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Fair: too sandy.
Fluvaquents--------	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
42C---------- Nelscott	Severe: cemented pan, wetness.	Severe: seepage, cemented pan, slope.	Severe: seepage.	Severe: cemented pan.	Poor: cemented pan.
42E---------- Nelscott	Severe: cemented pan, wetness, slope.	Severe: seepage, cemented pan, slope.	Severe: seepage, slope.	Severe: cemented pan, slope.	Poor: cemented pan, slope.
43H*:					
Neotsu----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
Necanicum----------	Severe: slope.	Severe: slope.	Severe: depth to rock, slope, large stones.	Severe: slope.	Poor: small stones, slope.
44H*:					
Neskowin----------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, excess humus.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
Rock outcrop-------	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
45E*, 45G*:					
Neskowin	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, excess humus.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, slope.
Salander	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: hard to pack, small stones, slope.
46A Nestucca	Severe: flooding, wetness, percs slowly.	Severe: flooding, wetness.	Severe: flooding, wetness.	Severe: flooding, wetness.	Poor: wetness.
47C Netarts	Slight	Severe: seepage, slope.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy.
47E Netarts	Severe: slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: seepage, too sandy, slope.
48E, 48F Peavine	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
49E*:					
Preacher	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: slope.	Poor: hard to pack, slope.
Bohannon	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
50G*:					
Preacher	Severe: slope.	Severe: seepage, slope.	Severe: depth to rock, seepage, slope.	Severe: slope.	Poor: hard to pack, slope.
Bohannon	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Slickrock	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope.
51A Quillamook	Moderate: percs slowly.	Moderate: seepage, excess humus.	Severe: excess humus.	Slight	Poor: hard to pack.

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
52H*:					
Reedsport	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
53E, 53G Sach	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, hard to pack, small stones.
54A Siletz	Moderate: percs slowly.	Severe: seepage.	Severe: seepage.	Slight	Poor: hard to pack.
55E*:					
Templeton	Severe: slope.	Severe: slope.	Severe: depth to rock, slope.	Severe: slope.	Poor: slope, thin layer.
Fendall	Severe: depth to rock, percs slowly, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope, too clayey.	Severe: depth to rock, slope.	Poor: depth to rock, too clayey, hard to pack.
56E*, 56G*:					
Tolovana	Severe: slope.	Severe: slope.	Severe: slope.	Severe: slope.	Poor: small stones, slope.
Reedsport	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Severe: depth to rock, slope.	Poor: depth to rock, slope.
57A Treharne	Severe: wetness, percs slowly.	Severe: wetness.	Severe: wetness.	Severe: wetness.	Fair: too clayey, wetness, thin layer.
58E*:					
Urban land.					
Bandon	Severe: cemented pan, slope.	Severe: seepage, cemented pan, slope.	Severe: seepage, slope.	Severe: cemented pan, slope.	Poor: cemented pan, slope.
59C*:					
Urban land.					
Nelscott	Severe: cemented pan, wetness.	Severe: seepage, cemented pan.	Severe: seepage.	Severe: cemented pan.	Poor: cemented pan.
60C*:					
Urban land.					

See footnote at end of table.

TABLE 10.--SANITARY FACILITIES--Continued

Soil name and map symbol	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
60C*:					
Waldport	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: too sandy.
61E*, 61G*, 61H*:					
Valsetz	Severe: depth to rock, slope, large stones.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, seepage, slope.	Poor: depth to rock, small stones, slope.
Yellowstone	Severe: depth to rock, slope.	Severe: seepage, depth to rock, slope.	Severe: depth to rock, seepage, slope.	Severe: depth to rock, slope.	Poor: depth to rock, small stones, slope.
62C---------- Wadecreek	Severe: wetness, percs slowly.	Severe: slope.	Severe: too clayey.	Moderate: wetness.	Poor: too clayey.
63E---------- Waldport	Severe: poor filter, slope.	Severe: seepage, slope.	Severe: seepage, slope, too sandy.	Severe: seepage, slope.	Poor: too sandy, slope.
64C*:					
Winema	Severe: percs slowly.	Severe: slope.	Severe: depth to rock, too clayey.	Moderate: depth to rock, slope.	Poor: too clayey, hard to pack.
Fendall	Severe: depth to rock, percs slowly.	Severe: depth to rock, slope.	Severe: depth to rock, too clayey.	Severe: depth to rock.	Poor: depth to rock, too clayey, hard to pack.
65A---------- Wolfer	Severe: poor filter.	Severe: seepage.	Severe: seepage, too sandy.	Severe: seepage.	Poor: seepage, too sandy, small stones.
66A---------- Yachats	Severe: flooding.	Severe: seepage, flooding.	Severe: flooding, seepage, wetness.	Severe: flooding, seepage.	Fair: too sandy.
67A---------- Yaquina	Severe: ponding, poor filter.	Severe: seepage, ponding.	Severe: seepage, ponding, too sandy.	Severe: seepage, ponding.	Poor: seepage, too sandy, ponding.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 11.--CONSTRUCTION MATERIALS

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "good," "fair," and other terms. Absence of an entry indicates that the soil was not rated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
1E*:				
Apt	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
McDuff	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
1F*:				
Apt	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
McDuff	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
2E Astoria	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
3C Bandon	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones.
3E Bandon	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
4A* Beaches	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.
5C Bentilla	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
6E Blachly	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
6F Blachly	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
7H*:				
Bohannon	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Preacher	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
8A Brallier	Poor: wetness.	Improbable: excess humus.	Improbable: excess humus.	Poor: excess humus, wetness.
9A Brenner	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
10G*: Caterl	Poor: slope.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
Laderly	Poor: depth to rock, slope.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.
11B Chitwood	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
12A, 13A Coquille	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
14B Depoe	Poor: cemented pan, wetness.	Probable	Improbable: too sandy.	Poor: cemented pan, wetness.
15B Eilertsen	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
16C Elsie	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
17A Euchre	Fair: wetness.	Probable	Probable	Fair: small stones, area reclaim.
18G*: Fendall	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Templeton	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
19E*: Fendall	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
Winema	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
20E*:				
Formader	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Hemcross	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
20G*:				
Formader	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Hemcross	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
21H*:				
Formader	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Klistan	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Hemcross	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
22C---------- Gleneden	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
23C---------- Grindbrook	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: thin layer.
24H*:				
Harslow	Poor: depth to rock, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, slope.
Rock outcrop	Poor: depth to rock, slope.	---	---	Poor: depth to rock, slope.
25A---------- Hebo	Poor: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, wetness.
26E---------- Hembre	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
26G---------- Hembre	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
27A---------- Histic Cryaquepts	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, wetness.
28E---------- Honeygrove	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, small stones, slope.
29E---------- Kilowan	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
29G---------- Kilowan	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
30A---------- Kirkendall	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
31G*:				
Klistan----------	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
Harslow----------	Poor: depth to rock, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, slope.
32E*:				
Klootchie----------	Poor: thin layer.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Neotsu----------	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
32G*:				
Klootchie----------	Poor: thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Neotsu----------	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
33B---------- Knappa	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
34E*:				
Laderly----------	Poor: depth to rock.	Improbable: excess fines, large stones.	Improbable: excess fines, large stones.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
34E*:				
Murtip	Fair: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
35E Lint	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
36A Logsden	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones.
37C McCurdy	Poor: shrink-swell, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
38C Meda	Good	Probable	Probable	Poor: small stones, area reclaim.
39E*:				
Murtip	Fair: depth to rock, thin layer, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Caterl	Fair: depth to rock, thin layer, slope.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
39G*:				
Murtip	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Caterl	Poor: slope.	Improbable: small stones.	Improbable: thin layer.	Poor: small stones, area reclaim, slope.
40A Nehalem	Fair: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
41A*:				
Nekoma	Good	Improbable: excess fines.	Improbable: excess fines.	Fair: too sandy.
Fluvaquents	Poor: wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: wetness.
42C Nelscott	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: cemented pan, small stones.
42E Nelscott	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
43H*:				
Neotsu	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Necanicum	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
44H*:				
Neskowin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Rock outcrop	Poor: depth to rock, slope.	---	---	Poor: depth to rock, slope.
45E*:				
Neskowin	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Salander	Fair: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
45G*:				
Neskowin	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Salander	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, area reclaim, slope.
46A Nestucca	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Good.
47C Netarts	Good	Probable	Improbable: too sandy.	Poor: too sandy.
47E Netarts	Fair: slope.	Probable	Improbable: too sandy.	Poor: too sandy, slope.
48E Peavine	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
48F Peavine	Poor: depth to rock, low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey, slope.
49E*:				
Preacher	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
49E*:				
Bohannon	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
50G*:				
Preacher	Poor: low strength, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Bohannon	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Slickrock	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, small stones, slope.
51A Quillamook	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
52H*:				
Reedsport	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
Tolovana	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
53E Sach	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
53G Sach	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
54A Siletz	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim.
55E*:				
Templeton	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: slope.
Fendall	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer, slope.
56E*:				
Tolovana	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Reedsport	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
56G*:				
Tolovana	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: area reclaim, slope.
Reedsport	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
57A				
Treharne	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: too clayey.
58E*:				
Urban land.				
Bandon	Poor: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: small stones, slope.
59C*:				
Urban land.				
Nelscott	Fair: wetness.	Improbable: excess fines.	Improbable: excess fines.	Fair: cemented pan, small stones.
60C*:				
Urban land.				
Waldport	Good	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy.
61E*:				
Valsetz	Poor: large stones, depth to rock.	Improbable: large stones, excess fines.	Improbable: large stones, excess fines.	Poor: small stones, slope.
Yellowstone	Poor: depth to rock.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
61G*, 61H*:				
Valsetz	Poor: large stones, depth to rock, slope.	Improbable: large stones, excess fines.	Improbable: large stones, excess fines.	Poor: small stones, slope.
Yellowstone	Poor: depth to rock, slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: depth to rock, small stones, slope.
62C				
Wadecreek	Fair: low strength, wetness.	Improbable: excess fines.	Improbable: excess fines.	Poor: too clayey.
63E				
Waldport	Fair: slope.	Improbable: excess fines.	Improbable: excess fines.	Poor: too sandy, slope.

See footnote at end of table.

TABLE 11.--CONSTRUCTION MATERIALS--Continued

Soil name and map symbol	Roadfill	Sand	Gravel	Topsoil
64C*:				
Winema	Poor: low strength.	Improbable: excess fines.	Improbable: excess fines.	Fair: small stones, thin layer, slope.
Fendall	Poor: depth to rock, low strength.	Improbable: excess fines.	Improbable: excess fines.	Poor: thin layer.
65A Wolfer	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim.
66A Yachats	Good	Improbable: excess fines.	Improbable: excess fines.	Good.
67A Yaquina	Poor: wetness.	Probable	Improbable: too sandy.	Poor: too sandy, wetness.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 12.--WATER MANAGEMENT

