United States
Department of
Agriculture

NRCS

Natural
Resources
Conservation
Service

In cooperation with
United States Department
of the Interior, National
Park Service; San Juan
County; San Juan County
Conservation District; and
Washington State
University, Agricultural
Research Center

Soil Survey of San Juan County, Washington

How To Use This Soil Survey

General Soil Map

The general soil map, which is a color map, 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.

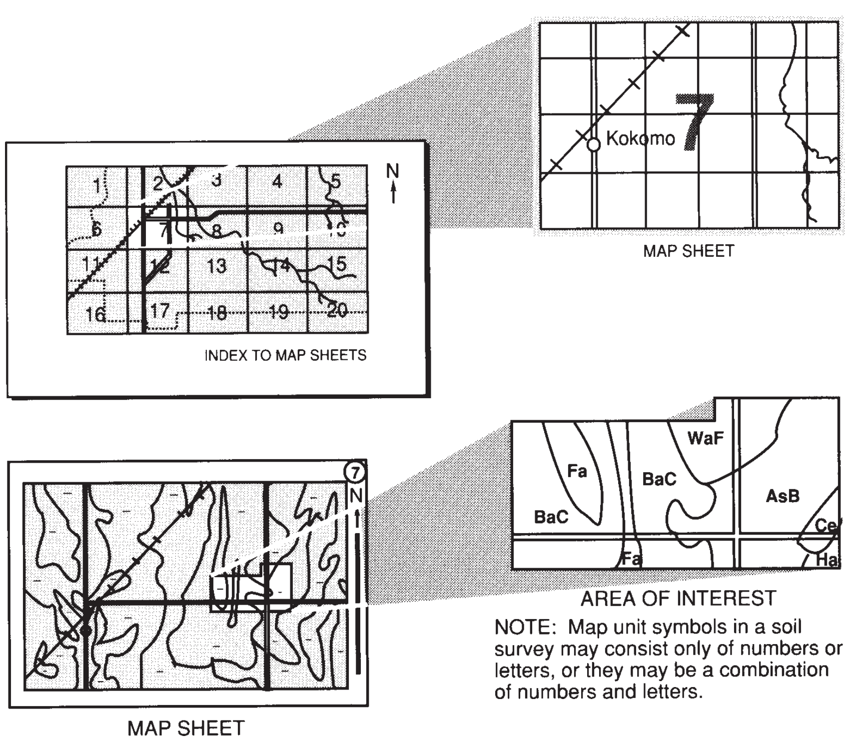
Detailed Soil Maps

The detailed soil maps 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**. Note the number of the map sheet and turn to that sheet.

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

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



National Cooperative Soil Survey

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 (formerly the Soil Conservation Service) has leadership for the Federal part of the National Cooperative Soil Survey. This survey was made cooperatively by the Natural Resources Conservation Service and the United States Department of the Interior, National Park Service; San Juan County; San Juan County Conservation District; and Washington State University, Agricultural Research Center. The survey is part of the technical assistance furnished to the San Juan County Conservation District.

Major fieldwork for this soil survey was completed in 2005. Soil names and descriptions were approved in 2005. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 2006. The most current official data are available on the Internet.

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.

Nondiscrimination Statement

Cover Caption

View of county, looking northwest. Canoe Island is in foreground, Shaw Island is in center, and Orcas Island is in background.

Additional information about the Nation's natural resources is available online from the Natural Resources Conservation Service at http://www.nrcs.usda.gov.

Contents

Issued August 2009

Foreword

Soil surveys contain information that affects land use planning in survey areas. They include predictions of soil behavior for selected land uses. The surveys highlight soil limitations, improvements needed to overcome the limitations, and the impact of selected land uses on the environment.

Soil surveys are designed for many different users. Farmers, ranchers, foresters, and agronomists can use the surveys 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 surveys 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 surveys to help them understand, protect, and enhance the environment.

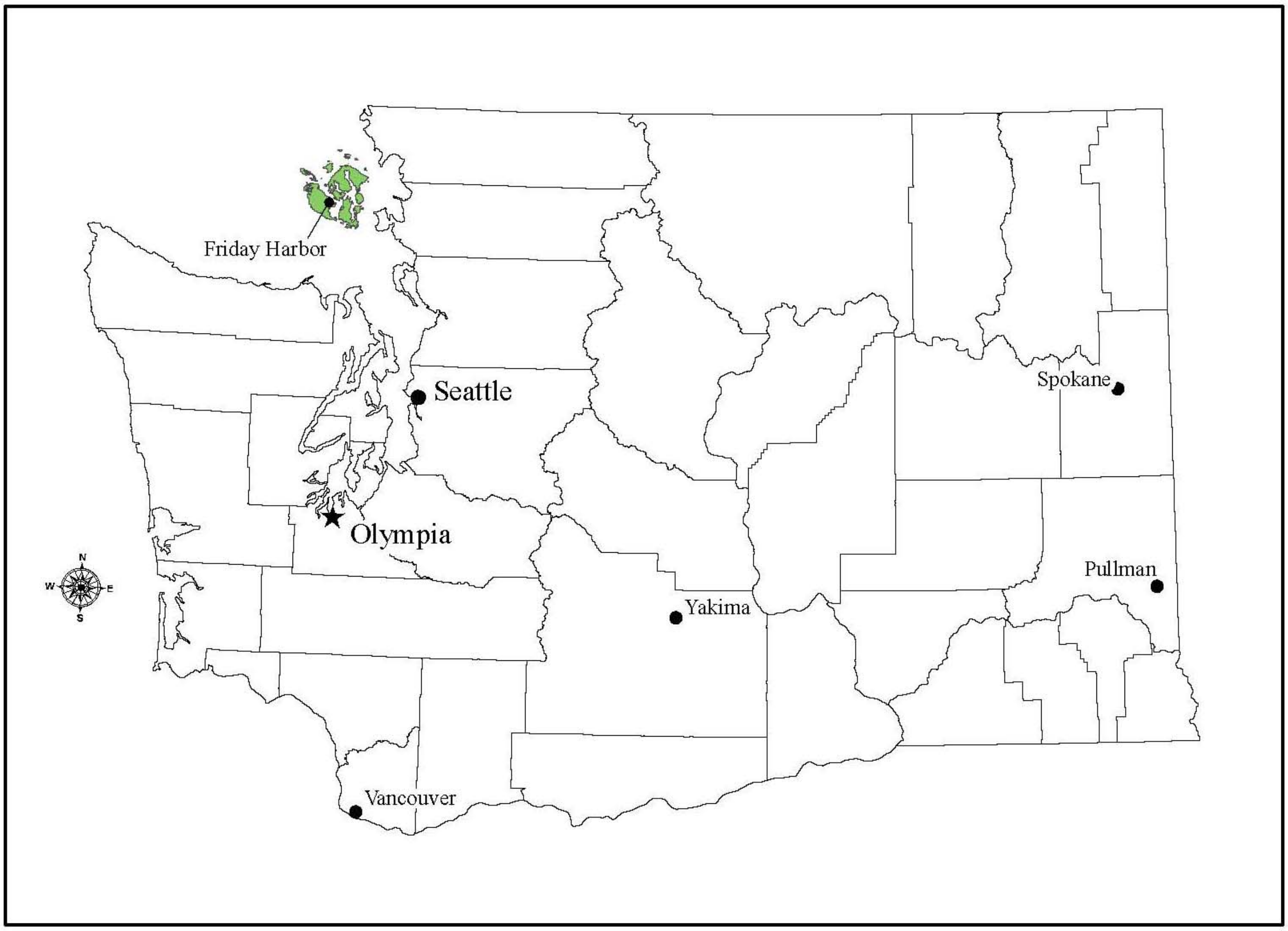
Various land use regulations of Federal, State, and local governments may impose special restrictions on land use or land treatment. The information in this report is intended to identify soil properties that are used in making various land use or land treatment decisions. Statements made in this report are intended to help the land users identify and reduce the effects of soil limitations on various land uses. The landowner or user is responsible for identifying and complying with existing laws and regulations.

Although soil survey information can be used for general farm, local, and wider area planning, onsite investigation is needed to supplement this information in some cases. Examples include soil quality assessments (http://soils.usda.gov/sqi/) and certain conservation and engineering applications. For more detailed information, contact your local USDA Service Center (http://offices.sc.egov.usda.gov/locator/app?agency—nrcs) or your NRCS State Soil Scientist (http://soils.usda.gov/contact/state_offices/).

Great differences in soil properties can occur within short distances. Some soils are seasonally wet or subject to flooding. 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. The location of each map unit is shown on the detailed soil maps. Each soil in the survey area is described, and information on specific uses is given. 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.

Roylene Rides at the Door
State Conservationist
Natural Resources Conservation Service



Location of San Juan County in Washington.