(Some terms that describe restrictive soil features are defined in the "Glossary." See text for definitions of "slight," "moderate," and "severe." Absence of an entry indicates that the soil was not evaluated. The information in this table indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1E*, 1F*:						
Apt	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
McDuff	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
2E Astoria	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
3C Bandon	Severe: seepage.	Severe: piping.	Deep to water	Slope, soil blowing, cemented pan.	Cemented pan, soil blowing.	Cemented pan.
3E Bandon	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, soil blowing, cemented pan.	Slope, cemented pan, soil blowing.	Slope, cemented pan.
4A* Beaches	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, flooding.	Ponding, droughty.	Ponding, too sandy, soil blowing.	Wetness, droughty, rooting depth.
5C Bentilla	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
6E, 6F Blachly	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
7H*:						
Bohannon	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Preacher	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
8A Brallier	Moderate: seepage.	Severe: excess humus, ponding.	Ponding, flooding, subsides.	Ponding, flooding.	Ponding	Wetness.
9A Brenner	Slight	Severe: thin layer, ponding.	Ponding, flooding.	Ponding, percs slowly, flooding.	Ponding	Wetness.
10G*:						
Caterl	Severe: slope.	Severe: seepage.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
Laderly	Severe: slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
11B---------- Chitwood	Moderate: slope.	Severe: wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Wetness, erodes easily.
12A---------- Coquille	Slight---------	Severe: piping, ponding.	Ponding, flooding.	Ponding, percs slowly.	Erodes easily, ponding.	Wetness, erodes easily.
13A---------- Coquille	Slight---------	Severe: piping, ponding.	Ponding--------	Ponding, percs slowly.	Erodes easily, ponding.	Wetness, erodes easily.
14B---------- Depoe	Severe: seepage, cemented pan.	Severe: seepage, piping, ponding.	Ponding, cemented pan, slope.	Slope, ponding, cemented pan.	Cemented pan, ponding, too sandy.	Wetness, cemented pan.
15B---------- Eilertsen	Moderate: seepage.	Moderate: thin layer, piping.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
16C---------- Elsie	Moderate: seepage, slope.	Severe: thin layer.	Deep to water	Slope----------	Erodes easily	Erodes easily.
17A---------- Euchre	Severe: seepage.	Severe: seepage, piping, wetness.	Cutbanks cave	Wetness--------	Wetness, too sandy.	Wetness.
18G*:						
Fendall----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Templeton--------	Severe: slope.	Severe: thin layer.	Deep to water	Slope----------	Slope----------	Slope.
19E*:						
Fendall----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Winema-----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
20E*, 20G*:						
Formader---------	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Hemcross---------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
21H*:						
Formader---------	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock, erodes easily.	Slope, erodes easily, depth to rock.
Klistan----------	Severe: slope.	Severe: seepage.	Deep to water	Slope, droughty.	Slope, large stones.	Large stones, slope, droughty.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
21H*:						
Hemcross	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
22C---------- Gleneden	Moderate: slope.	Moderate: hard to pack, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
23C---------- Grindbrook	Moderate: seepage, slope.	Moderate: wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Erodes easily, wetness.	Erodes easily, percs slowly.
24H*:						
Harslow	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Rock outcrop-----	Severe: depth to rock, slope.	---	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
25A---------- Hebo	Slight	Severe: ponding.	Ponding, percs slowly.	Ponding, percs slowly.	Ponding, percs slowly.	Wetness, percs slowly.
26E, 26G---------- Hembre	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
27A---------- Histic Cryaquepts	Slight	Severe: ponding.	Ponding, large stones, frost action.	Ponding	Ponding	Wetness.
28E---------- Honeygrove	Severe: slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
29E, 29G---------- Kilowan	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
30A---------- Kirkendall	Moderate: seepage.	Moderate: thin layer, piping, wetness.	Flooding	Wetness, flooding.	Erodes easily, wetness.	Erodes easily.
31G*:						
Klistan	Severe: slope.	Severe: seepage.	Deep to water	Slope, droughty.	Slope, large stones.	Large stones, slope, droughty.
Harslow	Severe: seepage, slope.	Severe: seepage.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
32E*, 32G*:						
Klootchie	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope	Slope.
Neotsu	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
33B---------- Knappa	Moderate: seepage, slope.	Moderate: piping.	Deep to water	Slope, erodes easily.	Erodes easily	Erodes easily.
34E*:						
Laderly----------	Severe: slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Murtip----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
35E---------- Lint	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, erodes easily.	Slope, erodes easily.	Slope, erodes easily.
36A---------- Logsden	Severe: seepage.	Severe: piping.	Deep to water	Favorable------	Erodes easily	Erodes easily.
37C---------- McCurdy	Moderate: slope.	Moderate: thin layer, wetness.	Slope----------	Slope, wetness.	Wetness--------	Favorable.
38C---------- Meda	Severe: seepage.	Severe: seepage.	Deep to water	Slope, droughty.	Large stones---	Large stones, droughty.
39E*, 39G*:						
Murtip----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Caterl----------	Severe: slope.	Severe: seepage.	Deep to water	Slope, large stones, droughty.	Slope, large stones.	Large stones, slope, droughty.
40A---------- Nehalem	Moderate: seepage.	Severe: piping.	Deep to water	Flooding-------	Erodes easily	Erodes easily.
41A*:						
Nekoma----------	Severe: seepage.	Severe: seepage, piping.	Deep to water	Flooding-------	Favorable------	Favorable.
Fluvaquents------	Slight---------	Severe: wetness.	Flooding-------	Wetness, flooding.	Wetness--------	Wetness.
42C---------- Nelscott	Severe: seepage.	Severe: piping.	Cemented pan, slope.	Slope, wetness, cemented pan.	Cemented pan, wetness.	Cemented pan.
42E---------- Nelscott	Severe: seepage, slope.	Severe: piping.	Cemented pan, slope.	Slope, wetness, cemented pan.	Slope, cemented pan, wetness.	Slope, cemented pan.
43H*:						
Neotsu----------	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Necanicum--------	Severe: slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones.	Slope, large stones.	Large stones, slope.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
44H*:						
Neskowin	Severe: slope.	Severe: piping, excess humus.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Rock outcrop	Severe: depth to rock, slope.	---	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
45E*, 45G*:						
Neskowin	Severe: slope.	Severe: piping, excess humus.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Salander	Severe: slope.	Severe: piping, hard to pack.	Deep to water	Slope	Slope, erodes easily.	Slope, erodes easily.
46A---- Nestucca	Slight	Moderate: wetness.	Flooding	Wetness, percs slowly, flooding.	Wetness	Wetness.
47C---- Netarts	Severe: seepage.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
47E---- Netarts	Severe: seepage, slope.	Severe: seepage, piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
48E, 48F---- Peavine	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
49E*:						
Preacher	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Bohannon	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
50G*:						
Preacher	Severe: seepage, slope.	Severe: hard to pack.	Deep to water	Slope	Slope	Slope.
Bohannon	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Slickrock	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope, large stones.	Large stones, slope.
51A---- Quillamook	Moderate: seepage.	Severe: excess humus, hard to pack.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
52H*:						
Reedsport	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
52H*:						
Tolovana	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
53E, 53G	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
Sach						
54A	Severe: seepage.	Severe: hard to pack.	Deep to water	Erodes easily	Erodes easily	Erodes easily.
Siletz						
55E*:						
Templeton	Severe: slope.	Severe: thin layer.	Deep to water	Slope	Slope	Slope.
Fendall	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
56E*, 56G*:						
Tolovana	Severe: slope.	Severe: piping.	Deep to water	Slope	Slope	Slope.
Reedsport	Severe: slope.	Severe: piping.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
57A	Moderate: seepage.	Moderate: piping, wetness.	Favorable	Wetness, erodes easily.	Erodes easily, wetness.	Erodes easily.
Treharne						
58E*:						
Urban land.						
Bandon	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, soil blowing, cemented pan.	Slope, cemented pan, soil blowing.	Slope, cemented pan.
59C*:						
Urban land.						
Nelscott	Severe: seepage.	Severe: piping.	Cemented pan, slope.	Slope, wetness, cemented pan.	Cemented pan, wetness.	Cemented pan.
60C*:						
Urban land.						
Waldport	Severe: seepage.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Too sandy, soil blowing.	Droughty.
61E*, 61G*, 61H*:						
Valsetz	Severe: seepage, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, depth to rock.	Slope, large stones, depth to rock.	Large stones, slope, depth to rock.
Yellowstone	Severe: depth to rock, slope.	Severe: seepage, large stones.	Deep to water	Slope, large stones, droughty.	Slope, large stones, depth to rock.	Large stones, slope, droughty.
62C	Moderate: seepage, slope.	Moderate: thin layer, wetness.	Percs slowly, slope.	Slope, wetness, percs slowly.	Wetness, percs slowly.	Percs slowly.
Wadecreek						

See footnote at end of table.

TABLE 12.--WATER MANAGEMENT--Continued

Soil name and map symbol	Limitations for--		Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Drainage	Irrigation	Terraces and diversions	Grassed waterways
63E---------- Waldport	Severe: seepage, slope.	Severe: piping.	Deep to water	Slope, droughty, fast intake.	Slope, too sandy, soil blowing.	Slope, droughty.
64C*:						
Winema----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope----------	Slope----------	Slope.
Fendall----------	Severe: slope.	Severe: hard to pack.	Deep to water	Slope, depth to rock.	Slope, depth to rock.	Slope, depth to rock.
65A---------- Wolfer	Severe: seepage.	Severe: seepage.	Deep to water	Favorable------	Large stones, too sandy.	Large stones.
66A---------- Yachats	Severe: seepage.	Severe: seepage, piping.	Deep to water	Soil blowing, flooding.	Soil blowing---	Favorable.
67A---------- Yaquina	Severe: seepage.	Severe: seepage, piping, ponding.	Ponding, cutbanks cave.	Ponding, droughty, fast intake.	Ponding, too sandy, soil blowing.	Wetness, droughty.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 13.--ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than. Absence of an entry indicates that data were not estimated)

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
1E*, 1F*:												
Apt	0-19	Silty clay loam.	ML, MH	A-7	0	0	95-100	90-100	75-100	60-95	40-60	10-20
	19-39	Clay, silty clay.	MH	A-7	0	0	95-100	80-100	75-95	60-90	50-60	10-20
	39-60	Silty clay, clay, silty clay loam.	MH, ML	A-7	0	0	95-100	90-100	75-100	60-95	40-60	10-20
McDuff	0-12	Silty clay loam.	ML	A-6	0	0-5	90-100	90-100	85-100	75-95	35-40	10-15
	12-36	Silty clay, clay.	MH	A-7	0	0	100	90-100	85-100	80-95	50-60	20-25
	36-40	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
2E	0-15	Silt loam	ML	A-5	0	0	95-100	95-100	85-100	65-90	40-50	NP-5
Astoria	15-28	Silt loam, silty clay loam.	ML	A-5	0	0	95-100	95-100	85-100	65-90	40-50	5-10
	28-50	Silty clay, clay.	MH	A-7	0	0	95-100	95-100	85-100	65-95	50-60	10-15
	50-60	Silty clay loam.	MH	A-7	0	0	100	100	85-95	60-70	50-60	10-15
3C, 3E	0-3	Fine sandy loam.	SM	A-4	0	0	100	100	70-85	40-50	---	NP
Bandon	3-28	Sandy loam, loam, gravelly sandy loam.	SM, ML	A-4, A-2	0	0	70-100	60-100	55-90	25-60	---	NP
	28-45	Cemented	---	---	---	---	---	---	---	---	---	---
	45-60	Stratified loam to fine sand.	SM	A-2, A-4	0	0	100	100	80-95	30-50	---	NP
4A*	0-60	Sand	SP, SP-SM, SM	A-2, A-3	0	0	100	100	65-80	3-35	---	NP
Beaches												
5C	0-16	Silty clay loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-15
Bentilla	16-60	Silty clay, clay, silty clay loam.	CL, CH	A-7	0	0	100	100	90-100	75-95	40-65	15-35
6E, 6F	0-21	Silty clay loam.	MH	A-5, A-7	0	0	100	100	95-100	85-95	50-65	5-15
Blachly	21-60	Silty clay, clay.	MH	A-7	0	0	85-100	75-100	65-100	50-90	50-65	10-20
7H*:												
Bohannon	0-16	Gravelly loam	SC-SM, ML, CL-ML	A-4, A-5	0-5	0-10	70-85	60-80	50-75	35-50	30-45	NP-10
	16-31	Gravelly loam, cobbly loam, cobbly clay loam.	SC-SM, CL-ML, ML	A-4, A-6	0-10	0-20	70-95	60-90	50-85	35-50	25-35	5-15
	31-35	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
7H*:												
Preacher	0-15	Loam	ML	A-4, A-6	0	0-5	95-100	90-100	80-100	60-80	30-40	5-15
	15-45	Loam, clay loam.	MH, ML	A-7	0	0-5	90-100	80-100	70-100	55-80	45-60	10-20
	45-54	Sandy loam, loam, clay loam.	SM, ML	A-4, A-2	0	0-15	85-100	75-100	45-95	30-75	---	NP
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
8A	0-60	Mucky peat	PT	A-8	0	0	---	---	---	---	---	NP
Brallier												
9A	0-14	Silt loam	ML	A-4	0	0	100	100	90-100	80-90	25-35	NP-5
Brenner	14-34	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	85-95	30-40	10-20
	34-60	Silty clay loam, silty clay.	MH, ML	A-6, A-7	0	0	100	100	95-100	85-95	35-55	10-20
10G*:												
Caterl	0-19	Gravelly loam	GM	A-5	0	0-15	60-80	55-75	45-65	35-50	50-60	NP-5
	19-43	Gravelly loam, very gravelly loam.	MH, GM	A-2, A-5	0	0-15	40-80	35-75	30-65	25-60	50-60	NP-5
	43-58	Extremely cobbly loam, extremely gravelly loam.	GM, GP-GM	A-2, A-1	0-15	0-45	20-45	15-40	15-35	10-30	50-60	NP-5
	58-62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Laderly	0-10	Gravelly loam	GM, SM	A-2, A-5	0	0-10	55-75	50-70	40-60	30-45	50-60	NP-5
	10-18	Gravelly loam, very gravelly loam.	GM	A-1, A-2, A-5	0	0-15	40-75	35-60	25-55	15-50	50-60	NP-10
	18-30	Extremely cobbly loam, extremely gravelly loam.	GM	A-1, A-2	0-25	0-65	35-50	25-45	20-30	15-25	50-60	5-10
	30-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
11B	0-19	Silt loam	ML	A-4	0	0	100	100	90-100	80-95	30-35	5-10
Chitwood	19-60	Silty clay loam, silty clay.	CL	A-7	0	0	100	100	95-100	85-95	40-50	15-25
12A, 13A	0-7	Silt loam	ML	A-4	0	0	100	100	95-100	75-90	30-35	NP-5
Coquille	7-60	Silty clay loam, silt loam.	ML	A-4	0	0	100	100	95-100	85-95	35-40	5-10

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
14B---------- Depoe	0-4 4-16	Loam---------- Sandy loam, loam.	CL-ML, CL CL-ML, SC-SM, SC, CL	A-4 A-4	0 0	0 0	95-100 95-100	95-100 90-100	85-95 60-95	65-75 35-80	20-30 20-30	5-10 5-10
	16-48	Cemented------	---	---	---	---	---	---	---	---	---	---
	48-60	Fine sand, loamy fine sand, sand.	SM, SP-SM	A-2	0	0	95-100	95-100	60-80	10-35	---	NP
15B---------- Eilertsen	0-13 13-60	Silt loam----- Silt loam, silty clay loam, loam.	CL-ML CL	A-4 A-6	0 0	0 0	100 100	100 100	95-100 95-100	75-85 75-95	25-30 30-40	5-10 10-20
16C---------- Elsie	0-21 21-47	Silt loam----- Silt loam, silty clay loam.	ML CL	A-4 A-6	0 0	0 0	100 100	100 100	90-100 95-100	75-90 80-95	30-35 30-40	5-10 10-20
	47-60	Loam, silt loam.	CL-ML	A-4	0	0	100	100	85-95	70-90	25-30	5-10
17A---------- Euchre	0-15 15-25	Silt loam----- Clay loam, silty clay loam.	MH, OH CL	A-5 A-6	0 0	0 0	85-100 85-100	80-100 80-100	70-100 70-100	55-90 55-95	50-60 25-35	NP-5 10-15
	25-36	Fine sandy loam, clay loam.	SM, SC-SM, CL	A-4, A-6	0	0	85-100	80-100	55-95	35-75	15-35	NP-15
	36-60	Sandy loam, loamy sand, gravelly loamy sand.	SM, SP-SM	A-1, A-2	0	0	60-100	50-100	25-65	10-35	---	NP
18G*: Fendall------	0-16	Silt loam-----	ML, OL	A-5	0	0	90-100	90-100	85-100	65-90	40-50	5-10
	16-27	Silty clay loam.	ML	A-5	0	0	80-100	70-100	65-100	50-95	40-45	5-10
	27-38	Clay, silty clay.	MH	A-7	0	0	75-100	65-100	60-100	50-95	50-60	10-20
	38-42	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Templeton----	0-17	Silt loam-----	ML, OL	A-5	0	0	100	100	95-100	75-90	40-50	5-10
	17-55	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	75-95	35-50	15-30
	55-59	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
19E*: Fendall------	0-16	Silt loam-----	ML, OL	A-5	0	0	90-100	90-100	85-100	65-90	40-50	5-10
	16-27	Silty clay loam.	ML	A-5	0	0	80-100	70-100	65-100	50-95	40-45	5-10
	27-38	Clay, silty clay.	MH	A-7	0	0	75-100	65-100	60-100	50-95	50-60	10-20
	38-42	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
19E*:												
Winema	0-18	Silt loam	MH, OH	A-5	0	0	95-100	95-100	80-100	70-90	50-60	NP-5
	18-25	Silty clay loam.	MH	A-5	0	0	95-100	95-100	90-100	80-95	50-60	NP-5
	25-54	Silty clay, silty clay loam.	MH, ML	A-7	0	0	80-100	80-100	75-95	65-85	40-60	10-20
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
20E*, 20G*:												
Formader	0-19	Loam	MH	A-5, A-7	0	0	95-100	85-100	85-95	60-75	50-65	5-15
	19-30	Silty clay loam, loam, gravelly silty clay loam.	ML, MH, GM, SM	A-7	0	0-15	70-95	65-95	55-95	40-90	40-55	10-20
	30-34	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Hemcross	0-15	Silt loam	MH	A-5	0	0-5	90-100	85-100	75-90	70-85	50-60	NP-5
	15-48	Silt loam, loam, gravelly loam.	MH	A-5	0	0-5	70-95	55-90	45-80	35-70	50-60	NP-5
	48-60	Very gravelly loam.	GM	A-2	0	0-15	40-55	35-50	30-45	25-35	25-35	5-10
21H*:												
Formader	0-19	Loam	MH	A-5, A-7	0	0	95-100	85-100	85-95	60-75	50-65	5-15
	19-30	Silty clay loam, loam, gravelly silty clay loam.	ML, MH, GM, SM	A-7	0	0-15	70-95	65-95	55-95	40-90	40-55	10-20
	30-34	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Klistan	0-19	Very gravelly loam.	GM	A-1, A-2, A-5	0	0-15	35-55	30-50	25-45	20-40	50-60	NP-5
	19-47	Very gravelly loam, extremely gravelly loam.	GM	A-1, A-2	0	0-25	25-50	20-45	15-40	10-35	40-50	5-10
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Hemcross	0-15	Silt loam	MH	A-5	0	0-5	90-100	85-100	75-90	70-85	50-60	NP-5
	15-48	Silt loam, loam, gravelly loam.	MH	A-5	0	0-5	70-95	55-90	45-80	35-70	50-60	NP-5
	48-60	Very gravelly loam.	GM	A-2	0	0-15	40-55	35-50	30-45	25-35	25-35	5-10
22C	0-11	Silty clay loam.	CL	A-6, A-7	0	0	95-100	95-100	90-100	80-90	35-45	15-20
Gleneden	11-25	Clay, silty clay.	CH	A-7	0	0	95-100	95-100	85-100	70-90	50-60	25-35
	25-60	Clay	CH	A-7	0	0	95-100	95-100	85-100	70-90	50-60	25-35

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
23C---------- Grindbrook	0-21	Silt loam-----	ML	A-4	0	0	100	100	95-100	70-90	30-35	5-10
	21-31	Silt loam, silty clay loam.	ML, CL	A-4, A-6	0	0	100	100	95-100	80-95	30-40	5-15
	31-60	Silty clay loam, silty clay, clay.	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-50	15-25
24H*: Harslow------	0-10	Very gravelly loam.	GM	A-2, A-5	0	0-15	40-55	35-50	30-45	25-40	50-60	NP-5
	10-25	Very cobbly loam, very gravelly loam.	GM	A-2, A-5	0	0-50	40-65	35-60	30-55	25-45	50-60	NP-5
	25-36	Extremely gravelly loam, extremely cobbly loam.	GM, GP-GM	A-1, A-2	0	0-50	20-45	15-40	15-35	10-30	25-30	NP-5
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
25A---------- Hebo	0-3	Silty clay loam.	ML, CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	10-20
	3-48	Silty clay, clay.	CH	A-7	0	0	100	100	90-100	80-95	50-65	25-35
	48-60	Clay loam, silty clay, silty clay loam.	CL	A-7	0	0	90-100	85-100	75-95	60-85	40-50	20-30
26E, 26G------ Hembre	0-19	Silt loam-----	ML	A-5	0-10	0-10	85-100	80-100	75-95	70-85	40-50	NP-5
	19-51	Silty clay loam, silt loam.	ML, CL	A-6, A-4	0-10	0-10	85-100	80-100	80-95	75-85	30-40	5-15
	51-60	Silty clay loam, silt loam, gravelly silty clay loam.	CL	A-6	0-15	0-15	55-100	50-100	45-95	40-90	30-40	10-15
27A---------- Histic Cryaquepts	0-12	Mucky peat----	PT	A-8	0	0	---	---	---	---	---	NP
	12-16	Silty clay loam.	ML	A-4	0	0	90-100	90-100	85-95	80-90	35-40	10-20
	16-36	Loam, gravelly loam, gravelly sandy loam.	ML, SM	A-4	0	0-15	70-100	70-100	50-90	25-60	20-40	5-10
	36-60	Gravelly clay loam, cobbly loam, very cobbly loam.	GM, SM	A-4, A-6	0	0-30	50-80	35-75	30-60	20-50	20-40	5-10
28E---------- Honeygrove	0-7	Silty clay loam.	ML	A-4	0	0	100	100	95-100	85-95	30-40	5-10
	7-60	Clay, silty clay.	MH	A-7	0	0-15	85-100	75-100	70-100	50-95	55-70	10-20

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
29E, 29G------	0-8	Clay loam-----	ML	A-6, A-4	0	0	100	100	95-100	85-95	30-40	5-15
Kilowan	8-37	Silty clay, clay, silty clay loam.	MH	A-7	0	0	100	100	90-100	75-95	50-60	15-20
	37-41	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
30A----------	0-17	Silt loam-----	ML, CL-ML	A-4	0	0	100	100	90-100	70-90	25-35	5-10
Kirkendall	17-36	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	95-100	75-95	25-45	10-20
	36-60	Silt loam, silty clay loam, loam.	CL, CL-ML	A-6, A-7, A-4	0	0	100	100	95-100	75-95	20-45	5-20
31G*:												
Klistan------	0-19	Very gravelly loam.	GM	A-1, A-2, A-5	0	0-15	35-55	30-50	25-45	20-40	50-60	NP-5
	19-47	Very gravelly loam, extremely gravelly loam.	GM	A-1, A-2	0	0-25	25-50	20-45	15-40	10-35	40-50	5-10
	47	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Harslow------	0-10	Very gravelly loam.	GM	A-2, A-5	0	0-15	40-55	35-50	30-45	25-40	50-60	NP-5
	10-25	Very cobbly loam, very gravelly loam.	GM	A-2, A-5	0	0-50	40-65	35-60	30-55	25-45	50-60	NP-5
	25-36	Extremely gravelly loam, extremely cobbly loam.	GM, GP-GM	A-1, A-2	0	0-50	20-45	15-40	15-35	10-30	25-30	NP-5
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
32E*, 32G*:												
Klootchie----	0-14	Silt loam-----	MH, OH	A-5	0	0	85-100	75-95	70-80	65-75	50-60	NP-5
	14-44	Silt loam, loam, silty clay loam.	MH	A-5	0	0	85-100	75-95	70-90	65-85	50-60	5-10
	44-53	Gravelly silt loam, gravelly loam, gravelly silty clay loam.	GM, MH, SM, ML	A-5	0	0	60-90	50-75	45-70	40-65	40-60	NP-10
	53-57	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Neotsu-------	0-12	Silt loam-----	MH, OH	A-5	0	0	90-100	75-100	70-100	60-90	50-60	NP-5
	12-26	Silt loam, silty clay loam, loam.	MH, GM, SM	A-5	0	0	70-100	65-100	55-95	40-85	50-60	5-10
	26-33	Gravelly loam	GM, SM	A-2, A-5	0	0-10	55-80	50-70	40-65	30-50	50-60	5-10
	33	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plasticity index
	In				Pct	Pct					Pct	
33B----------- Knappa	0-23	Silt loam-----	ML	A-4	0	0	100	100	90-100	80-90	30-35	5-10
	23-60	Silty clay loam, silt loam.	ML	A-6	0	0	95-100	95-100	95-100	80-95	35-40	10-15
34E*:												
Laderly------	0-10	Gravelly loam	GM, SM	A-2, A-5	0	0-10	55-75	50-70	40-60	30-45	50-60	NP-5
	10-18	Gravelly loam, very gravelly loam.	GM	A-1, A-2, A-5	0	0-15	40-75	35-60	25-55	15-50	50-60	NP-10
	18-30	Extremely cobbly loam, extremely gravelly loam.	GM	A-1, A-2	0-25	0-65	35-50	25-45	20-30	15-25	50-60	5-10
	30-34	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Murtip-------	0-11	Loam----------	MH	A-5	0	0	90-100	85-100	75-95	60-75	50-60	NP-5
	11-42	Loam----------	MH	A-5	0	0	85-100	80-100	70-90	55-70	50-60	NP-5
	42-50	Gravelly loam, very gravelly loam.	MH, GM, ML, SM	A-2, A-5, A-1	0	0	35-80	30-75	25-65	20-55	40-60	NP-10
	50-54	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
35E----------- Lint	0-19	Silt loam-----	MH, OH	A-5	0	0	100	95-100	90-100	70-85	50-65	NP-10
	19-60	Silt loam, silty clay loam.	MH	A-7	0	0	100	95-100	85-95	65-85	50-60	10-15
36A----------- Logsden	0-19	Silt loam-----	ML, CL-ML, CL	A-4	0	0	90-100	90-100	80-100	75-85	25-35	5-10
	19-42	Silt loam, silty clay loam.	ML	A-4	0	0	90-100	90-100	80-100	75-85	30-40	5-10
	42-60	Loamy sand, fine sandy loam, loam.	SM, CL-ML, ML, SC-SM	A-2, A-4	0	0	90-100	90-100	60-90	30-70	20-30	NP-10
37C----------- McCurdy	0-16	Silt loam-----	ML	A-4	0	0	100	90-100	80-100	60-90	30-35	5-10
	16-46	Silty clay loam, silty clay.	CL	A-6, A-7	0	0	95-100	90-100	90-100	80-95	35-45	15-25
	46-60	Silty clay loam, silty clay, clay.	MH	A-7	0	0	85-100	75-100	70-100	60-95	50-60	20-25
38C----------- Meda	0-11	Loam----------	ML	A-4	0	0	80-90	75-85	60-75	50-65	25-40	NP-10
	11-30	Gravelly clay loam, gravelly loam.	ML, GM, SM	A-2, A-4	0	0-25	55-80	50-75	40-70	25-55	30-40	NP-10
	30-60	Very gravelly sandy loam, very gravelly loam, gravelly sandy loam.	GP-GM, GM, SM, SP-SM	A-1, A-2	0	0-25	25-75	20-70	10-60	10-35	15-20	NP-5