Soil Survey of San Juan County, Washington

By Michael Regan, Natural Resources Conservation Service

Fieldwork by Michael Regan, Toby Rodgers, Erik Dahlke, Jason Outlaw, Tim Riebe, Sharon Walker, and Theresa Kunch, Natural Resources Conservation Service

Forestry fieldwork by Al Craney, Skagit County Conservation District, and Kathryn Smith, Natural Resources Conservation Service

Range fieldwork by Marty Chaney, Natural Resources Conservation Service

United States Department of Agriculture, Natural Resources Conservation Service,
in cooperation with
United States Department of the Interior, National Park Service; San Juan County; San Juan County Conservation District; Washington State University, Agricultural Research Center

General Nature of the Survey Area

This section provides general information about the climate and geology of the survey area.

Climate

Prepared by the Natural Resources Conservation Service, National Water and Climate Center, Portland, Oregon.

Temperature and precipitation data for the survey area were recorded at Olga 2 SE, Washington, in the period 1891 to 2008. Climate data provided in the tables "Temperature and Precipitation," "Freeze Dates in Spring and Fall," and "Growing Season" were recorded at Olga 2 SE, Washington, in the period 1971 to 2000.

Relative humidity, percent sunshine, and wind information are estimated from data recorded at the First Order station in Seattle, Washington.

In winter, the average temperature is 41.0 degrees F and the average daily minimum temperature is 35.8 degrees. The lowest temperature on record, which occurred at Olga 2 SE on January 13, 1950, is -8 degrees. In summer, the average temperature is 59.4 degrees and the average daily maximum temperature is 68.9 degrees. The highest temperature, which occurred at Olga 2 SE on July 17, 1941, is 92 degrees.

Growing degree days are shown in the table "Temperature and Precipitation." They are equivalent to "heat units." During the month, growing degree days accumulate by the amount that the average temperature each day exceeds a base temperature (40 degrees F). The normal monthly accumulation is used to schedule single or successive plantings of a crop between the last freeze in spring and the first freeze in fall.

The average annual total precipitation is about 28.07 inches. Of this, about 17.36 inches, or 62 percent, usually falls in March through November. The growing season for most crops falls within this period. The heaviest 1-day rainfall during the period of record was 3.40 inches at Olga 2 SE on January 21, 1935, and the next highest 1-day rainfall was 2.89 inches on January 24, 1935.

The average seasonal snowfall is 5.6 inches. The greatest snow depth at any one time during the period of record was 27 inches on December 29, 1996. On an average, 3 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfall on record was 15 inches in February of 1916.

The average relative humidity in midafternoon is about 62 percent. Humidity is higher at night, and the average at dawn is about 83 percent. The sun shines 62 percent of the time in summer and 28 percent in winter. The prevailing wind in Seattle is from the southwest. The average windspeed is 9 miles per hour, and the highest windspeed, about 10 miles per hour, occurs in January. The speed and direction of the wind in San Juan County are highly variable; windspeed in the county easily exceeds that in and near Seattle.

Temperature and Precipitation

(Recorded in the period 1971 to 2000 at Olga 2 SE, Washington [6096])

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
January-----	45.2	35.3	40.3	57	18	81	3.85	2.11	5.53	10	1.7
February----	48.1	36.6	42.3	60	21	99	2.79	1.66	3.91	8	1.0
March-------	52.1	38.5	45.3	63	27	171	2.27	1.53	2.92	8	0.4
April-------	57.1	41.2	49.2	71	33	274	1.88	1.19	2.58	6	0.0
May---------	62.8	45.1	53.9	79	36	431	1.72	0.89	2.49	5	0.0
June--------	66.6	48.2	57.4	80	41	522	1.36	0.79	1.90	4	0.0
July--------	69.9	50.5	60.2	83	44	625	0.94	0.45	1.40	2	0.0
August------	70.2	50.9	60.6	83	44	637	1.07	0.32	1.80	2	0.0
September---	66.4	48.5	57.5	80	40	524	1.34	0.42	2.26	3	0.0
October-----	58.0	44.4	51.2	71	34	348	2.42	1.26	3.58	7	0.1
November----	49.6	39.0	44.3	62	23	152	4.36	2.51	6.10	11	0.5
December----	45.3	35.6	40.4	58	18	79	4.07	2.65	5.53	10	1.8
Yearly:											
Average---	57.6	42.8	50.2	---	---	---	---	---	---	---	---
Extreme---	89	-1	---	85	12	---	---	---	---	---	---
Total-----	---	---	---	---	---	3,943	28.07	23.80	31.62	76	5.6

Average number of days per year with at least 1 inch of snow on the ground: 3

*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 (Threshold: 40 degrees F).

Freeze Dates in Spring and Fall

(Recorded in the period 1971 to 2000 at Olga 2 SE, Washington [6096])

Probability	Temperature		
	24 °F or lower	28 °F or lower	32 °F or lower
Last freezing temperature in spring:			
1 year in 10 later than----	February 17	March 3	April 11
2 years in 10 later than---	February 5	February 22	April 1
5 years in 10 later than---	January 10	February 4	March 12
First freezing temperature in fall:			
1 year in 10 earlier than--	November 21	November 13	October 29
2 years in 10 earlier than	December 6	November 24	November 6
5 years in 10 earlier than	January 7	December 15	November 21

Growing Season

(Recorded in the period 1971 to 2000 at Olga 2 SE, Washington [6096])

Probability	Daily minimum temperature during growing season		
	Higher than 24 °F	Higher than 28 °F	Higher than 32 °F
	Days	*Days*	*Days*
9 years in 10------------	305	269	211
8 years in 10------------	324	284	225
5 years in 10------------	>365	316	250
2 years in 10------------	>365	>365	276
1 year in 10-------------	>365	>365	290

Geology

By Jon Riedel, geologist, National Park Service, San Juan Island National Historical Park.

San Juan County is on the continent side of the Subduction margin between the Juan de Fuca and North American plates. This area is part of the “ring of fire,” a Pacific Basin region that is tectonically active and contains hundreds of volcanoes. Major earthquakes punctuate the Holocene geologic history of the region. The most recent of these earthquakes occurred in 1701, although six other major quakes have occurred in the last 4,000 years. The full impact of large Subduction quakes in the county is unknown, but crustal subsidence and tsunamis may be included. The county has been impacted to a lesser extent by large eruptions of the Cascade Range volcanoes. Approximately 8,000 years ago, the eruption of Mt. Mazama (now the site of Crater Lake, Oregon) resulted in the deposition of volcanic ash on the San Juan Islands. Hillslope erosion and deposition have reworked and mixed the tephra material into some of the soil profiles.

Rocks exposed in the county are part of the Late Cretaceous San Juan Thrust System. This system is a series of nappes that lie in a northwest-trending belt about 90 miles wide. Nappes are massive sheets of rock that have moved to the west along dominantly horizontal thrust faults. These terranes consist primarily of metamorphosed sedimentary and volcanic deposits from early Paleozoic (250 million years ago [Ma]) to middle Cretaceous (100 Ma). They are placed along a series of westerly-vergent thrust faults that date to a period between 100 to 84 Ma. The orogenic event that caused the thrust faulting is believed to be the collision of the Wrangellia terrane with the North American continent. Some elements of the nappe sequence are metamorphosed by rapid burial from the North American continent (as much as 12 miles) and subsequent tectonic uplift during this event (Brandon, 1989). Rock exposures on the northern part of San Juan Island are part of the Deadman Bay terrane, which is the western leading edge of the thrust system. They date from Late Permian to Lower Jurassic. This terrane includes red and green pillow basalt, tuff, limestone, and ribbon chert. Early Permian crinoid and Tethyian fusilinid fossils can be found in some massive gray limestone pods. The Tethyian fossils are exotic to North America, evidence that the rocks containing them have been transported long distances. Rocks exposed along the bluffs near Cattle Point are thrust over the Deadman Bay terrane, along the Rosario Thrust Zone. The Constitution Formation consists of massive volcaniclastic sandstone thrust over greenstone, mudstone, and Orcas ribbon chert. Imbricated slices of Garrison Schist and Orcas Chert in the fault zone are evidence of thrust displacement (Brandon and others, 1988). Some of the bedrock outcroppings in the county are polished and striated by glacial abrasion. The most recent ice sheet, the Cordilleran ice sheet, covered San Juan Island between 18,200 and 13,300 years ago. The ice sheet flowed south-southwest across the northern Puget Lowland from Canada. It reached its maximum thickness, 4,000 feet, over San Juan County about 17,000 years ago (Porter and Swanson,1998; Booth, 1986).

Much of the county is covered with glaciomarine and glacial outwash deposits. Glaciomarine deposits are significant hydrologic and pedologic features. Locally known as a hardpan, or densic material, these deposits restrict water and plant roots. Glacial outwash contains a diverse mixture of rocks from Canada, including granite from the Coast Range and North Cascade Range. In the southern part of San Juan Island, a glacial moraine forms the backbone of the island northwest of Mount Finlayson. The moraine is approximately 13,000 years old. It represents the point where retreat of the glacier paused for a period of time or where the glacier became grounded on existing glacial sediment. To the south of the moraine is an extensive outwash plain that slopes gently to the south and probably formed as the glacier stabilized along the moraine. The immense weight of the glacial ice depressed the crust 300 to 400 feet. As the ice sheet melted some 13,000 years ago, the crust rebounded and left a series of stranded marine terraces along the south side of Cattle Point and along Bell Point and Young Bluff. Shells and other marine fossils can be found in the glacial sediment on the shoreline well above the modern sea level. Four prominent perched marine terraces are clearly visible in the Cattle Point area in the American Camp of San Juan National Historical Park. These features are evidence of isostatic uplifting of the crust following deglaciation. Eroding bluffs along both sides of Cattle Point consist of marine outwash, diamict, and subtidal deposits that date to the emergence of the shoreline some time between 13,300 and 12,600 years ago (Dethier and others, 1996). Rocks more resistant to erosion form headlands along the coastline at Cattle Point. Prevailing winds from the south and the Strait of Juan de Fuca pummel the unprotected shoreline of the American Camp (Johannesen, 1993). Longshore drift generally is to the west, along the south side of Cattle Point. Large beach deposits are between the rock headlands. They consist of wide beaches and back berms dotted with large pieces of driftwood.

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 biological activity.

Currently, soils are mapped according to the boundaries of major land resource areas (MLRAs). MLRAs are geographically associated land resource units that share common characteristics related to physiography, geology, climate, water resources, soils, biological resources, and land uses (USDA, 2006). Soil survey areas typically consist of parts of one MLRA or more.

The soils and miscellaneous areas in the survey area occur 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 of landform or with a segment of the landform. By observing the soils and miscellaneous areas in the survey area and relating their position to specific segments of the landform, 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 a considerable degree of accuracy the kind of soil or miscellaneous area at a specific location on the landscape.

Commonly, individual soils on the landscape merge into one another as their characteristics gradually change. To construct an accurate soil 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 soil 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. 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 a soil survey is in progress, samples of some of the soils in the area generally are collected for laboratory analyses and for engineering tests. Soil scientists interpret 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 are field tested through observation of the soils in different uses and under different levels of management. Some interpretations are modified to fit local conditions, and some new interpretations are developed to meet local needs. Data are 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 are 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 predict with a fairly high degree of accuracy 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 in 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, it 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 components of one map unit can occur in another 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 can be identified on the map. Likewise, areas where the soils 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.

1. Soils in Valleys of Glacial Drift Plains (Coveland-Deadmanbay-Bazal)

Percentage of county: 19 percent (fig. 1)
Parent material: Glacial drift, glacial outwash, dense glaciomarine deposits, colluvium, and organic material
Depth class: Moderately deep and deep
Elevation: 0 to 650 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Minor Components

Coupeville, Mitchellbay, and Limepoint soils

Characteristics of Coveland

Landform: Hillslopes and valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 10 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): 0 to 9 inches (see Water Features table)

Characteristics of Deadmanbay

Landform: Drainageways and valleys
Parent material: Gracial drift over dense glaciomarine deposits
Slope range: 2 to 15 percent

Figure 1.—View of northern part of San Juan Island, looking northeast. The numbers in the polygons correspond with general soil map unit symbols. The image was created with a geographic information system by draping a digital orthographic photograph over a 10-meter digital elevation model.

Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): 4 to 9 inches (see Water Features table)

Characteristics of Bazal

Landform: Drainageways
Parent material: Glacial drift over dense glaciomarine deposits (fig. 2)
Slope range: 0 to 5 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Very low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Occasional (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface (see Water Features table)

2. Soils on Glacial Drift Plains (Mitchellbay-Whidbey-Roche)

Percentage of county: 20 percent (fig. 3)
Parent material: Glacial drift, glacial outwash, and dense glaciomarine deposits
Depth class: Shallow to very deep
Elevation: 0 to 520 feet
Mean annual precipitation: 18 to 40 inches

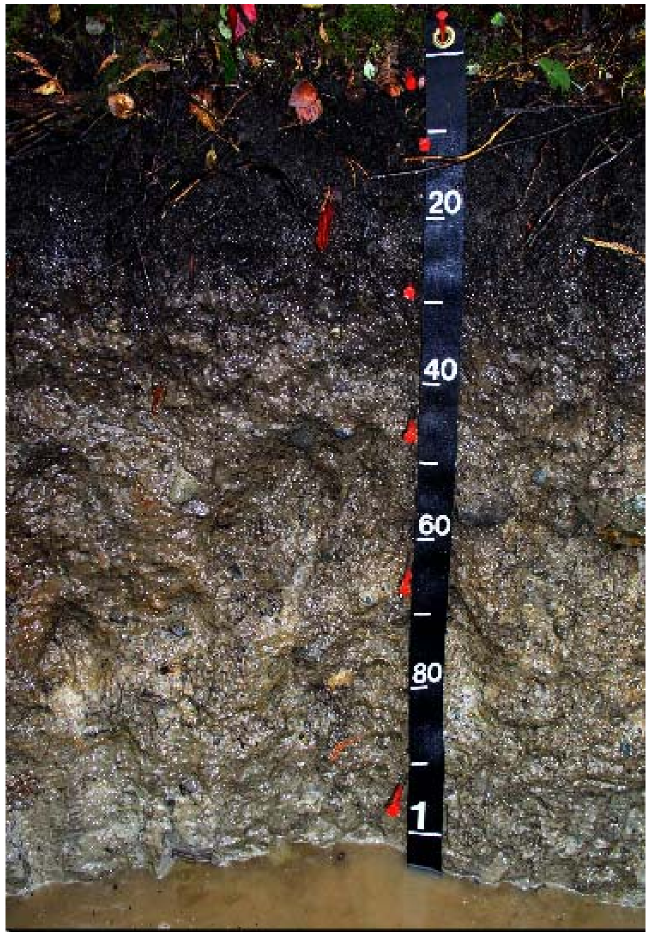


Figure 2.—Profile of a Bazal soil. These soils formed in fine-loamy glacial drift over dense glaciomarine deposits. They are moderately deep to a water- and root-restricting layer, are poorly drained, and support forests that consist dominantly of Sitka spruce and red alder. Numerals on tape indicate centimeters.

Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Minor Components

Killebrew and Hoypus soils and Alderwood taxadjunct

Characteristics of Mitchellbay

Landform: Valleys and valleysides
Parent material: Glacial drift over dense glaciomarine deposits (fig. 4)
Slope range: 0 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): 6 to 15 inches (see Water Features table)

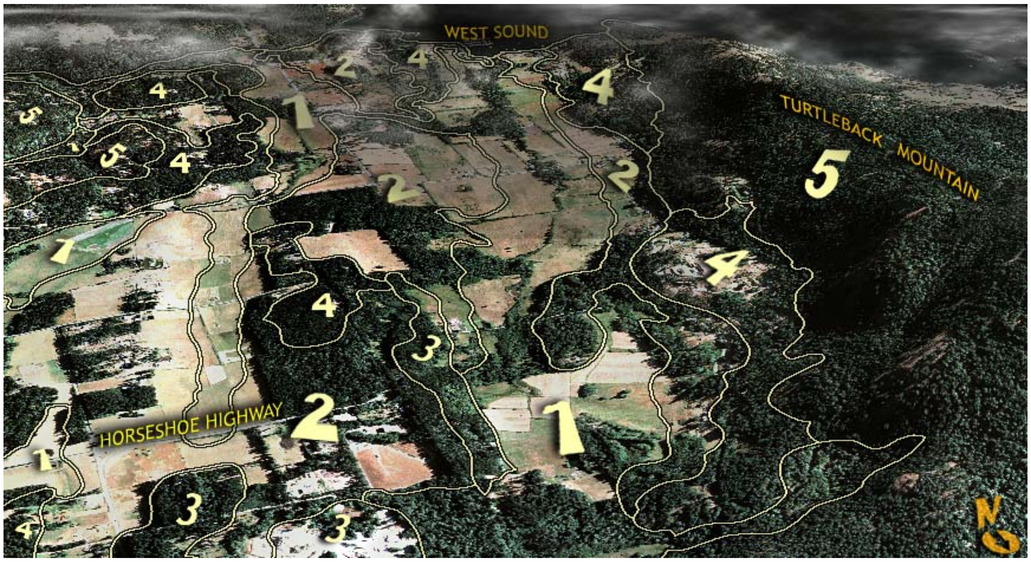


Figure 3.—View of Crow Valley on Orcas Island, looking south. The numbers in the polygons correspond with general soil map unit symbols. The image was created with a geographic information system by draping a digital orthographic photograph over a 10-meter digital elevation model.