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
39E*, 39G*:												
Murtip	0-11	Loam	MH	A-5	0	0	90-100	85-100	75-95	60-75	50-60	NP-5
	11-42	Loam	MH	A-5	0	0	85-100	80-100	70-90	55-70	50-60	NP-5
	42-50	Gravelly loam, very gravelly loam.	MH, GM, ML, SM	A-2, A-5, A-1	0	0	35-80	30-75	25-65	20-55	40-60	NP-10
	50-54	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Caterl	0-19	Gravelly loam	GM	A-5	0	0-15	60-80	55-75	45-65	35-50	50-60	NP-5
	19-43	Gravelly loam, very gravelly loam.	MH, GM	A-2, A-5	0	0-15	40-80	35-75	30-65	25-60	50-60	NP-5
	43-58	Extremely cobbly loam, extremely gravelly loam.	GM, GP-GM	A-2, A-1	0-15	0-45	20-45	15-40	15-35	10-30	50-60	NP-5
	58-62	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
40A	0-18	Silt loam	ML, CL-ML	A-4	0	0	100	100	90-100	70-90	25-35	5-10
Nehalem	18-51	Silt loam, silty clay loam.	CL	A-6, A-7	0	0	100	100	90-100	75-95	30-45	10-20
	51-60	Silty clay loam, silt loam, loam.	CL, CL-ML	A-6, A-4	0	0-5	85-100	80-100	75-95	55-90	25-40	5-15
41A*:												
Nekoma	0-13	Silt loam	ML	A-4	0	0	100	100	85-100	65-90	25-35	NP-5
	13-19	Fine sandy loam, silt loam, loam.	SM, ML	A-4	0	0	100	100	70-90	40-70	---	NP
	19-60	Stratified very fine sandy loam to loamy fine sand.	SM	A-2	0	0	95-100	90-100	50-80	15-35	---	NP
Fluvaquents	0-60	Variable	---	---	---	---	---	---	---	---	---	---
42C, 42E	0-15	Loam	ML	A-4	0	0	95-100	95-100	85-95	65-75	30-40	NP-5
Nelscott	15-29	Clay loam, loam, silty clay loam.	ML	A-6, A-7, A-4	0	0	90-100	85-100	75-95	60-85	35-45	5-15
	29-36	Fine sand, loamy fine sand.	SM	A-2	0	0	95-100	95-100	65-80	20-35	---	NP
	36-48	Cemented	---	---	---	---	---	---	---	---	---	---
	48-60	Stratified fine sand to silt loam.	SM, ML	A-2, A-4	0	0	95-100	95-100	65-95	30-75	---	NP
43H*:												
Neotsu	0-12	Silt loam	MH, OH	A-5	0	0	90-100	75-100	70-100	60-90	50-60	NP-5
	12-26	Silt loam, silty clay loam, loam.	MH, GM, SM	A-5	0	0	70-100	65-100	55-95	40-85	50-60	5-10
	26-33	Gravelly loam	GM, SM	A-2, A-5	0	0-10	55-80	50-70	40-65	30-50	50-60	5-10
	33	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
43H*:												
Necanicum----	0-12	Gravelly loam	GM, SM, MH, OH	A-5, A-2	0	0-15	65-75	50-70	25-70	25-65	50-60	NP-5
	12-21	Very gravelly loam.	GM, SM	A-2, A-1	0	0-20	45-70	30-55	20-40	15-35	50-60	NP-5
	21-46	Extremely cobbly loam, extremely gravelly loam.	GM	A-2, A-1	0-15	5-60	35-60	25-50	20-40	15-35	50-60	NP-5
	46	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
44H*:												
Neskowin-----	0-19	Silt loam-----	ML, OL	A-5	0	0-5	95-100	85-95	80-90	70-85	40-50	NP-5
	19-23	Silty clay loam, silt loam, clay loam.	ML	A-5	0	0-5	95-100	85-100	75-95	65-85	40-50	NP-10
	23-27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
45E*, 45G*:												
Neskowin-----	0-19	Silt loam-----	ML, OL	A-5	0	0-5	95-100	85-95	80-90	70-85	40-50	NP-5
	19-23	Silty clay loam, silt loam, clay loam.	ML	A-5	0	0-5	95-100	85-100	75-95	65-85	40-50	NP-10
	23-27	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Salander-----	0-28	Silt loam-----	ML, MH, OL, OH	A-5	0	0	85-100	80-100	75-95	70-90	45-55	NP-10
	28-60	Silty clay loam, silt loam, loam.	ML, MH, GM	A-7, A-5	0	0-15	55-100	50-100	45-95	40-90	45-55	5-15
46A----------	0-14	Silt loam-----	CL-ML	A-4	0	0	100	100	90-100	75-95	20-30	5-10
Nestucca	14-32	Silty clay loam, silt loam.	CL	A-6, A-7	0	0	100	100	95-100	85-95	35-45	15-20
	32-60	Silty clay, clay loam, loam.	CL	A-7, A-6	0	0	100	95-100	85-100	65-95	30-50	10-25
47C, 47E------	0-5	Fine sand-----	SM, SP, SP-SM	A-2, A-3	0	0	100	100	65-80	0-20	---	NP
Netarts	5-39	Loamy fine sand, fine sand, sand.	SM, SP, SP-SM	A-2, A-3	0	0	100	100	65-80	0-25	---	NP
	39-60	Fine sand-----	SM, SP, SP-SM	A-2, A-3	0	0	100	100	65-80	0-15	---	NP
48E, 48F------	0-7	Silty clay loam.	ML, MH	A-7	0	0	100	100	90-100	80-90	45-55	10-20
Peavine	7-37	Silty clay, clay.	MH	A-7	0	0	100	100	90-100	80-95	60-85	25-45
	37-41	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
49E*:												
Preacher	0-15	Loam	ML	A-4, A-6	0	0-5	95-100	90-100	80-100	60-80	30-40	5-15
	15-45	Loam, clay loam.	MH, ML	A-7	0	0-5	90-100	80-100	70-100	55-80	45-60	10-20
	45-54	Sandy loam, loam, clay loam.	SM, ML	A-4, A-2	0	0-15	85-100	75-100	45-95	30-75	---	NP
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Bohannon	0-16	Gravelly loam	SC-SM, ML, CL-ML	A-4, A-5	0-5	0-10	70-85	60-80	50-75	35-50	30-45	NP-10
	16-31	Gravelly loam, cobbly loam, cobbly clay loam.	SC-SM, CL-ML, ML	A-4, A-6	0-10	0-20	70-95	60-90	50-85	35-50	25-35	5-15
	31-35	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
50G*:												
Preacher	0-15	Loam	ML	A-4, A-6	0	0-5	95-100	90-100	80-100	60-80	30-40	5-15
	15-45	Loam, clay loam.	MH, ML	A-7	0	0-5	90-100	80-100	70-100	55-80	45-60	10-20
	45-54	Sandy loam, loam, clay loam.	SM, ML	A-4, A-2	0	0-15	85-100	75-100	45-95	30-75	---	NP
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Bohannon	0-16	Gravelly loam	SC-SM, ML, CL-ML	A-4, A-5	0-5	0-10	70-85	60-80	50-75	35-50	30-45	NP-10
	16-31	Gravelly loam, cobbly loam, cobbly clay loam.	SC-SM, CL-ML, ML	A-4, A-6	0-10	0-20	70-95	60-90	50-85	35-50	25-35	5-15
	31-35	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Slickrock	0-14	Gravelly loam	ML, SM	A-4, A-5	---	0-10	70-90	60-85	55-80	40-60	30-45	NP-10
	14-39	Gravelly loam, gravelly clay loam, cobbly clay loam.	SM, ML	A-4, A-5	0-10	0-30	75-90	70-85	60-80	40-55	30-45	NP-10
	39-53	Very cobbly clay loam, very cobbly loam.	GM, SM	A-4	0-25	25-50	50-70	45-65	35-60	30-50	30-40	NP-10
	53-57	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
51A	0-34	Silt loam	MH, OH	A-5	0	0	100	100	90-100	70-90	50-60	NP-5
Quillamook	34-58	Silt loam, silty clay loam.	MH, ML	A-5, A-7	0	0	100	100	90-100	80-95	40-60	5-20
	58-60	Loamy sand	SM	A-2	0	0	100	100	50-75	15-30	---	NP

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
52H*:												
Reedsport----	0-14	Loam----------	SM, ML	A-4	0	0	85-95	85-95	60-75	40-55	20-35	NP-10
	14-32	Loam, clay loam, gravelly loam.	GM, ML	A-4, A-6	0	0-10	65-100	60-95	50-90	45-70	30-45	5-15
	32-36	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Tolovana-----	0-18	Silt loam-----	MH, OH	A-5	0	0	100	100	90-100	70-90	50-60	NP-5
	18-32	Silt loam, clay loam.	ML	A-7, A-4	0	0	100	90-100	80-100	70-95	30-50	5-15
	32-60	Cobbly loam, cobbly clay loam, gravelly loam.	GM, ML, SM	A-4, A-7, A-6	0	0-20	70-95	65-90	55-80	45-70	30-45	5-15
53E, 53G------ Sach	0-10	Gravelly loam	MH, GM, SM	A-5	0	0-10	70-80	65-75	55-70	35-55	50-60	NP-5
	10-19	Gravelly loam, gravelly silt loam, gravelly silty clay loam.	MH, SM, GM	A-5, A-2, A-7	0	0-10	65-75	55-70	40-60	30-55	50-60	5-15
	19-27	Very gravelly loam, very gravelly clay loam.	GM	A-1, A-2	0	0-15	40-55	30-45	25-40	15-35	40-55	5-15
	27	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
54A---------- Siletz	0-14	Silt loam-----	MH, OH	A-5	0	0	95-100	90-100	80-95	65-85	50-60	NP-5
	14-31	Silt loam, loam.	MH	A-5	0	0	85-100	80-100	70-95	50-85	50-60	NP-5
	31-42	Very fine sandy loam.	ML, SM	A-4	0	0	85-100	80-100	65-90	40-60	25-35	NP-5
	42-55	Extremely gravelly loamy sand, extremely gravelly sand.	GM, SM, GP-GM	A-1	0	0	20-70	15-30	10-25	5-15	---	NP
	55-63	Fine sandy loam, gravelly fine sandy loam.	SM, GM	A-1, A-2	0	0	60-90	50-75	30-50	20-40	---	NP
55E*:												
Templeton----	0-17	Silt loam-----	ML, OL	A-5	0	0	100	100	95-100	75-90	40-50	5-10
	17-55	Silty clay loam, silt loam.	CL	A-6	0	0	100	100	95-100	75-95	35-50	15-30
	55-59	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
55E*:												
Fendall------	0-16	Silt loam-----	ML, OL	A-5	0	0	90-100	90-100	85-100	65-90	40-50	5-10
	16-27	Silty clay loam.	ML	A-5	0	0	80-100	70-100	65-100	50-95	40-45	5-10
	27-38	Clay, silty clay.	MH	A-7	0	0	75-100	65-100	60-100	50-95	50-60	10-20
	38-42	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
56E*, 56G*:												
Tolovana-----	0-18	Silt loam-----	MH, OH	A-5	0	0	100	100	90-100	70-90	50-60	NP-5
	18-32	Silt loam, clay loam.	ML	A-7, A-4	0	0	100	90-100	80-100	70-95	30-50	5-15
	32-60	Cobbly loam, cobbly clay loam, gravelly loam.	GM, ML, SM	A-4, A-7, A-6	0	0-20	70-95	65-90	55-80	45-70	30-45	5-15
Reedsport----	0-14	Loam----------	SM, ML	A-4	0	0	85-95	85-95	60-75	40-55	20-35	NP-10
	14-32	Loam, clay loam, gravelly loam.	GM, ML	A-4, A-6	0	0-10	65-100	60-95	50-90	45-70	30-45	5-15
	32-36	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
57A----------	0-18	Silt loam-----	CL-ML	A-4	0	0	100	100	95-100	75-90	25-30	5-10
Treharne	18-38	Silt loam, silty clay loam.	CL	A-6	0	0	100	100	95-100	75-95	30-40	10-20
	38-60	Silt loam, silty clay loam, silty clay.	CL	A-6, A-7	0	0	100	100	95-100	75-95	30-50	10-25
58E*:												
Urban land.												
Bandon-------	0-3	Fine sandy loam.	SM	A-4	0	0	100	100	70-85	40-50	---	NP
	3-28	Sandy loam, loam, gravelly sandy loam.	SM, ML	A-4, A-2	0	0	70-100	60-100	55-90	25-60	---	NP
	28-45	Cemented------	---	---	---	---	---	---	---	---	---	---
	45-60	Stratified loam to fine sand.	SM	A-2, A-4	0	0	100	100	80-95	30-50	---	NP
59C*:												
Urban land.												

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
59C*:												
Nelscott-----	0-15	Loam----------	ML	A-4	0	0	95-100	95-100	85-95	65-75	30-40	NP-5
	15-29	Clay loam, loam, silty clay loam.	ML	A-6, A-7, A-4	0	0	90-100	85-100	75-95	60-85	35-45	5-15
	29-36	Fine sand, loamy fine sand.	SM	A-2	0	0	95-100	95-100	65-80	20-35	---	NP
	36-48	Cemented------	---	---	---	---	---	---	---	---	---	---
	48-60	Stratified fine sand to silt loam.	SM, ML	A-2, A-4	0	0	95-100	95-100	65-95	30-75	---	NP
60C*:												
Urban land.												
Waldport-----	0-7	Fine sand-----	SM	A-2	0	0	100	100	70-80	20-30	---	NP
	7-60	Fine sand-----	SM	A-2	0	0	100	100	70-80	20-30	---	NP
61E*, 61G*:												
Valsetz------	0-5	Cobbly loam---	SM, MH	A-5	0-15	15-45	75-95	70-90	45-75	35-60	50-60	NP-5
	5-36	Very cobbly loam, very cobbly clay loam, extremely cobbly loam.	GM, GP-GM	A-2, A-5, A-1	0-35	25-65	30-60	20-55	15-50	10-45	40-60	NP-10
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
Yellowstone--	0-10	Stony loam----	GM, SM, MH	A-5	10-15	0-10	65-85	60-80	50-70	35-55	50-60	NP-5
	10-18	Extremely stony sandy loam, very stony sandy loam, extremely cobbly loam.	GM, SM	A-1, A-2, A-5	25-50	25-50	35-80	30-75	25-65	15-50	40-60	NP-10
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
61H*:												
Valsetz------	0-5	Cobbly loam---	SM, MH	A-5	10-15	10-45	75-95	70-90	45-75	35-60	50-60	NP-5
	5-36	Very cobbly loam, very cobbly clay loam, extremely cobbly loam.	GM, GP-GM	A-2, A-5, A-1	0-35	25-65	30-60	20-55	15-50	10-45	40-60	NP-10
	36-40	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Fragments > 10 inches	Fragments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
61H*:												
Yellowstone--	0-10	Stony loam----	GM, SM, MH	A-5	10-15	0-10	65-85	60-80	50-70	35-55	50-60	NP-5
	10-18	Extremely stony sandy loam, very stony sandy loam, extremely cobbly loam.	GM, SM	A-1, A-2, A-5	25-50	25-50	35-80	30-75	25-65	15-50	40-60	NP-10
	18-22	Unweathered bedrock.	---	---	---	---	---	---	---	---	---	---
62C---------- Wadecreek	0-9	Silt loam-----	ML, CL, CL-ML	A-4	0	0	100	100	90-100	70-90	25-35	5-10
	9-19	Silt loam, silty clay loam.	ML, CL	A-6	0	0	100	100	90-100	75-95	35-40	10-15
	19-48	Silty clay loam, silty clay.	CL	A-7	0	0	90-100	75-100	75-100	70-95	40-50	15-25
	48-60	Silty clay loam, clay loam, loam.	CL-ML, CL	A-4, A-6	0	0	85-100	75-100	70-100	50-95	25-40	5-15
63E---------- Waldport	0-7	Fine sand-----	SM	A-2	0	0	100	100	70-80	20-30	---	NP
	7-60	Fine sand-----	SM	A-2	0	0	100	100	70-80	20-30	---	NP
64C*:												
Winema-------	0-18	Silt loam-----	MH, OH	A-5	0	0	95-100	95-100	80-100	70-90	50-60	NP-5
	18-25	Silty clay loam.	MH	A-5	0	0	95-100	95-100	90-100	80-95	50-60	NP-5
	25-54	Silty clay, silty clay loam.	MH, ML	A-7	0	0	80-100	80-100	75-95	65-85	40-60	10-20
	54-58	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---
Fendall------	0-16	Silt loam-----	ML, OL	A-5	0	0	90-100	90-100	85-100	65-90	40-50	5-10
	16-27	Silty clay loam.	ML	A-5	0	0	80-100	70-100	65-100	50-95	40-45	5-10
	27-38	Clay, silty clay.	MH	A-7	0	0	75-100	65-100	60-100	50-95	50-60	10-20
	38-42	Weathered bedrock.	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 13.--ENGINEERING INDEX PROPERTIES--Continued