Characteristics of Whidbey

Landform: Hillslopes
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): 34 to 39 inches (see Water Features table)

Characteristics of Roche

Landform: Hillslopes
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): 15 to 23 inches (see Water Features table)

3. Soils on Hills of Glacial Drift Plains (Everett Taxadjunct-Indianola-San Juan)

Percentage of county: 7 percent (fig. 3)
Parent material: Glacial drift, glacial outwash, and dense glaciomarine deposits

Figure 4.—Profile of a Mitchellbay soil. These soils formed in fine-loamy glacial drift over dense glaciomarine deposits. They are moderately deep to a water- and root-restricting layer, are somewhat poorly drained, and support forests that consist dominantly of western redcedar and Douglas-fir. Numerals on tape indicate inches.

Depth class: Moderately deep and very deep
Elevation: 0 to 500 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Minor Components

Hoypus (fig. 5), Pilepoint, and Sucia soils

Characteristics of Everett Taxadjunct

Landform: Hillslopes
Parent material: Glacial outwash
Slope range: 3 to 40 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High and very high (see Physical Properties table)
Flooding frequency: None

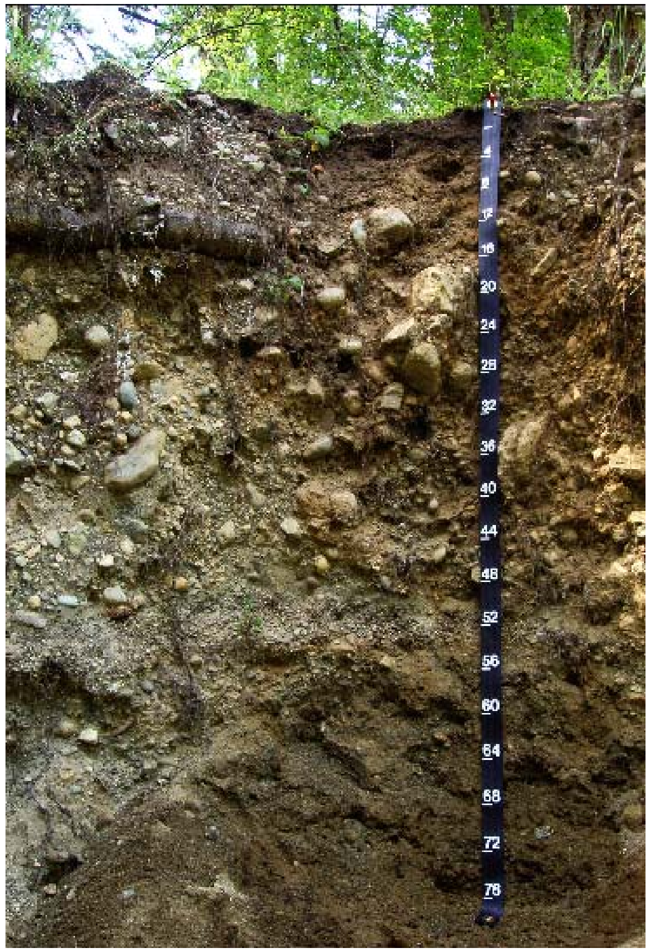


Figure 5.—Profile of a Hoypus soil. These soils formed in sandy glacial outwash. They are very deep, are somewhat excessively drained, and support forests that consist dominantly of Douglas-fir and Pacific madrone. Numerals on tape indicate inches.

Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Characteristics of Indianola

Landform: Hillslopes
Parent material: Glacial outwash
Slope range: 3 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High and very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Characteristics of San Juan

Landform: Hillslopes
Parent material: Eolian sand over glacial outwash

Slope range: 0 to 40 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High and very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

4. Soils on Glacial Drift Plains and Hills (Roche-Rock outcrop-Killebrew)

Percentage of county: 9 percent (fig. 3)
Parent material: Glacial drift, glacial outwash, colluvium, and dense glaciomarine deposits
Depth class: Shallow to very deep
Elevation: 0 to 650 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Minor Components

Hoypus, Pilepoint, and Sucia soils

Characteristics of Roche

Landform: Hillslopes
Parent material: Glacial drift over dense glaciomarine deposits (fig. 6)
Slope range: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): 15 to 23 inches (see Water Features table)

Characteristics of Rock Outcrop

Kind of rock: Metasedimentary

Characteristics of Killebrew

Landform: Valleys and valleysides
Parent material: Glacial drift over dense glaciomarine sediment
Slope range: 2 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): 5 to 9 inches (see Water Features table)

Figure 6.—Profile of a Roche soil. These soils formed in coarse-loamy glacial drift. They are moderately deep to a water- and root-restricting layer, are moderately well drained, and support forests that consist dominantly of Douglas-fir and Pacific madrone. Numerals on tape indicate inches.

5. Soils on Hills and Mountains (Cady-Rock outcrop-Doebay)

Percentage of county: 45 percent (fig. 1)
Parent material: Glacial drift and colluvium
Depth class: Shallow and moderately deep
Elevation: 0 to 2,400 feet
Mean annual precipitation: 18 to 45 inches
Mean annual air temperature: 46 to 52 degrees F
Frost-free period: 160 to 240 days

Minor Components

Haro (fig. 7) and Pickett soils and Doebay soils, moist

Characteristics of Cady

Landform: Hillslopes and mountain slopes

Figure 7.—Profile of a Haro soil. These soils formed in glacial drift mixed with colluvium derived from metasedimentary rock. They are shallow to bedrock, are well drained, and support grassland with scattered Garry oak. Numerals on tape indicate centimeters.

Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock (fig. 8)
Slope range: 5 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high and high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Characteristics of Rock Outcrop

Kind of rock: Metasedimentary

Characteristics of Doebay

Landform: Hillslopes and mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 75 percent

Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high and high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Figure 8.—Profile of a Cady soil. These soils formed in glacial drift mixed with colluvium derived from metasedimentary rock. They are shallow to bedrock, are well drained, and support forests that consist dominantly of Douglas-fir and Pacific madrone. Numerals on tape indicate centimeters.

Detailed Soil Map Units

The map units delineated on the detailed soil maps in 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.

A map unit delineation on a soil 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. Within a taxonomic class there are precisely defined limits for the properties of the soils. On the landscape, however, the soils 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 minor components that belong to taxonomic classes other than those of the major soils.

Most minor 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, components. They may or may not be mentioned in a particular map unit description. Other minor components, however, have properties and behavioral characteristics divergent enough to affect use or to require different management. These are called contrasting, or dissimilar, components. 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 contrasting components are mentioned in the map unit descriptions. A few areas of minor components 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 minor components 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 landforms or landform segments that have similar use and management requirements. The delineation of such segments on the map provides sufficient information for the development of resource plans. If intensive use of small areas is planned, however, onsite investigation is needed to define and locate the soils and miscellaneous areas.

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*. All the soils of a series have major horizons that are similar in composition, thickness, and arrangement. The soils of a given series can differ in texture of the surface layer, slope, stoniness, salinity, 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, Coveland loam, 0 to 5 percent slopes, is a phase of the Coveland series.

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

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. Sholander-Spieden complex, 0 to 5 percent slopes, is an example.

An *association* is made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Xerorthents-Endoaquents, tidal association, 0 to 100 percent slopes, is an example.

This survey includes *miscellaneous areas*. Such areas have little or no soil material and support little or no vegetation. Pits, gravel, is an example.

The table “Acreage and Proportionate Extent of the Soils” gives the acreage and proportionate extent of each map unit. Other tables give properties of the soils. The Glossary defines many of the terms used in describing the soils or miscellaneous areas.

Acreage and Proportionate Extent of the Soils

Map symbol	Soil name	Acres	Percent
997	Pits, gravel	111	*
998	Water, saline	17	*
999	Water, fresh	1,241	1.1
1000	Sholander-Spieden complex, 0 to 5 percent slopes	1,167	1.0
1001	Coveland loam, 0 to 5 percent slopes	6,366	5.5
1002	Sholander gravelly loam, 2 to 8 percent slopes	238	0.2
1003	Coupeville loam, 0 to 5 percent slopes	687	0.6
1004	Limepoint-Sholander complex, 0 to 8 percent slopes	1,479	1.3
1005	Shalcar muck, 0 to 2 percent slopes	644	0.6
1006	Semiahmoo muck, 0 to 2 percent slopes	724	0.6
1009	Coveland-Mitchellbay complex, 2 to 15 percent slopes	2,538	2.2
1010	Deadmanbay-Morancreek complex, 2 to 15 percent slopes	2,111	1.8
1013	Bazal-Mitchellbay complex, 0 to 5 percent slopes	1,442	1.3
1014	Beaches-Endoaquents, tidal-Xerorthents association, 0 to 5 percent slopes	2,383	2.1
1015	Deadmanbay-Bazal-Cady complex, 2 to 20 percent slopes	1,315	1.1
1016	Orcas peat, 0 to 2 percent slopes	51	*
1053	Dugualla muck, 0 to 2 percent slopes	189	0.2
2000	Whidbey gravelly loam, 3 to 15 percent slopes	1,643	1.4
2001	Mitchellbay gravelly sandy loam, 5 to 15 percent slopes	4,167	3.6
2002	Sucia loamy sand, 2 to 10 percent slopes	945	0.8
2004	Mitchellbay gravelly sandy loam, 0 to 5 percent slopes	3,831	3.3
2007	Alderwood-Everett complex, warm, 5 to 15 percent slopes	1,859	1.6
2008	Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes	2,982	2.6
2009	Limepoint-Alderwood, warm-Sholander complex, 2 to 12 percent slopes	484	0.4
2010	Whidbey-Hoypus complex, 2 to 15 percent slopes	2,451	2.1
2011	Roche-Killebrew complex, 2 to 10 percent slopes	4,337	3.8
3000	Pilepoint loam, 2 to 8 percent slopes	696	0.6
3001	Hoypus sandy loam, 3 to 25 percent slopes	414	0.4
3002	Keystone sandy loam, 5 to 15 percent slopes	274	0.2
3005	San Juan sandy loam, 2 to 8 percent slopes	440	0.4
3006	San Juan sandy loam, 20 to 40 percent slopes	55	*
3007	San Juan sandy loam, 5 to 20 percent slopes	264	0.2
3008	Xerorthents-Endoaquents, tidal association, 0 to 100 percent slopes	87	*

Acreage and Proportionate Extent of the Soils--Continued

Map symbol	Soil name	Acres	Percent
3010	San Juan-Dune land complex, 0 to 20 percent slopes	78	*
3012	Hoypus sandy loam, 10 to 40 percent slopes	324	0.3
3013	Everett sandy loam, warm, 3 to 20 percent slopes	2,453	2.1
3014	Everett sandy loam, warm, 20 to 40 percent slopes	171	0.1
3015	Indianola loamy sand, warm, 3 to 15 percent slopes	1,294	1.1
3016	Sucia-Sholander complex, 5 to 20 percent slopes	922	0.8
4000	Roche-Killebrew-Rock outcrop complex, 5 to 35 percent slopes	5,141	4.5
4002	Laconner gravelly sandy loam, warm, 5 to 15 percent slopes	564	0.5
4003	Hoypus-Whidbey complex, 10 to 30 percent slopes	742	0.6
4005	Roche-Haro-Rock outcrop complex, 5 to 25 percent slopes	541	0.5
4006	Alderwood, warm-Hoypus complex, 5 to 20 percent slopes	236	0.2
4007	Roche-Mitchellbay complex, 3 to 15 percent slopes	1,300	1.1
4008	Mitchellbay-Rock outcrop-Killebrew complex, 3 to 15 percent slopes	2,137	1.9
5000	Cady-Rock outcrop complex, 5 to 30 percent slopes	11,297	9.8
5001	Rock outcrop-Haro complex, 25 to 75 percent slopes	1,199	1.0
5002	Doebay, moist-Cady-Doebay complex, 25 to 75 percent slopes	1,102	1.0
5003	Doebay-Morancreek complex, 5 to 25 percent slopes	3,133	2.7
5004	Pickett-Kahboo-Rock outcrop complex, 25 to 75 percent slopes	3,817	3.3
5005	Constitution-Skipjack-Kahboo complex, 5 to 25 percent slopes	1,747	1.5
5006	Cady-Doebay-Rock outcrop complex, 25 to 75 percent slopes	6,824	5.9
5007	Haro-Hiddenridge-Rock outcrop complex, 5 to 30 percent slopes	3,487	3.0
5008	Doebay-Cady-Rock outcrop complex, 10 to 30 percent slopes	11,053	9.6
5009	Haro-Hiddenridge-Rock outcrop complex, 25 to 75 percent slopes	1,010	0.9
5010	Turtleback-Cady-Rock outcrop complex, 25 to 75 percent slopes	2,500	2.2
5015	Doebay, moist-Cady-Rock outcrop complex, 10 to 30 percent slopes	4,178	3.6
	Total	114,882	100.0

* Less than 0.1 percent.

997—Pits, gravel

Elevation: 0 to 650 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days
Map unit composition: Pits, gravel—100 percent
Slope range: 5 to 35 percent
Land capability subclass (nonirrigated): 8

998—Water, saline

Elevation: 0 to 10 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days
Map unit composition: Water, saline—100 percent

999—Water, fresh

Elevation: 0 to 2,150 feet
Mean annual precipitation: 20 to 40 inches

Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days
Map unit composition: Water, fresh—100 percent

1000—Sholander-Spieden complex, 0 to 5 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 250 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Sholander and similar soils: 45 percent
Spieden and similar soils: 35 percent
Dissimilar minor components: 20 percent

Characteristics of Sholander

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A—0 to 8 inches; gravelly loam
E—8 to 16 inches; gravelly sandy loam
Bg1—16 to 28 inches; gravelly loamy sand
Bg2—28 to 51 inches; gravelly sand
2Cd—51 to 60 inches; loam

Characteristics of Spieden

Setting
Landform: Drainageways
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash
Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Low (about 4.9 inches)

Interpretive groups
Land capability subclass (nonirrigated): 5w
Land capability subclass (irrigated): 5w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A1—0 to 4 inches; mucky silt loam
A2—4 to 11 inches; silt loam
E—11 to 24 inches; gravelly loamy sand
Bg—24 to 36 inches; gravelly loamy coarse sand
C1—36 to 48 inches; coarse sand
C2—48 to 60 inches; coarse sand

Dissimilar Minor Components

Spieden soils, drained
Percentage of map unit: 10 percent
Landform: Drainageways

Sucia soils
Percentage of map unit: 10 percent
Landform: Valleys

Major Uses

Livestock grazing, forage production, forestry

1001—Coveland loam, 0 to 5 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Coveland and similar soils: 70 percent
Dissimilar minor components: 30 percent

Characteristics of Coveland

Setting
Landform: Hillslopes, valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6w
Land capability subclass (irrigated): 6w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A1—0 to 4 inches; loam
A2—4 to 9 inches; loam
E—9 to 20 inches; sandy loam
2Btg1—20 to 36 inches; silty clay loam
2Btg2—36 to 44 inches; silt loam
2Cd—44 to 60 inches; silt loam

Dissimilar Minor Components

Coveland soils, drained
Percentage of map unit: 10 percent
Landform: Hillslopes, valleys

Coupeville soils
Percentage of map unit: 10 percent
Landform: Valleys

Sucia soils
Percentage of map unit: 10 percent
Landform: Valleys

Major Uses

Livestock grazing, forage production, forestry

1002—Sholander gravelly loam, 2 to 8 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 250 feet

Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Sholander and similar soils: 85 percent
Dissimilar minor component: 15 percent

Characteristics of Sholander

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 2 to 8 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A—0 to 8 inches; gravelly loam
E—8 to 16 inches; gravelly sandy loam
Bg1—16 to 28 inches; gravelly loamy sand
Bg2—28 to 51 inches; gravelly sand
2Cd—51 to 60 inches; loam

Dissimilar Minor Component

Whidbey soils
Percentage of map unit: 15 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production, forestry

1003—Coupeville loam, 0 to 5 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet

Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Coupeville and similar soils: 80 percent
Dissimilar minor components: 20 percent

Characteristics of Coupeville

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): High (about 9.6 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6w
Land capability subclass (irrigated): 6w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Ap—0 to 7 inches; loam
A—7 to 12 inches; loam
2E—12 to 20 inches; clay loam
2Btg1—20 to 34 inches; clay loam
2Btg2—34 to 50 inches; clay loam
2Cd—50 to 60 inches; silty clay loam

Dissimilar Minor Components

Coupeville soils, drained
Percentage of map unit: 10 percent
Landform: Valleys

Coveland soils
Percentage of map unit: 10 percent
Landform: Hillslopes, valleys

Major Uses

Livestock grazing, forage production, forestry

1004—Limepoint-Sholander complex, 0 to 8 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Limepoint and similar soils: 60 percent
Sholander and similar soils: 20 percent
Dissimilar minor components: 20 percent

Characteristics of Limepoint

Setting
Landform: Valleys, drainageways
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6w
Land capability subclass (irrigated): 6w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A1—0 to 6 inches; mucky silt loam
A2—6 to 14 inches; loam
Bg—14 to 31 inches; loamy coarse sand
Cg1—31 to 49 inches; loam
Cg2—49 to 58 inches; sandy loam
2Cd—58 to 60 inches; silty clay loam

Characteristics of Sholander

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 2 to 8 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A—0 to 8 inches; gravelly loam
E—8 to 16 inches; gravelly sandy loam
Bg1—16 to 28 inches; gravelly loamy sand
Bg2—28 to 51 inches; gravelly sand
2Cd—51 to 60 inches; loam

Dissimilar Minor Components

Limepoint soils, drained
Percentage of map unit: 10 percent
Landform: Drainageways, valleys

Shalcar soils
Percentage of map unit: 10 percent
Landform: Depressions

Major Uses

Livestock grazing, forage production, forestry

1005—Shalcar muck, 0 to 2 percent slopes

Map Unit Setting

General landscape: Drift plains (fig. 9)
Elevation: 0 to 450 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Shalcar and similar soils: 80 percent
Dissimilar minor components: 20 percent

Figure 9.—Typical area of Shalcar muck, 0 to 2 percent slopes, in foreground, on San Juan Island.