Soil name and map symbol	Depth	USDA texture	Classification		Frag-ments > 10 inches	Frag-ments 3-10 inches	Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO			4	10	40	200		
	In				Pct	Pct					Pct	
65A---------- Wolfer	0-9	Silt loam-----	MH, OH	A-5	0	0-5	90-95	85-95	65-85	60-80	50-60	NP-5
	9-19	Gravelly silt loam.	MH	A-5	0	0-5	70-90	60-75	55-75	50-70	50-60	NP-5
	19-29	Very gravelly loam, very gravelly sandy loam, gravelly loam.	GM, SM	A-1, A-4	0	0-25	35-70	45-60	30-50	20-40	25-35	NP-5
	29-60	Extremely gravelly sand, extremely gravelly loamy sand, extremely gravelly coarse sand.	GP	A-1	0	0-25	25-40	20-30	10-25	0-5	---	NP
66A---------- Yachats	0-7	Very fine sandy loam.	ML	A-4	0	0	100	100	85-90	50-65	20-30	NP-5
	7-22	Fine sandy loam, loam.	SM, ML	A-4	0	0	100	100	75-90	45-70	20-30	NP-5
	22-31	Fine sandy loam.	SM	A-4	0	0	100	100	70-80	40-50	---	NP
	31-60	Loamy fine sand.	SM	A-2	0	0	100	100	50-75	15-30	---	NP
67A---------- Yaquina	0-6	Fine sand-----	SM, SP, SP-SM	A-2, A-3	0	0	100	100	75-80	0-15	---	NP
	6-35	Fine sand, sand.	SM, SP, SP-SM	A-2, A-3	0	0	100	100	75-80	0-15	---	NP
	35-60	Fine sand, sand.	SM, SP, SP-SM	A-2, A-3	0	0	100	100	75-80	0-15	---	NP

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS

(The symbol < means less than; > means more than. Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Organic matter" apply only to the surface layer. Absence of an entry indicates that data were not available or were not estimated)

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
1E*, 1F*:											
Apt	0-19	30-40	1.10-1.30	0.6-2.0	0.14-0.21	4.5-5.5	Moderate	0.28	5	4	4-8
	19-39	45-60	1.10-1.30	0.2-0.6	0.14-0.16	4.5-5.5	Moderate	0.32			
	39-60	30-45	1.10-1.30	0.2-0.6	0.14-0.16	4.5-5.5	Moderate	0.28			
McDuff	0-12	27-35	0.95-1.10	0.6-2.0	0.19-0.21	4.5-5.5	Moderate	0.24	2	7	4-6
	12-36	40-60	0.95-1.10	0.2-0.6	0.11-0.13	3.6-5.0	Moderate	0.28			
	36-40	---	---	---	---	---	---	---			
2E	0-15	20-27	0.85-0.95	0.6-2.0	0.25-0.35	4.5-5.0	Low	0.32	5	6	5-10
Astoria	15-28	25-35	0.90-1.00	0.6-2.0	0.15-0.20	4.5-5.0	Low	0.32			
	28-50	40-60	0.90-1.20	0.6-2.0	0.13-0.15	4.5-5.0	Moderate	0.28			
	50-60	27-35	0.90-1.20	0.6-2.0	0.10-0.12	4.5-5.0	Moderate	0.37			
3C, 3E	0-3	5-12	1.20-1.50	0.6-2.0	0.11-0.13	3.6-5.5	Low	0.28	3	3	1-3
Bandon	3-28	5-15	1.20-1.50	0.6-2.0	0.12-0.17	5.1-6.0	Low	0.24			
	28-45	---	---	---	---	---	---	---			
	45-60	5-18	1.30-1.50	2.0-6.0	0.	5.1-6.0	Low	0.15			
4A*	0-60	0-1	1.60-1.80	>20	0.03-0.05	---	Low	0.17	5	1	<.1
Beaches											
5C	0-16	27-40	1.10-1.20	0.6-2.0	0.19-0.21	3.6-5.0	Moderate	0.28	5	7	7-10
Bentilla	16-60	35-60	1.15-1.30	<0.06	0.14-0.17	3.6-5.0	High	0.32			
6E, 6F	0-21	27-40	1.10-1.20	0.6-2.0	0.17-0.21	4.5-6.0	Low	0.17	5	7	3-6
Blachly	21-60	40-50	1.10-1.30	0.2-0.6	0.11-0.13	4.5-6.0	Moderate	0.24			
7H*:											
Bohannon	0-16	15-25	0.85-0.95	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.10	2	7	4-6
	16-31	18-30	1.00-1.30	2.0-6.0	0.09-0.15	4.5-6.0	Low	0.17			
	31-35	---	---	---	---	---	---	---			
Preacher	0-15	20-27	0.85-0.95	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.17	3	6	5-8
	15-45	25-35	1.10-1.30	0.6-2.0	0.16-0.21	4.5-5.5	Moderate	0.24			
	45-54	7-30	1.20-1.30	2.0-6.0	0.10-0.17	4.5-5.0	Low	0.32			
	54-58	---	---	---	---	---	---	---			
8A	0-60	---	0.10-0.20	0.6-2.0	0.30-0.40	5.1-7.3	Low	0.00	5	5	50-70
Brallier											
9A	0-14	20-27	0.90-1.20	0.6-2.0	0.19-0.21	3.6-5.5	Low	0.32	5	6	5-10
Brenner	14-34	18-30	1.10-1.30	0.2-0.6	0.19-0.21	3.6-5.5	Moderate	0.24			
	34-60	27-50	1.10-1.30	0.06-0.2	0.15-0.17	3.6-6.5	Moderate	0.24			
10G*:											
Caterl	0-19	12-18	0.70-0.85	0.6-2.0	0.20-0.25	3.6-6.0	Low	0.15	3	6	8-10
	19-43	12-27	0.70-0.85	0.6-2.0	0.15-0.25	3.6-6.0	Low	0.15			
	43-58	18-27	0.75-0.85	0.6-2.0	0.05-0.10	3.6-6.0	Low	0.05			
	58-62	---	---	---	---	---	---	---			
Laderly	0-10	12-15	0.75-0.85	0.6-2.0	0.25-0.30	4.5-5.5	Low	0.20	2	6	8-12
	10-18	12-27	0.75-0.85	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.15			
	18-30	15-27	0.75-0.85	0.6-2.0	0.05-0.10	3.6-5.0	Low	0.05			
	30-34	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
11B	0-19	20-27	1.10-1.25	0.2-0.6	0.19-0.21	3.6-5.5	Low	0.32	5	6	4-8
Chitwood	19-60	35-45	1.20-1.45	0.06-0.2	0.15-0.18	3.6-5.0	Moderate	0.37			
12A	0-7	20-27	1.00-1.20	0.6-2.0	0.19-0.21	5.6-7.3	Low	0.32	5	6	4-10
Coquille	7-60	25-35	1.20-1.30	0.06-0.6	0.19-0.21	5.6-7.3	Low	0.37			
13A	0-7	20-27	1.00-1.20	0.6-2.0	0.19-0.21	3.6-5.0	Low	0.32	5	6	4-10
Coquille	7-60	25-35	1.20-1.30	0.06-0.6	0.19-0.21	3.6-5.0	Low	0.37			
14B	0-4	15-27	0.90-1.20	0.6-2.0	0.15-0.18	4.5-5.5	Low	0.24	1	5	5-10
Depoe	4-16	15-27	1.10-1.30	0.6-2.0	0.14-0.19	4.5-5.5	Low	0.28			
	16-48	---	---	---	---	---	---	---			
	48-60	1-5	1.50-1.70	2.0-6.0	0.	5.1-6.0	Low	0.15			
15B	0-13	12-20	1.10-1.30	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.37	5	5	2-5
Eilertsen	13-60	18-35	1.20-1.30	0.6-2.0	0.19-0.21	4.5-5.5	Moderate	0.32			
16C	0-21	18-25	1.10-1.20	0.6-2.0	0.19-0.21	3.6-5.0	Low	0.32	5	6	5-12
Elsie	21-47	22-30	1.15-1.30	0.6-2.0	0.19-0.21	3.6-5.0	Low	0.37			
	47-60	18-27	1.20-1.35	0.6-2.0	0.17-0.19	3.6-5.0	Low	0.37			
17A	0-15	12-25	0.75-0.85	0.6-2.0	0.35-0.45	3.6-5.0	Low	0.32	5	6	10-15
Euchre	15-25	27-35	1.20-1.30	0.2-0.6	0.19-0.21	3.6-5.0	Low	0.28			
	25-36	10-35	1.25-1.35	0.2-2.0	0.13-0.20	3.6-5.0	Low	0.28			
	36-60	3-10	1.30-1.40	2.0-6.0	0.05-0.13	4.5-5.5	Low	0.20			
18G*:											
Fendall	0-16	20-27	0.90-0.95	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.28	2	6	10-15
	16-27	30-40	1.10-1.20	0.6-2.0	0.16-0.21	4.5-5.0	Low	0.20			
	27-38	40-50	1.10-1.30	0.2-0.6	0.11-0.16	4.5-5.0	Moderate	0.20			
	38-42	---	---	---	---	---	---	---			
Templeton	0-17	18-27	0.85-0.95	0.6-2.0	0.25-0.35	3.6-5.5	Low	0.32	3	6	10-15
	17-55	25-35	0.90-1.10	0.6-2.0	0.20-0.25	3.6-5.0	Moderate	0.20			
	55-59	---	---	---	---	---	---	---			
19E*:											
Fendall	0-16	20-27	0.90-0.95	0.6-2.0	0.25-0.35	4.5-5.0	Low	0.28	2	6	10-15
	16-27	30-40	1.10-1.20	0.6-2.0	0.16-0.21	4.5-5.0	Low	0.20			
	27-38	40-50	1.10-1.30	0.2-0.6	0.11-0.16	4.5-5.0	Moderate	0.20			
	38-42	---	---	---	---	---	---	---			
Winema	0-18	20-27	0.75-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.20	3	6	10-15
	18-25	27-35	0.75-0.95	0.6-2.0	0.30-0.40	4.5-5.0	Low	0.20			
	25-54	35-50	1.10-1.20	0.2-0.6	0.15-0.17	4.5-5.0	Moderate	0.24			
	54-58	---	---	---	---	---	---	---			
20E*, 20G*:											
Formader	0-19	15-20	0.70-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.28	2	5	5-10
	19-30	20-35	0.90-1.20	0.6-2.0	0.18-0.25	4.5-5.5	Low	0.37			
	30-34	---	---	---	---	---	---	---			
Hemcross	0-15	15-20	0.75-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	5	5	8-12
	15-48	18-27	0.80-0.85	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.24			
	48-60	15-25	1.25-1.35	0.6-2.0	0.08-0.10	4.5-5.5	Low	0.15			
21H*:											
Formader	0-19	15-20	0.70-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.28	2	5	5-10
	19-30	20-35	0.90-1.20	0.6-2.0	0.18-0.25	4.5-5.5	Low	0.37			
	30-34	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
21H*:											
Klistan	0-19	12-18	0.70-0.85	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.20	3	7	8-12
	19-47	18-25	0.75-0.85	0.6-2.0	0.05-0.08	4.5-5.5	Low	0.10			
	47	---	---	---	---	---					
Hemcross	0-15	15-20	0.75-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	5	5	8-12
	15-48	18-27	0.80-0.85	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.24			
	48-60	15-25	1.25-1.35	0.6-2.0	0.08-0.10	4.5-5.5	Low	0.15			
22C	0-11	27-35	0.95-1.10	0.6-2.0	0.19-0.22	4.5-5.5	Low	0.24	5	7	5-10
Gleneden	11-25	40-50	1.00-1.20	<0.06	0.13-0.16	4.5-5.5	High	0.28			
	25-60	50-60	1.30-1.40	<0.06	0.12-0.15	4.5-5.5	High	0.20			
23C	0-21	20-27	1.10-1.20	0.6-2.0	0.15-0.19	3.6-5.0	Low	0.37	5	6	8-12
Grindbrook	21-31	20-35	1.15-1.30	0.6-2.0	0.17-0.21	3.6-5.0	Low	0.32			
	31-60	30-45	1.25-1.35	0.06-0.2	0.13-0.16	3.6-5.0	Moderate	0.28			
24H*:											
Harslow	0-10	15-25	0.75-0.85	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.20	2	8	5-10
	10-25	20-27	0.80-0.85	0.6-2.0	0.08-0.10	4.5-5.5	Low	0.17			
	25-36	15-25	0.80-0.85	2.0-6.0	0.06-0.08	4.5-5.5	Low	0.10			
	36-40	---	---	---	---	---					
Rock outcrop.											
25A	0-3	27-35	1.20-1.35	0.2-0.6	0.19-0.21	3.6-5.0	Moderate	0.28	5	7	7-12
Hebo	3-48	40-60	1.35-1.45	<0.06	0.14-0.17	3.6-5.0	High	0.24			
	48-60	35-45	1.30-1.40	0.06-0.2	0.13-0.21	3.6-5.0	Moderate	0.32			
26E, 26G	0-19	18-25	0.85-0.95	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.32	5	6	5-10
Hembre	19-51	20-30	1.00-1.15	0.6-2.0	0.19-0.21	4.5-5.5	Low	0.37			
	51-60	25-30	1.00-1.15	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.28			
27A	0-12	0	0.10-0.20	0.6-2.0	0.30-0.40	3.6-5.5	Low	0.00	5	5	50-70
Histic Cryaquepts	12-16	25-40	1.10-1.30	0.2-0.6	0.19-0.21	3.6-5.5	Moderate	0.28			
	16-36	10-27	1.10-1.30	0.2-0.6	0.15-0.19	3.6-5.5	Moderate	0.24			
	36-60	10-40	1.10-1.40	0.2-0.6	0.10-0.12	3.6-5.5	Moderate	0.20			
28E	0-7	30-40	1.20-1.40	0.2-0.6	0.14-0.16	4.5-6.5	Low	0.17	5	4	5-8
Honeygrove	7-60	50-60	1.20-1.40	0.2-0.6	0.14-0.16	4.5-5.5	Moderate	0.24			
29E, 29G	0-8	27-35	1.15-1.30	0.6-2.0	0.19-0.21	4.5-5.5	Moderate	0.32	2	7	1-3
Kilowan	8-37	35-50	1.25-1.50	0.2-0.6	0.11-0.13	4.5-5.5	Moderate	0.28			
	37-41	---	---	---	---	---					
30A	0-17	15-25	1.10-1.20	0.6-2.0	0.19-0.21	4.5-6.5	Low	0.32	5	6	5-10
Kirkendall	17-36	20-35	1.20-1.30	0.6-2.0	0.19-0.21	4.5-6.5	Moderate	0.37			
	36-60	15-35	1.25-1.35	0.2-0.6	0.16-0.21	4.5-6.5	Moderate	0.37			
31G*:											
Klistan	0-19	12-18	0.70-0.85	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.20	3	7	8-12
	19-47	18-25	0.75-0.85	0.6-2.0	0.05-0.08	4.5-5.5	Low	0.10			
	47	---	---	---	---	---					
Harslow	0-10	15-25	0.75-0.85	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.20	2	8	5-10
	10-25	20-27	0.80-0.85	0.6-2.0	0.08-0.10	4.5-5.5	Low	0.17			
	25-36	15-25	0.80-0.85	2.0-6.0	0.06-0.08	4.5-5.5	Low	0.10			
	36-40	---	---	---	---	---					

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
32E*, 32G*:											
Klootchie	0-14	15-22	0.75-0.85	0.6-2.0	0.35-0.45	3.6-5.0	Low	0.32	3	6	10-15
	14-44	22-30	0.70-0.85	0.6-2.0	0.25-0.35	3.6-5.0	Low	0.24			
	44-53	20-30	0.80-1.00	0.6-2.0	0.15-0.20	3.6-5.0	Low	0.17			
	53-57	---	---	---	---	---	---	---			
Neotsu	0-12	15-20	0.70-0.85	0.6-2.0	0.30-0.40	3.6-5.0	Low	0.32	2	5	10-15
	12-26	18-30	0.70-0.85	0.6-2.0	0.30-0.40	3.6-5.0	Low	0.24			
	26-33	18-25	0.70-0.85	0.6-2.0	0.15-0.20	3.6-5.0	Low	0.20			
	33	---	---	---	---	---	---	---			
33B	0-23	15-25	1.10-1.30	0.6-2.0	0.19-0.21	3.6-5.5	Low	0.37	5	6	8-12
Knappa	23-60	22-35	1.20-1.35	0.6-2.0	0.19-0.21	3.6-5.5	Moderate	0.37			
34E*:											
Laderly	0-10	12-15	0.75-0.85	0.6-2.0	0.25-0.30	4.5-5.5	Low	0.20	2	6	8-12
	10-18	12-27	0.75-0.85	0.6-2.0	0.15-0.20	4.5-5.5	Low	0.15			
	18-30	15-27	0.75-0.85	0.6-2.0	0.05-0.10	3.6-5.0	Low	0.05			
	30-34	---	---	---	---	---	---	---			
Murtip	0-11	12-20	0.70-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	3	5	7-10
	11-42	18-24	0.75-0.85	0.6-2.0	0.20-0.25	4.5-5.5	Low	0.32			
	42-50	18-24	0.70-0.85	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.20			
	50-54	---	---	---	---	---	---	---			
35E	0-19	15-20	0.50-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.37	5	5	10-15
Lint	19-60	15-30	0.50-0.85	0.6-2.0	0.22-0.48	4.5-5.5	Low	0.49			
36A	0-19	18-25	0.95-1.20	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.32	5	6	5-12
Logsden	19-42	20-35	1.10-1.30	0.6-2.0	0.18-0.22	4.5-5.5	Low	0.37			
	42-60	5-20	1.20-1.35	0.6-6.0	0.10-0.20	3.6-5.5	Low	0.37			
37C	0-16	20-27	1.10-1.25	0.6-2.0	0.20-0.23	4.5-5.5	Low	0.28	5	6	3-5
McCurdy	16-46	35-50	1.20-1.30	0.2-0.6	0.19-0.21	4.5-5.5	High	0.28			
	46-60	35-50	1.20-1.35	0.2-0.6	0.15-0.17	4.5-5.5	High	0.32			
38C	0-11	20-25	1.30-1.35	0.6-2.0	0.14-0.17	4.5-6.0	Low	0.32	5	6	1-3
Meda	11-30	20-35	1.30-1.35	0.6-2.0	0.08-0.14	4.5-6.0	Low	0.24			
	30-60	3-15	1.25-1.30	6.0-20.0	0.07-0.10	4.5-6.0	Low	0.10			
39E*, 39G*:											
Murtip	0-11	12-20	0.70-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	3	5	7-10
	11-42	18-24	0.75-0.85	0.6-2.0	0.20-0.25	4.5-5.5	Low	0.32			
	42-50	18-24	0.70-0.85	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.20			
	50-54	---	---	---	---	---	---	---			
Caterl	0-19	12-18	0.70-0.85	0.6-2.0	0.20-0.25	3.6-6.0	Low	0.15	3	6	8-10
	19-43	12-27	0.70-0.85	0.6-2.0	0.15-0.25	3.6-6.0	Low	0.15			
	43-58	18-27	0.75-0.85	0.6-2.0	0.05-0.10	3.6-6.0	Low	0.05			
	58-62	---	---	---	---	---	---	---			
40A	0-18	15-25	1.10-1.20	0.6-2.0	0.19-0.21	4.5-6.0	Low	0.32	5	6	5-10
Nehalem	18-51	20-35	1.20-1.30	0.6-2.0	0.19-0.21	4.5-5.5	Moderate	0.37			
	51-60	20-35	1.25-1.35	0.6-2.0	0.19-0.21	4.5-5.0	Low	0.37			
41A*:											
Nekoma	0-13	5-20	1.00-1.20	0.6-2.0	0.20-0.23	5.1-6.0	Low	0.24	5	5	4-8
	13-19	5-15	1.10-1.30	2.0-6.0	0.12-0.15	5.1-6.0	Low	0.15			
	19-60	5-15	1.30-1.40	6.0-20.0	0.10-0.13	4.5-6.0	Low	0.10			
Fluvaquents	0-60	---	---	---	---	---	---	---	---	---	---

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
42C, 42E	0-15	15-25	0.90-1.20	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.28	2	6	7-12
Nelscott	15-29	18-30	1.00-1.30	0.6-2.0	0.19-0.22	4.5-5.5	Moderate	0.32			
	29-36	1-5	1.10-1.30	0.6-2.0	0.05-0.08	5.1-6.0	Low	0.15			
	36-48	---	---	---	---	---	---	---			
	48-60	1-10	1.10-1.30	2.0-6.0	0.	5.1-6.0	Low	0.17			
43H*:											
Neotsu	0-12	15-20	0.70-0.85	0.6-2.0	0.30-0.40	3.6-5.0	Low	0.32	2	5	10-15
	12-26	18-30	0.70-0.85	0.6-2.0	0.30-0.40	3.6-5.0	Low	0.24			
	26-33	18-25	0.70-0.85	0.6-2.0	0.15-0.20	3.6-5.0	Low	0.20			
	33	---	---	---	---	---	---	---			
Necanicum	0-12	10-18	0.75-0.85	0.6-2.0	0.20-0.25	3.6-5.0	Low	0.15	3	6	10-15
	12-21	12-18	0.75-0.85	0.6-2.0	0.15-0.20	3.6-5.0	Low	0.10			
	21-46	8-20	0.80-1.40	0.6-2.0	0.05-0.08	3.6-5.0	Low	0.05			
	46	---	---	---	---	---	---	---			
44H*:											
Neskowin	0-19	15-27	0.75-0.85	0.6-2.0	0.30-0.40	4.5-5.5	Low	0.24	2	6	10-15
	19-23	15-35	0.75-0.85	0.6-2.0	0.30-0.40	4.5-5.5	Moderate	0.24			
	23-27	---	---	---	---	---	---	---			
Rock outcrop.											
45E*, 45G*:											
Neskowin	0-19	15-27	0.75-0.85	0.6-2.0	0.30-0.40	4.5-5.5	Low	0.24	2	6	10-15
	19-23	15-35	0.75-0.85	0.6-2.0	0.30-0.40	4.5-5.5	Moderate	0.24			
	23-27	---	---	---	---	---	---	---			
Salander	0-28	10-15	0.55-0.65	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.28	5	5	10-15
	28-60	18-30	0.65-1.05	0.6-2.0	0.30-0.40	4.5-5.5	Low	0.43			
46A	0-14	18-27	1.10-1.25	0.6-2.0	0.19-0.21	4.5-5.5	Low	0.32	5	6	4-8
Nestucca	14-32	25-35	1.25-1.40	0.2-0.6	0.19-0.21	4.5-5.5	Moderate	0.32			
	32-60	20-45	1.35-1.45	0.2-0.6	0.15-0.17	4.5-5.5	Moderate	0.28			
47C, 47E	0-5	1-5	1.30-1.60	6.0-20	0.05-0.07	3.6-5.5	Low	0.17	5	2	3-5
Netarts	5-39	1-5	1.30-1.60	2.0-6.0	0.05-0.10	4.5-6.0	Low	0.17			
	39-60	1-5	1.30-1.60	6.0-20	0.05-0.10	5.1-6.0	Low	0.17			
48E, 48F	0-7	30-40	1.10-1.30	0.2-0.6	0.18-0.20	5.1-6.0	Moderate	0.28	2	7	4-8
Peavine	7-37	45-60	1.10-1.30	0.2-0.6	0.13-0.16	4.5-5.5	Moderate	0.28			
	37-41	---	---	---	---	---	---	---			
49E*:											
Preacher	0-15	20-27	0.85-0.95	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.17	3	6	5-8
	15-45	25-35	1.10-1.30	0.6-2.0	0.16-0.21	4.5-5.5	Moderate	0.24			
	45-54	7-30	1.20-1.30	2.0-6.0	0.10-0.17	4.5-5.0	Low	0.32			
	54-58	---	---	---	---	---	---	---			
Bohannon	0-16	15-25	0.85-0.95	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.10	2	7	4-6
	16-31	18-30	1.00-1.30	2.0-6.0	0.09-0.15	4.5-6.0	Low	0.17			
	31-35	---	---	---	---	---	---	---			
50G*:											
Preacher	0-15	20-27	0.85-0.95	0.6-2.0	0.25-0.35	4.5-5.5	Low	0.17	3	6	5-8
	15-45	25-35	1.10-1.30	0.6-2.0	0.16-0.21	4.5-5.5	Moderate	0.24			
	45-54	7-30	1.20-1.30	2.0-6.0	0.10-0.17	4.5-5.0	Low	0.32			
	54-58	---	---	---	---	---	---	---			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
50G*:											
Bohannon	0-16	15-25	0.85-0.95	2.0-6.0	0.15-0.20	4.5-6.0	Low	0.10	2	7	4-6
	16-31	18-30	1.00-1.30	2.0-6.0	0.09-0.15	4.5-6.0	Low	0.17			
	31-35	---	---	---	---	---	---	----			
Slickrock	0-14	18-27	0.75-0.85	0.6-2.0	0.20-0.30	4.5-5.5	Low	0.15	4	6	8-12
	14-39	20-35	1.00-1.30	0.6-2.0	0.12-0.16	4.5-5.5	Low	0.32			
	39-53	15-30	1.20-1.40	0.6-2.0	0.10-0.12	4.5-5.5	Low	0.28			
	53-57	---	---	---	---	---	---	----			
51A	0-34	15-25	0.50-0.85	0.6-2.0	0.35-0.45	4.5-5.0	Low	0.37	5	6	15-25
Quillamook	34-58	18-30	0.75-0.85	0.6-2.0	0.30-0.40	4.5-5.0	Low	0.32			
	58-60	5-10	1.35-1.45	0.6-2.0	0.06-0.08	4.5-5.0	Low	0.15			
52H*:											
Reedsport	0-14	10-25	0.70-0.95	0.6-2.0	0.15-0.25	5.1-6.0	Low	0.15	2	6	5-12
	14-32	20-35	1.00-1.30	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.10			
	32-36	---	---	---	---	---	---	----			
Tolovana	0-18	15-20	0.55-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	5	5	10-15
	18-32	20-35	0.80-0.90	0.6-2.0	0.20-0.35	4.5-5.5	Low	0.32			
	32-60	20-35	0.95-1.10	0.6-2.0	0.05-0.15	4.5-5.5	Low	0.24			
53E, 53G	0-10	15-20	0.70-0.85	0.6-2.0	0.20-0.25	4.5-5.5	Low	0.15	2	6	7-10
Sach	10-19	18-30	0.70-0.85	0.6-2.0	0.20-0.25	4.5-5.5	Low	0.15			
	19-27	18-35	1.00-1.30	0.6-2.0	0.10-0.15	3.6-5.5	Low	0.10			
	27	---	---	---	---	---	---	----			
54A	0-14	10-18	0.75-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.37	5	5	10-15
Siletz	14-31	10-18	0.75-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.37			
	31-42	10-18	0.95-1.20	0.6-2.0	0.15-0.17	4.5-5.5	Low	0.43			
	42-55	5-15	1.25-1.40	6.0-20	0.05-0.15	4.5-5.5	Low	0.10			
	55-63	5-8	1.25-1.40	6.0-20	0.05-0.10	4.5-5.5	Low	0.17			
55E*:											
Templeton	0-17	18-27	0.85-0.95	0.6-2.0	0.25-0.35	3.6-5.5	Low	0.32	3	6	10-15
	17-55	25-35	0.90-1.10	0.6-2.0	0.20-0.25	3.6-5.0	Moderate	0.20			
	55-59	---	---	---	---	---	---	----			
Fendall	0-16	20-27	0.90-0.95	0.6-2.0	0.25-0.35	4.5-5.0	Low	0.28	2	6	10-15
	16-27	30-40	1.10-1.20	0.6-2.0	0.16-0.21	4.5-5.0	Low	0.20			
	27-38	40-50	1.10-1.30	0.2-0.6	0.11-0.16	4.5-5.0	Moderate	0.20			
	38-42	---	---	---	---	---	---	----			
56E*, 56G*:											
Tolovana	0-18	15-20	0.55-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	5	5	10-15
	18-32	20-35	0.80-0.90	0.6-2.0	0.20-0.35	4.5-5.5	Low	0.32			
	32-60	20-35	0.95-1.10	0.6-2.0	0.05-0.15	4.5-5.5	Low	0.24			
Reedsport	0-14	10-25	0.70-0.95	0.6-2.0	0.15-0.25	5.1-6.0	Low	0.15	2	6	5-12
	14-32	20-35	1.00-1.30	0.6-2.0	0.12-0.17	4.5-5.5	Low	0.10			
	32-36	---	---	---	---	---	---	----			
57A	0-18	15-25	1.10-1.30	0.6-2.0	0.18-0.22	4.5-6.5	Low	0.37	5	6	1-2
Treharne	18-38	18-35	1.20-1.30	0.6-2.0	0.18-0.22	4.5-5.5	Moderate	0.37			
	38-60	18-45	1.20-1.30	0.2-0.6	0.16-0.22	4.5-5.5	Moderate	0.43			
58E*:											
Urban land.											