Characteristics of Shalcar

Setting

Landform: Depressions
Aspect (range): All aspects

Properties and qualities

Parent material: Highly decomposed plant material over glacial outwash or dense glaciomarine deposits
Slope range: 0 to 2 percent
Depth to restrictive feature: 16 to 51 inches to strongly contrasting textural stratification
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Very high (about 15.9 inches)

Interpretive groups

Land capability subclass (nonirrigated): 5w
Land capability subclass (irrigated): 5w

Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: BOG or FEN (R002XN603WA)

Common trees
None

Typical profile
Oa1—0 to 3 inches; muck
Oa2—3 to 11 inches; muck
Oa3—11 to 22 inches; muck
2Bg1—22 to 27 inches; fine sandy loam
2Bg2—27 to 44 inches; silt loam
2Cg—44 to 60 inches; sandy loam

Dissimilar Minor Components

Shalcar soils, drained
Percentage of map unit: 10 percent
Landform: Depressions

Semiahmoo soils
Percentage of map unit: 10 percent
Landform: Depressions

Major Uses

Livestock grazing, forage production

1006—Semiahmoo muck, 0 to 2 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 450 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Semiahmoo and similar soils: 80 percent
Dissimilar minor components: 20 percent

Characteristics of Semiahmoo

Setting
Landform: Depressions
Aspect (range): All aspects

Properties and qualities
Parent material: Highly decomposed plant material with a thin layer of volcanic ash mixed with diatomaceous earth
Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)

Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Very high (about 37.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 5w
Land capability subclass (irrigated): 5w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: BOG or FEN (R002XN603WA)

Common trees
None

Typical profile
Oa1—0 to 9 inches; muck
C—9 to 10 inches; silt loam
Oa2—10 to 30 inches; muck
Oa3—30 to 48 inches; muck
Oa4—48 to 60 inches; muck
Oe1—60 to 72 inches; mucky peat
Oe2—72 to 84 inches; mucky peat

Dissimilar Minor Components

Semiahmoo soils, drained
Percentage of map unit: 10 percent
Landform: Depressions

Shalcar soils
Percentage of map unit: 10 percent
Landform: Depressions

Major Uses

Livestock grazing, forage production

1009—Coveland-Mitchellbay complex, 2 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Coveland and similar soils: 70 percent
Mitchellbay and similar soils: 25 percent
Dissimilar minor component: 5 percent

Characteristics of Coveland

Setting
Landform: Hillslopes, valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 10 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6w
Land capability subclass (irrigated): 6w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A1—0 to 4 inches; loam
A2—4 to 9 inches; loam
E—9 to 20 inches; sandy loam
2Btg1—20 to 36 inches; silty clay loam
2Btg2—36 to 44 inches; silt loam
2Cd—44 to 60 inches; silt loam

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Dissimilar Minor Component

Rock outcrop
Percentage of map unit: 5 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production, forestry

1010—Deadmanbay-Morancreek complex, 2 to 15 percent slopes

Map Unit Setting

General landscape: Hills, mountains, drift plains
Elevation: 0 to 550 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Deadmanbay and similar soils: 55 percent
Morancreek and similar soils: 30 percent
Dissimilar minor components: 15 percent

Characteristics of Deadmanbay

Setting
Landform: Drainageways, valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 8 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): High (about 9.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w

Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; silt loam
Bw—5 to 16 inches; silt loam
Bg—16 to 29 inches; loamy coarse sand
2Btg—29 to 57 inches; gravelly silty clay loam
2Cd—57 to 60 inches; silty clay loam

Characteristics of Morancreek

Setting
Landform: Mountain slopes, hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift
Slope range: 5 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): High
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 16 to 28 inches (see Water Features table)
Available water capacity (entire profile): High (about 9.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 4e
Forage suitability group: Sloping to Steep Soils (G002XN702WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 3 inches; sandy loam
Bw1—3 to 10 inches; sandy loam
Bw2—10 to 21 inches; sandy loam
Bg—21 to 28 inches; sandy loam
C—28 to 60 inches; sandy loam

Dissimilar Minor Components

Bazal soils
Percentage of map unit: 10 percent
Landform: Drainageways, valleys

Rock outcrop
Percentage of map unit: 5 percent

Major Uses

Livestock grazing, forage production, forestry

1013—Bazal-Mitchellbay complex, 0 to 5 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Bazal and similar soils: 50 percent
Mitchellbay and similar soils: 40 percent
Dissimilar minor components: 10 percent

Characteristics of Bazal

Setting
Landform: Drainageways, valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 5w
Land capability subclass (irrigated): 5w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 4 inches; mucky loam
A2—4 to 10 inches; loam
Bw—10 to 17 inches; loam
E—17 to 24 inches; loamy coarse sand

Btg—24 to 39 inches; loam
2Cd—39 to 60 inches; loam

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Occasional (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Dissimilar Minor Component

Bazal soils, drained
Percentage of map unit: 10 percent
Landform: Drainageways, valleys

Major Uses

Livestock grazing, forage production, forestry

1014—Beaches-Endoaquents, tidal-Xerorthents association, 0 to 5 percent slopes

Map Unit Setting

General landscape: Shore complexes (fig. 10)
Elevation: 0 to 50 feet
Mean annual precipitation: 20 to 40 inches

Figure 10.—Typical area of Beaches-Endoaquents, tidal-Xerorthents association, 0 to 5 percent slopes, in foreground, on the southern part of Orcas Island.

Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 365 days

Map Unit Composition

Beaches: 40 percent
Endoaquents, tidal, and similar soils: 25 percent
Xerorthents and similar soils: 25 percent
Dissimilar minor components: 10 percent

Characteristics of Beaches

Setting
Landform: Beaches
Aspect (range): All aspects

Properties and qualities
Slope range: 0 to 5 percent
Depth to restrictive feature: None within a depth of 60 inches
Flooding frequency: Very frequent (see Water Features table)
Ponding frequency: None
Seasonal high water table (minimum depth): At the soil surface (see Water Features table)

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
C—0 to 60 inches; stratified sand to gravel

Characteristics of Endoaquents, Tidal

Setting
Landform: Beaches
Aspect (range): All aspects

Properties and qualities
Parent material: Beach sand
Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Very high
Flooding frequency: Very frequent (see Water Features table)
Ponding frequency: None
Seasonal high water table (minimum depth): At the soil surface (see Water Features table)
Salinity (maximum): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Sodium adsorption ratio about 1
Available water capacity (entire profile): Very low (about 1.8 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7w
Ecological site: LOW SALT MARSH (R002XN713WA)

Common trees
None

Typical profile
C1—0 to 29 inches; gravelly sand
C2—29 to 48 inches; very gravelly coarse sand
C3—48 to 60 inches; extremely gravelly coarse sand

Characteristics of Xerorthents

Setting
Landform: Hillslopes, beaches
Aspect (range): All aspects

Properties and qualities
Parent material: Beach sand and colluvium derived from glacial outwash
Slope range: 0 to 5 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Excessively drained
Capacity to transmit water (Ksat): Very high
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 0.6 inch)

Interpretive groups
Land capability subclass (nonirrigated): 7s
Ecological site: SALT WATER BLUFF (R002XN702WA)

Common trees
None

Typical profile
A—0 to 1 inch; very gravelly sand
C1—1 to 20 inches; very gravelly sand
C2—20 to 60 inches; very gravelly sand

Dissimilar Minor Component

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hillslopes

1015—Deadmanbay-Bazal-Cady complex, 2 to 20 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 650 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Deadmanbay and similar soils: 45 percent
Bazal and similar soils: 35 percent
Cady and similar soils: 20 percent

Characteristics of Deadmanbay

Setting
Landform: Drainageways
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): High (about 9.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; silt loam
Bw—5 to 16 inches; silt loam
Bg—16 to 29 inches; loamy coarse sand
2Btg—29 to 57 inches; gravelly silty clay loam
2Cd—57 to 60 inches; silty clay loam

Characteristics of Bazal

Setting
Landform: Drainageways
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 5 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6w
Land capability subclass (irrigated): 6w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 4 inches; mucky loam
A2—4 to 10 inches; loam
Bw—10 to 17 inches; loam
E—17 to 24 inches; loamy coarse sand
Btg—24 to 39 inches; loam
2Cd—39 to 60 inches; loam