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
								K	T		
	In	Pct	g/cc	In/hr	In/in	pH					Pct
58E*:											
Bandon	0-3	5-12	1.20-1.50	0.6-2.0	0.11-0.13	3.6-5.5	Low	0.28	3	3	1-3
	3-28	5-15	1.20-1.50	0.6-2.0	0.12-0.17	5.1-6.0	Low	0.24			
	28-45	---	---	---	---	---	---	----			
	45-60	5-18	1.30-1.50	2.0-6.0	0.	5.1-6.0	Low	0.15			
59C*:											
Urban land.											
Nelscott	0-15	15-25	0.90-1.20	0.6-2.0	0.16-0.20	4.5-5.5	Low	0.28	2	6	7-12
	15-29	18-30	1.00-1.30	0.6-2.0	0.19-0.22	4.5-5.5	Moderate	0.32			
	29-36	1-5	1.10-1.30	0.6-2.0	0.05-0.08	5.1-6.0	Low	0.15			
	36-48	---	---	---	---	---	---	----			
	48-60	1-10	1.10-1.30	2.0-6.0	0.	5.1-6.0	Low	0.17			
60C*:											
Urban land.											
Waldport	0-7	1-5	1.40-1.60	>20	0.05-0.07	4.5-6.0	Low	0.17	5	1	1-5
	7-60	1-5	1.40-1.60	>20	0.05-0.07	4.5-6.0	Low	0.17			
61E*, 61G*:											
Valsetz	0-5	20-25	0.75-0.85	2.0-6.0	0.20-0.25	4.5-5.0	Low	0.15	2	7	4-8
	5-36	20-30	0.75-0.85	2.0-6.0	0.10-0.14	4.5-5.0	Low	0.15			
	36-40	---	---	---	---	---	---	----			
Yellowstone	0-10	10-20	0.75-0.85	2.0-6.0	0.20-0.25	4.5-5.5	Low	0.10	1	6	4-8
	10-18	5-15	0.75-0.85	6.0-20	0.04-0.06	4.5-5.5	Low	0.10			
	18-22	---	---	---	---	---	---	----			
61H*:											
Valsetz	0-5	20-25	0.75-0.85	2.0-6.0	0.20-0.25	4.5-5.0	Low	0.15	2	7	4-8
	5-36	20-30	0.75-0.85	2.0-6.0	0.10-0.14	4.5-5.0	Low	0.15			
	36-40	---	---	---	---	---	---	----			
Yellowstone	0-10	10-20	0.75-0.85	2.0-6.0	0.20-0.25	4.5-5.5	Low	0.10	1	6	4-8
	10-18	5-15	0.75-0.85	6.0-20	0.04-0.06	4.5-5.5	Low	0.10			
	18-22	---	---	---	---	---	---	----			
62C	0-9	18-25	0.95-1.10	0.6-2.0	0.21-0.23	3.6-5.5	Low	0.32	5	6	7-10
Wadecreek	9-19	25-35	1.10-1.20	0.6-2.0	0.19-0.21	3.6-5.5	Low	0.32			
	19-48	35-50	1.20-1.30	0.06-0.2	0.16-0.19	3.6-5.5	Moderate	0.28			
	48-60	15-35	1.20-1.35	0.6-2.0	0.16-0.20	3.6-5.5	Low	0.32			
63E	0-7	1-5	1.40-1.60	>20	0.05-0.07	4.5-6.0	Low	0.17	5	1	1-5
Waldport	7-60	1-5	1.40-1.60	>20	0.05-0.07	4.5-6.0	Low	0.17			
64C*:											
Winema	0-18	20-27	0.75-0.85	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.20	3	6	10-15
	18-25	27-35	0.75-0.95	0.6-2.0	0.30-0.40	4.5-5.0	Low	0.20			
	25-54	35-50	1.10-1.20	0.2-0.6	0.15-0.17	4.5-5.0	Moderate	0.24			
	54-58	---	---	---	---	---	---	----			
Fendall	0-16	20-27	0.90-0.95	0.6-2.0	0.25-0.35	4.5-5.0	Low	0.28	2	6	10-15
	16-27	30-40	1.10-1.20	0.6-2.0	0.16-0.21	4.5-5.0	Low	0.20			
	27-38	40-50	1.10-1.30	0.2-0.6	0.11-0.16	4.5-5.0	Moderate	0.20			
	38-42	---	---	---	---	---	---	----			

See footnote at end of table.

TABLE 14.--PHYSICAL AND CHEMICAL PROPERTIES OF THE SOILS--Continued

Soil name and map symbol	Depth	Clay	Moist bulk density	Permeability	Available water capacity	Soil reaction	Shrink-swell potential	Erosion factors		Wind erodibility group	Organic matter
	In	Pct	g/cc	In/hr	In/in	pH		K	T		Pct
65A	0-9	10-20	0.50-0.70	0.6-2.0	0.35-0.45	4.5-5.5	Low	0.32	3	5	10-15
Wolfer	9-19	10-20	0.50-0.80	0.6-2.0	0.20-0.25	4.5-5.5	Low	0.28			
	19-29	5-15	0.75-0.85	0.6-2.0	0.10-0.15	4.5-5.5	Low	0.10			
	29-60	0-5	1.30-1.50	6.0-20	0.01-0.03	4.5-5.5	Low	0.02			
66A	0-7	5-15	1.20-1.30	2.0-6.0	0.15-0.17	3.6-5.5	Low	0.32	5	3	5-10
Yachats	7-22	5-15	1.25-1.35	2.0-6.0	0.14-0.17	3.6-5.5	Low	0.24			
	22-31	5-10	1.30-1.40	2.0-6.0	0.09-0.13	3.6-5.5	Low	0.20			
	31-60	5-6	1.30-1.40	2.0-6.0	0.09-0.10	3.6-5.5	Low	0.20			
67A	0-6	1-5	1.30-1.60	2.0-6.0	0.05-0.10	4.5-5.5	Low	0.17	5	1	2-5
Yaquina	6-35	1-2	1.30-1.60	2.0-6.0	0.05-0.07	4.5-6.0	Low	0.17			
	35-60	1-2	1.30-1.60	6.0-20	0.05-0.07	4.5-6.0	Low	0.17			

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 15.--WATER FEATURES

("Flooding," "water table," and terms such as "rare," "brief," "apparent," and "perched" are explained in the text. The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
1E*, 1F*:							
Apt	B	None	---	---	>6.0	---	---
McDuff	C	None	---	---	>6.0	---	---
2E Astoria	B	None	---	---	>6.0	---	---
3C, 3E Bandon	C	None	---	---	>6.0	---	---
4A* Beaches	D	Frequent	Very brief	Jan-Dec	+2-6.0	Apparent	Jan-Dec
5C Bentilla	C	None	---	---	2.0-3.0	Perched	Nov-May
6E, 6F Blachly	B	None	---	---	>6.0	---	---
7H*:							
Bohannon	C	None	---	---	>6.0	---	---
Preacher	B	None	---	---	>6.0	---	---
8A Brallier	D	Frequent	Brief	Jan-Dec	+2-1.0	Apparent	Jan-Dec
9A Brenner	D	Frequent	Brief	Dec-Apr	+.5-1.0	Apparent	Dec-Apr
10G*:							
Caterl	B	None	---	---	>6.0	---	---
Laderly	C	None	---	---	>6.0	---	---
11B Chitwood	D	None	---	---	1.0-3.0	Apparent	Nov-May
12A Coquille	D	Frequent	Brief	Jan-Dec	+2-2.0	Apparent	Jan-Dec
13A Coquille	D	Rare	---	---	+.5-2.0	Apparent	Oct-Jun
14B Depoe	D	None	---	---	+.5-2.0	Perched	Oct-May
15B Eilertsen	B	None	---	---	>6.0	---	---
16C Elsie	B	None	---	---	>6.0	---	---
17A Euchre	C	None	---	---	1.0-3.0	Apparent	Nov-May

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
18G*:							
Fendall	C	None	---	---	>6.0	---	---
Templeton	B	None	---	---	>6.0	---	---
19E*:							
Fendall	C	None	---	---	>6.0	---	---
Winema	C	None	---	---	>6.0	---	---
20E*, 20G*:							
Formader	C	None	---	---	>6.0	---	---
Hemcross	B	None	---	---	>6.0	---	---
21H*:							
Formader	C	None	---	---	>6.0	---	---
Klistan	B	None	---	---	>6.0	---	---
Hemcross	B	None	---	---	>6.0	---	---
22C Gleneden	D	None	---	---	1.5-2.0	Perched	Dec-Apr
23C Grindbrook	C	None	---	---	2.0-3.0	Perched	Nov-May
24H*:							
Harslow	C	None	---	---	>6.0	---	---
Rock outcrop	D	None	---	---	>6.0	---	---
25A Hebo	D	None	---	---	+.5-1.0	Perched	Nov-Jun
26E, 26G Hembre	B	None	---	---	>6.0	---	---
27A Histic Cryaquepts	D	None	---	---	+2-1.0	Apparent	Jan-Dec
28E Honeygrove	B	None	---	---	>6.0	---	---
29E, 29G Kilowan	C	None	---	---	>6.0	---	---
30A Kirkendall	C	Occasional	Brief	Nov-Apr	2.5-6.0	Apparent	Nov-Apr
31G*:							
Klistan	B	None	---	---	>6.0	---	---
Harslow	C	None	---	---	>6.0	---	---
32E*, 32G*:							
Klootchie	B	None	---	---	>6.0	---	---
Neotsu	C	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
33B Knappa	B	None	---	---	>6.0	---	---
34E*: Laderly	C	None	---	---	>6.0	---	---
Murtip	B	None	---	---	>6.0	---	---
35E Lint	B	None	---	---	>6.0	---	---
36A Logsden	B	Rare	---	---	>6.0	---	---
37C McCurdy	C	None	---	---	2.0-3.0	Apparent	Nov-Apr
38C Meda	B	None	---	---	>6.0	---	---
39E*, 39G*: Murtip	B	None	---	---	>6.0	---	---
Caterl	B	None	---	---	>6.0	---	---
40A Nehalem	C	Occasional	Brief	Dec-Apr	3.0-6.0	Apparent	Dec-Apr
41A*: Nekoma	B	Frequent	Brief	Nov-Apr	4.0-6.0	Apparent	Nov-Apr
Fluvaquents	D	Frequent	Brief	Nov-Apr	0-3.0	Apparent	Nov-May
42C, 42E Nelscott	C	None	---	---	2.0-3.5	Perched	Nov-Mar
43H*: Neotsu	C	None	---	---	>6.0	---	---
Necanicum	B	None	---	---	>6.0	---	---
44H*: Neskowin	C	None	---	---	>6.0	---	---
Rock outcrop	D	None	---	---	>6.0	---	---
45E*, 45G*: Neskowin	C	None	---	---	>6.0	---	---
Salander	B	None	---	---	>6.0	---	---
46A Nestucca	D	Frequent	Brief	Nov-Apr	1.0-2.0	Apparent	Dec-Apr
47C, 47E Netarts	B	None	---	---	>6.0	---	---
48E, 48F Peavine	C	None	---	---	>6.0	---	---

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
49E*:							
Preacher	B	None	---	---	>6.0	---	---
Bohannon	C	None	---	---	>6.0	---	---
50G*:							
Preacher	B	None	---	---	>6.0	---	---
Bohannon	C	None	---	---	>6.0	---	---
Slickrock	B	None	---	---	>6.0	---	---
51A---------- Quillamook	B	None	---	---	>6.0	---	---
52H*:							
Reedsport	C	None	---	---	>6.0	---	---
Tolovana	B	None	---	---	>6.0	---	---
53E, 53G---------- Sach	C	None	---	---	>6.0	---	---
54A---------- Siletz	B	None	---	---	>6.0	---	---
55E*:							
Templeton	B	None	---	---	>6.0	---	---
Fendall	C	None	---	---	>6.0	---	---
56E*, 56G*:							
Tolovana	B	None	---	---	>6.0	---	---
Reedsport	C	None	---	---	>6.0	---	---
57A---------- Treharne	C	None	---	---	2.0-3.0	Apparent	Nov-Apr
58E*: Urban land.							
Bandon	C	None	---	---	>6.0	---	---
59C*: Urban land.							
Nelscott	C	None	---	---	2.0-3.5	Perched	Nov-Mar
60C*: Urban land.							
Waldport	A	None	---	---	>6.0	---	---
61E*, 61G*, 61H*:							
Valsetz	C	None	---	---	>6.0	---	---
Yellowstone	D	None	---	---	>6.0	---	---
62C---------- Wadecreek	C	None	---	---	2.0-3.0	Perched	Nov-May

See footnote at end of table.

TABLE 15.--WATER FEATURES--Continued

Soil name and map symbol	Hydrologic group	Flooding			High water table		
		Frequency	Duration	Months	Depth	Kind	Months
					Ft		
63E---------- Waldport	A	None----------	---	---	>6.0	---	---
64C*:							
Winema----------	C	None----------	---	---	>6.0	---	---
Fendall----------	C	None----------	---	---	>6.0	---	---
65A---------- Wolfer	B	None----------	---	---	>6.0	---	---
66A---------- Yachats	B	Frequent--------	Brief---------	Nov-Apr	4.0-6.0	Apparent	Nov-Apr
67A---------- Yaquina	D	None----------	---	---	+.5-2.0	Apparent	Nov-Apr

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 16.--SOIL FEATURES

(The symbol < means less than; > means more than. Absence of an entry indicates that the feature is not a concern or that data were not estimated)

Soil name and map symbol	Bedrock		Cemented pan		Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
	In		In			
1E*, 1F*:						
Apt	>60	---	---	---	High	High.
McDuff	20-40	Soft	---	---	High	High.
2E Astoria	>60	---	---	---	High	High.
3C, 3E Bandon	>60	---	20-36	Thin	High	High.
4A* Beaches	>60	---	---	---	High	High.
5C Bentilla	>60	---	---	---	High	High.
6E, 6F Blachly	>60	---	---	---	High	High.
7H*:						
Bohannon	20-40	Soft	---	---	High	High.
Preacher	40-60	Soft	---	---	High	High.
8A Brallier	>60	---	---	---	Moderate	Moderate.
9A Brenner	>60	---	---	---	High	High.
10G*:						
Caterl	40-60	Hard	---	---	High	High.
Laderly	20-40	Hard	---	---	High	High.
11B Chitwood	>60	---	---	---	High	High.
12A Coquille	>60	---	---	---	Moderate	Moderate.
13A Coquille	>60	---	---	---	High	High.
14B Depoe	>60	---	12-20	Thick	High	High.
15B Eilertsen	>60	---	---	---	High	High.
16C Elsie	>60	---	---	---	High	High.
17A Euchre	>60	---	---	---	High	High.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
	In		In			
18G*:						
Fendall	20-40	Soft	---	---	High	High.
Templeton	40-60	Soft	---	---	High	High.
19E*:						
Fendall	20-40	Soft	---	---	High	High.
Winema	40-60	Soft	---	---	High	High.
20E*, 20G*:						
Formader	20-40	Soft	---	---	High	High.
Hemcross	>60	---	---	---	High	High.
21H*:						
Formader	20-40	Soft	---	---	High	High.
Klistan	40-60	Hard	---	---	High	High.
Hemcross	>60	---	---	---	High	High.
22C---- Gleneden	>60	---	---	---	High	High.
23C---- Grindbrook	>60	---	---	---	High	High.
24H*:						
Harslow	20-40	Hard	---	---	High	High.
Rock outcrop	0	Hard	---	---	---	---
25A---- Hebo	>60	---	---	---	High	High.
26E, 26G---- Hembre	>60	---	---	---	High	High.
27A---- Histic Cryaquepts	>60	---	---	---	High	High.
28E---- Honeygrove	>60	---	---	---	High	High.
29E, 29G---- Kilowan	20-40	Soft	---	---	High	High.
30A---- Kirkendall	>60	---	---	---	High	High.
31G*:						
Klistan	40-60	Hard	---	---	High	High.
Harslow	20-40	Hard	---	---	High	High.
32E*, 32G*:						
Klootchie	40-60	Soft	---	---	High	High.
Neotsu	20-40	Soft	---	---	High	High.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
	In		In			
33B Knappa	>60	---	---	---	High	High.
34E*:						
Laderly	20-40	Hard	---	---	High	High.
Murtip	40-60	Soft	---	---	High	High.
35E Lint	>60	---	---	---	High	High.
36A Logsden	>60	---	---	---	High	High.
37C McCurdy	>60	---	---	---	High	High.
38C Meda	>60	---	---	---	High	High.
39E*, 39G*:						
Murtip	40-60	Soft	---	---	High	High.
Caterl	40-60	Hard	---	---	High	High.
40A Nehalem	>60	---	---	---	High	High.
41A*:						
Nekoma	>60	---	---	---	High	High.
Fluvaquents	>60	---	---	---	Moderate	Moderate.
42C, 42E Nelscott	>60	---	24-40	Thin	High	High.
43H*:						
Neotsu	20-40	Soft	---	---	High	High.
Necanicum	40-60	Soft	---	---	High	High.
44H*:						
Neskowin	20-40	Hard	---	---	High	High.
Rock outcrop	0	Hard	---	---	---	---
45E*, 45G*:						
Neskowin	20-40	Hard	---	---	High	High.
Salander	>60	---	---	---	High	High.
46A Nestucca	>60	---	---	---	High	High.
47C, 47E Netarts	>60	---	---	---	High	High.
48E, 48F Peavine	20-40	Soft	---	---	High	High.

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
	In		In			
49E*:						
Preacher	40-60	Soft	---	---	High	High.
Bohannon	20-40	Soft	---	---	High	High.
50G*:						
Preacher	40-60	Soft	---	---	High	High.
Bohannon	20-40	Soft	---	---	High	High.
Slickrock	40-60	Soft	---	---	High	High.
51A	>60	---	---	---	High	High.
Quillamook						
52H*:						
Reedsport	20-40	Soft	---	---	High	High.
Tolovana	>60	---	---	---	High	High.
53E, 53G	20-40	Soft	---	---	High	High.
Sach						
54A	>60	---	---	---	High	High.
Siletz						
55E*:						
Templeton	40-60	Soft	---	---	High	High.
Fendall	20-40	Soft	---	---	High	High.
56E*, 56G*:						
Tolovana	>60	---	---	---	High	High.
Reedsport	20-40	Soft	---	---	High	High.
57A	>60	---	---	---	High	High.
Treharne						
58E*:						
Urban land.						
Bandon	>60	---	20-36	Thin	High	High.
59C*:						
Urban land.						
Nelscott	>60	---	24-40	Thin	High	High.
60C*:						
Urban land.						
Waldport	>60	---	---	---	High	High.
61E*, 61G*, 61H*:						
Valsetz	20-40	Hard	---	---	High	High.
Yellowstone	10-20	Hard	---	---	High	High.
62C	>60	---	---	---	High	High.
Wadecreek						

See footnote at end of table.

TABLE 16.--SOIL FEATURES--Continued

Soil name and map symbol	Bedrock		Cemented pan		Risk of corrosion	
	Depth	Hardness	Depth	Hardness	Uncoated steel	Concrete
	In		In			
63E Waldport	>60	---	---	---	High	High.
64C*:						
Winema	40-60	Soft	---	---	High	High.
Fendall	20-40	Soft	---	---	High	High.
65A Wolfer	>60	---	---	---	High	High.
66A Yachats	>60	---	---	---	High	High.
67A Yaquina	>60	---	---	---	High	High.

* See description of the map unit for composition and behavior characteristics of the map unit.

TABLE 17.--CLASSIFICATION OF THE SOILS

(An asterisk in the first column indicates that the soil is a taxadjunct to the series. See text for a description of those characteristics of the soil that are outside the range of the series)

Soil name	Family or higher taxonomic class
Apt	Clayey, mixed, mesic Typic Haplohumults
Astoria	Fine, mixed, mesic Andic Haplumbrepts
Bandon	Coarse-loamy, mixed, isomesic, ortstein Typic Haplorthods
Bentilla	Clayey, mixed, isomesic Typic Palehumults
Blachly	Fine, mixed, mesic Umbric Dystrochrepts
Bohannon	Fine-loamy, mixed, mesic Andic Haplumbrepts
*Brallier	Dysic, isomesic Typic Tropohemists
Brenner	Fine-silty, mixed, acid, isomesic Aeric Tropaquepts
Caterl	Medial-skeletal, frigid Alic Hapludands
Chitwood	Fine, mixed, isomesic Aquic Humitropepts
Coquille	Fine-silty, mixed, nonacid, isomesic Aeric Tropic Fluvaquents
Depoe	Loamy, mixed, isomesic, ortstein & shallow Sideric Tropaquods
Eilertsen	Fine-silty, mixed, mesic Ultic Hapludalfs
Elsie	Fine-silty, mixed, mesic Typic Haplohumults
Euchre	Medial over loamy, mixed, isomesic Alic Haplaquands
Fendall	Fine, mixed, isomesic Andic Humitropepts
Fluvaquents	Fluvaquents
Formader	Medial over loamy, mixed, mesic Alic Hapludands
Gleneden	Fine, mixed, isomesic Aquic Humitropepts
Grindbrook	Fine-silty, mixed, isomesic Aquic Humitropepts
Harslow	Medial-skeletal, mesic Alic Hapludands
Hebo	Fine, mixed, acid, isomesic Typic Tropaquepts
Hembre	Fine-loamy, mixed, mesic Andic Haplumbrepts
Hemcross	Medial, mesic Alic Hapludands
Histic Cryaquepts	Histic Cryaquepts
Honeygrove	Clayey, mixed, mesic Typic Palehumults
Kilowan	Fine, mixed, mesic Umbric Dystrochrepts
Kirkendall	Fine-silty, mixed, mesic Fluventic Haplumbrepts
Klistan	Medial-skeletal, mesic Alic Hapludands
Klootchie	Medial, isomesic Alic Fulvudands
Knappa	Fine-silty, mixed, isomesic Typic Humitropepts
Laderly	Medial-skeletal, frigid Alic Hapludands
Lint	Medial, isomesic Alic Fulvudands
Logsden	Fine-silty, mixed, isomesic Typic Humitropepts
McCurdy	Clayey, mixed, mesic Typic Palehumults
McDuff	Clayey, mixed, mesic Typic Haplohumults
Meda	Fine-loamy, mixed, mesic Typic Haplumbrepts
Murtip	Medial, frigid Alic Hapludands
Necanicum	Medial-skeletal, isomesic Alic Fulvudands
Nehalem	Fine-silty, mixed, isomesic Fluventic Humitropepts
Nekoma	Coarse-loamy, mixed, mesic Fluventic Haplumbrepts
Nelscott	Fine-loamy over sandy or sandy-skeletal, mixed, isomesic, ortstein Typic Haplorthods
Neotsu	Medial, isomesic Alic Fulvudands
Neskowin	Medial, isomesic Alic Fulvudands
Nestucca	Fine-silty, mixed, acid, isomesic Aeric Tropaquepts
Netarts	Sandy, mixed, isomesic Entic Haplorthods
Peavine	Clayey, mixed, mesic Typic Haplohumults
Preacher	Fine-loamy, mixed, mesic Andic Haplumbrepts
Quillamook	Medial, isomesic Alic Pachic Melanudands
Reedsport	Fine-loamy, mixed, isomesic Typic Humitropepts
Sach	Medial over loamy-skeletal, mixed, frigid Alic Hapludands
Salander	Medial, isomesic Alic Fulvudands
Siletz	Medial over loamy, mixed, isomesic Alic Fulvudands
Slickrock	Medial over loamy, mixed, mesic Alic Fulvudands
Templeton	Fine-silty, mixed, isomesic Andic Humitropepts
Tolovana	Medial over loamy, mixed, isomesic Alic Fulvudands
Treharne	Fine-silty, mixed, mesic Aquultic Hapludalfs
Valsetz	Medial-skeletal Typic Haplocryands

TABLE 17.--CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Wadecreek	Clayey, mixed, isomesic Typic Haplohumults
Waldport	Mixed, isomesic Typic Tropopsamments
Winema	Medial over clayey, mixed, isomesic Alic Fulvudands
Wolfer	Medial over sandy or sandy-skeletal, mixed, isomesic Alic Fulvudands
Yachats	Coarse-loamy, mixed, isomesic Fluventic Humitropepts
Yaquina	Sandy, mixed, isomesic Aquentic Haplorthods
Yellowstone	Medial-skeletal Lithic Haplocryands

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