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (range): All aspects

Properties and qualities
Parent material: Colluvium derived from glacial drift and metasedimentary rock
Slope range: 10 to 20 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None

Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Land capability subclass (irrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Major Uses

Livestock grazing, forage production, forestry

1016—Orcas peat, 0 to 2 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 340 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Orcas and similar soils: 100 percent

Characteristics of Orcas

Setting
Landform: Depressions
Aspect (range): All aspects

Properties and qualities
Parent material: Slightly decomposed plant material
Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface (see Water Features table)
Available water capacity (entire profile): Very high (about 26.9 inches)

Interpretive groups
Land capability subclass (nonirrigated): 5w
Land capability subclass (irrigated): 5w

Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: BOG or FEN (R002XN603WA)

Common trees
None

Typical profile
Oi1—0 to 3 inches; peat
Oi2—3 to 12 inches; peat
Oi3—12 to 60 inches; peat

Major Uses

Livestock grazing, forage production

1053—Dugualla muck, 0 to 2 percent slopes

Map Unit Setting

General landscape: Shore complexes
Elevation: 0 to 10 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Dugualla and similar soils: 80 percent
Dissimilar minor components: 20 percent

Characteristics of Dugualla

Setting
Landform: Depressions, tidal flats
Aspect (range): All aspects

Properties and qualities
Parent material: Herbaceous organic deposits
Slope range: 0 to 2 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: Very frequent (see Water Features table)
Ponding frequency: None
Seasonal high water table (minimum depth): At the soil surface (see Water Features table)
Salinity (maximum): Strongly saline (about 50 millimhos per centimeter)
Sodicity (maximum): Sodium adsorption ratio about 3
Available water capacity (entire profile): Very high (about 26.9 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Land capability subclass (irrigated): 6s
Ecological site: HIGH SALT MARSH (R002XN703WA)

Common trees
None

Typical profile
Oa1—0 to 11 inches; muck
Oa2—11 to 20 inches; muck
Oa3—20 to 26 inches; muck
Oa4—26 to 60 inches; muck

Dissimilar Minor Components

Dugualla soils, protected
Percentage of map unit: 10 percent
Landform: Depressions, tidal flats

Endoaquents, tidal
Percentage of map unit: 10 percent
Landform: Depressions, tidal flats

Major Uses

Livestock grazing, forage production

2000—Whidbey gravelly loam, 3 to 15 percent slopes

Map Unit Setting

General landscape: Hills, drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Whidbey and similar soils: 90 percent
Dissimilar minor component: 10 percent

Characteristics of Whidbey

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift over dense glacial drift
Slope range: 3 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)

Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 6 inches; gravelly loam
Bw—6 to 20 inches; very gravelly sandy loam
Bg—20 to 37 inches; very gravelly sandy loam
2Cd—37 to 60 inches; gravelly sandy loam

Dissimilar Minor Component

Hoypus soils
Percentage of map unit: 10 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production, forestry

2001—Mitchellbay gravelly sandy loam, 5 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains (fig. 11)
Elevation: 0 to 350 feet

Figure 11.—Typical area of Mitchellbay gravelly sandy loam, 5 to 15 percent slopes, under pasture in foreground, on Orcas Island.

Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Mitchellbay and similar soils: 85 percent
Dissimilar minor components: 15 percent

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Dissimilar Minor Components

Killebrew soils
Percentage of map unit: 10 percent
Landform: Valleys, valleysides

Rock outcrop
Percentage of map unit: 5 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production, forestry

2002—Sucia loamy sand, 2 to 10 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Sucia and similar soils: 90 percent
Dissimilar minor component: 10 percent

Characteristics of Sucia

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 2 to 10 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3s
Land capability subclass (irrigated): 4e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
A—0 to 8 inches; loamy sand
Bw—8 to 17 inches; loamy sand
E—17 to 31 inches; gravelly loamy sand
2Btg—31 to 38 inches; loam
2Cd—38 to 60 inches; silt loam

Dissimilar Minor Component

Sholander soils
Percentage of map unit: 10 percent
Landform: Valleys

Major Uses

Livestock grazing, forage production, forestry

2004—Mitchellbay gravelly sandy loam, 0 to 5 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Mitchellbay and similar soils: 90 percent
Dissimilar minor component: 10 percent

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Occasional (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Dissimilar Minor Component

Coupeville soils
Percentage of map unit: 10 percent
Landform: Valleys

Major Uses

Livestock grazing, forage production, forestry

2007—Alderwood-Everett complex, warm, 5 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Alderwood, warm, and similar soils: 60 percent
Everett, warm, and similar soils: 40 percent

Characteristics of Alderwood, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 5.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 10 inches; extremely gravelly sandy loam
Bw—10 to 18 inches; extremely gravelly coarse sandy loam
Bg—18 to 36 inches; extremely gravelly coarse sandy loam
2Cd—36 to 60 inches; gravelly silty clay loam

Characteristics of Everett, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash
Slope range: 5 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.4 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 9 inches; sandy loam
Bw1—9 to 13 inches; gravelly sandy loam
Bw2—13 to 30 inches; very gravelly coarse sand
C—30 to 60 inches; extremely gravelly coarse sand

Major Uses

Livestock grazing, forage production, forestry

2008—Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Mitchellbay and similar soils: 35 percent
Sholander and similar soils: 30 percent
Bazal and similar soils: 20 percent
Dissimilar minor components: 15 percent

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 8 percent

Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Characteristics of Sholander

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 2 to 8 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A—0 to 8 inches; gravelly loam
E—8 to 16 inches; gravelly sandy loam
Bg1—16 to 28 inches; gravelly loamy sand
Bg2—28 to 51 inches; gravelly sand
2Cd—51 to 60 inches; loam

Characteristics of Bazal

Setting
Landform: Drainageways, valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 2 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 5w
Land capability subclass (irrigated): 5w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 4 inches; mucky loam
A2—4 to 10 inches; loam
Bw—10 to 17 inches; loam
E—17 to 24 inches; loamy coarse sand
Btg—24 to 39 inches; loam
2Cd—39 to 60 inches; loam

Dissimilar Minor Components

Killebrew soils
Percentage of map unit: 10 percent
Landform: Valleys, valleysides

Hoypus soils
Percentage of map unit: 5 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production, forestry

2009—Limepoint-Alderwood, warm-Sholander complex, 2 to 12 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 250 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Limepoint and similar soils: 40 percent
Alderwood, warm, and similar soils: 30 percent
Sholander and similar soils: 30 percent

Characteristics of Limepoint

Setting
Landform: Drainageways, valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 5 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: Frequent (see Water Features table)
Seasonal high water table (minimum depth): At the soil surface to a depth of 8 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6w
Land capability subclass (irrigated): 6w
Forage suitability group: Wet Soils (G002XN102WA)
Ecological site: Sitka spruce - red alder/salmonberry/field horsetail (F002XN904WA)

Common trees
Sitka spruce, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A1—0 to 6 inches; mucky silt loam
A2—6 to 14 inches; loam
Bg—14 to 31 inches; loamy coarse sand
Cg1—31 to 49 inches; loam
Cg2—49 to 58 inches; sandy loam
2Cd—58 to 60 inches; silty clay loam

Characteristics of Alderwood, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits

Slope range: 3 to 12 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 5.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 10 inches; extremely gravelly sandy loam
Bw—10 to 18 inches; extremely gravelly coarse sandy loam
Bg—18 to 36 inches; extremely gravelly coarse sandy loam
2Cd—36 to 60 inches; gravelly silty clay loam

Characteristics of Sholander

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 3 to 12 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A—0 to 8 inches; gravelly loam
E—8 to 16 inches; gravelly sandy loam
Bg1—16 to 28 inches; gravelly loamy sand

Bg2—28 to 51 inches; gravelly sand
2Cd—51 to 60 inches; loam

Major Uses

Livestock grazing, forage production, forestry

2010—Whidbey-Hoypus complex, 2 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains, hills (fig. 12)
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Whidbey and similar soils: 60 percent
Hoypus and similar soils: 40 percent

Characteristics of Whidbey

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift over dense glacial drift

Figure 12.—Typical area of Whidbey-Hoypus complex, 2 to 15 percent slopes, under pasture in foreground, on Lopez Island.

Slope range: 2 to 10 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 6 inches; gravelly loam
Bw—6 to 20 inches; very gravelly sandy loam
Bg—20 to 37 inches; very gravelly sandy loam
2Cd—37 to 60 inches; gravelly sandy loam

Characteristics of Hoypus

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial outwash
Slope range: 5 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3s
Land capability subclass (irrigated): 4e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw1—5 to 20 inches; loamy sand

Bw2—20 to 36 inches; very gravelly loamy sand
C—36 to 60 inches; extremely gravelly sand

Major Uses

Livestock grazing, forage production, forestry

2011—Roche-Killebrew complex, 2 to 10 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 520 feet
Mean annual precipitation: 25 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Roche and similar soils: 60 percent
Killebrew and similar soils: 25 percent
Dissimilar minor component: 15 percent

Characteristics of Roche

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 10 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 3w
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; loam
Bw1—5 to 15 inches; gravelly sandy loam
2Bw2—15 to 23 inches; loam
2Bg—23 to 39 inches; loam
2Cd—39 to 60 inches; silt loam

Characteristics of Killebrew

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 10 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 4.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Land capability subclass (irrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw—5 to 9 inches; sandy loam
2E—9 to 17 inches; gravelly sandy loam
2Btg—17 to 27 inches; silt loam
2Cd—27 to 60 inches; loam

Dissimilar Minor Component

Mitchellbay soils
Percentage of map unit: 15 percent
Landform: Valleys, valleysides

Major Uses

Livestock grazing, forage production, forestry

3000—Pilepoint loam, 2 to 8 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 250 feet
Mean annual precipitation: 20 to 30 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Pilepoint and similar soils: 90 percent
Dissimilar minor component: 10 percent

Characteristics of Pilepoint

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Eolian sand over glacial outwash and dense glaciomarine deposits
Slope range: 2 to 8 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 4.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 3w
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: XERIC PRAIRIE (R002XN502WA)

Common trees
None

Typical profile
A1—0 to 4 inches; loam
A2—4 to 13 inches; loam
Bw—13 to 22 inches; very gravelly sandy loam
E—22 to 29 inches; gravelly loamy sand
2Btg—29 to 36 inches; silt loam
2Cd1—36 to 46 inches; silt loam
2Cd2—46 to 60 inches; silt loam

Dissimilar Minor Component

Rock outcrop
Percentage of map unit: 10 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production

3001—Hoypus sandy loam, 3 to 25 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 250 feet
Mean annual precipitation: 20 to 35 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Hoypus and similar soils: 100 percent

Characteristics of Hoypus

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial outwash
Slope range: 3 to 25 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw1—5 to 20 inches; loamy sand
Bw2—20 to 36 inches; very gravelly loamy sand
C—36 to 60 inches; extremely gravelly sand

Major Uses

Livestock grazing, forage production, forestry

3002—Keystone sandy loam, 5 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 130 to 220 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Keystone and similar soils: 100 percent

Characteristics of Keystone

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial outwash
Slope range: 5 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3s
Land capability subclass (irrigated): 4e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 3 inches; sandy loam
A2—3 to 8 inches; sandy loam
Bw1—8 to 19 inches; loamy sand
Bw2—19 to 34 inches; very gravelly loamy sand
C—34 to 60 inches; loamy sand

Major Uses

Livestock grazing, forage production, forestry

3005—San Juan sandy loam, 2 to 8 percent slopes

Map Unit Setting

General landscape: Drift plains (fig. 13)
Elevation: 120 to 220 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

San Juan and similar soils: 100 percent

Characteristics of San Juan

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Figure 13.—Typical area of San Juan sandy loam, 2 to 8 percent slopes, in nonforested foreground, in the southern part of San Juan Island.

Properties and qualities
Parent material: Eolian sand over glacial outwash
Slope range: 2 to 8 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: XERIC PRAIRIE (R002XN502WA)

Common trees
None

Typical profile
A1—0 to 4 inches; sandy loam
A2—4 to 13 inches; sandy loam
A3—13 to 19 inches; sandy loam
Bw—19 to 27 inches; gravelly loamy coarse sand
C1—27 to 41 inches; extremely gravelly coarse sand
C2—41 to 62 inches; extremely gravelly coarse sand
C3—62 to 70 inches; extremely gravelly coarse sand

Major Uses

Livestock grazing, forage production

3006—San Juan sandy loam, 20 to 40 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

San Juan and similar soils: 100 percent

Characteristics of San Juan

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Eolian sand over glacial outwash
Slope range: 20 to 40 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6e
Land capability subclass (irrigated): 7e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: XERIC PRAIRIE (R002XN502WA)

Common trees
None

Typical profile
A1—0 to 4 inches; sandy loam
A2—4 to 13 inches; sandy loam
A3—13 to 19 inches; sandy loam
Bw—19 to 27 inches; gravelly loamy coarse sand
C1—27 to 41 inches; extremely gravelly coarse sand
C2—41 to 62 inches; extremely gravelly coarse sand
C3—62 to 70 inches; extremely gravelly coarse sand

Major Uses

Livestock grazing, forage production

3007—San Juan sandy loam, 5 to 20 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 110 to 200 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

San Juan and similar soils: 100 percent

Characteristics of San Juan

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Eolian sand over glacial outwash
Slope range: 5 to 20 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: XERIC PRAIRIE (R002XN502WA)

Common trees
None

Typical profile
A1—0 to 4 inches; sandy loam
A2—4 to 13 inches; sandy loam
A3—13 to 19 inches; sandy loam
Bw—19 to 27 inches; gravelly loamy coarse sand
C1—27 to 41 inches; extremely gravelly coarse sand
C2—41 to 62 inches; extremely gravelly coarse sand
C3—62 to 70 inches; extremely gravelly coarse sand

Major Uses

Livestock grazing, forage production

3008—Xerorthents-Endoaquents, tidal association, 0 to 100 percent slopes

Map Unit Setting

General landscape: Shore complexes
Elevation: 0 to 250 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Xerorthents and similar soils: 70 percent
Endoaquents, tidal, and similar soils: 20 percent
Dissimilar minor component: 10 percent

Characteristics of Xerorthents

Setting
Landform: Hillslopes, sea cliffs, beaches
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Beach sand and colluvium derived from glacial outwash
Slope range: 5 to 100 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Excessively drained
Capacity to transmit water (Ksat): Very high
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 0.6 inch)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: SALT WATER BLUFF (R002XN702WA)

Common trees
None

Typical profile
A—0 to 1 inch; very gravelly sand
C1—1 to 20 inches; very gravelly sand
C2—20 to 60 inches; very gravelly sand

Characteristics of Endoaquents, Tidal

Setting
Landform: Beaches
Aspect (range): All aspects

Properties and qualities
Parent material: Beach sand
Slope range: 0 to 5 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Very high
Flooding frequency: Very frequent (see Water Features table)

Ponding frequency: None
Seasonal high water table (minimum depth): At the soil surface (see Water Features table)
Salinity (maximum): Nonsaline (about 1.5 millimhos per centimeter)
Sodicity (maximum): Sodium adsorption ratio about 1
Available water capacity (entire profile): Very low (about 1.8 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7w
Ecological site: LOW SALT MARSH (R002XN713WA)

Common trees
None

Typical profile
C1—0 to 29 inches; gravelly sand
C2—29 to 48 inches; very gravelly coarse sand
C3—48 to 60 inches; extremely gravelly coarse sand

Dissimilar Minor Component

Beaches
Percentage of map unit: 10 percent
Landform: Beaches

3010—San Juan-Dune land complex, 0 to 20 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 150 feet
Mean annual precipitation: 20 to 25 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

San Juan and similar soils: 60 percent
Dune land: 30 percent
Dissimilar minor component: 10 percent

Characteristics of San Juan

Setting
Landform: Dunes, blowouts
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Eolian sand over glacial outwash
Slope range: 0 to 20 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: XERIC PRAIRIE (R002XN502WA)

Common trees
None

Typical profile
A1—0 to 4 inches; sandy loam
A2—4 to 13 inches; sandy loam
A3—13 to 19 inches; sandy loam
Bw—19 to 27 inches; gravelly loamy coarse sand
C1—27 to 41 inches; extremely gravelly coarse sand
C2—41 to 62 inches; extremely gravelly coarse sand
C3—62 to 70 inches; extremely gravelly coarse sand

Characteristics of Dune Land

Setting
Landform: Dunes

Properties and qualities
Parent material: Eolian sand over glacial outwash
Slope range: 0 to 20 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 2.4 inches)

Interpretive groups
Land capability subclass (nonirrigated): 8s

Common trees
None

Typical profile
C—0 to 60 inches; fine sand

Dissimilar Minor Component

Blownout land
Percentage of map unit: 10 percent
Landform: Blowouts

Major Uses

Livestock grazing, forage production

3012—Hoypus sandy loam, 10 to 40 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 400 feet
Mean annual precipitation: 20 to 35 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Hoypus and similar soils: 95 percent
Dissimilar minor component: 5 percent

Characteristics of Hoypus

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial outwash
Slope range: 10 to 40 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6e
Land capability subclass (irrigated): 7e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw1—5 to 20 inches; loamy sand
Bw2—20 to 36 inches; very gravelly loamy sand
C—36 to 60 inches; extremely gravelly sand

Dissimilar Minor Component

Rock outcrop
Percentage of map unit: 5 percent

Major Uses

Livestock grazing, forage production, forestry

3013—Everett sandy loam, warm, 3 to 20 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 400 feet
Mean annual precipitation: 25 to 40 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Everett, warm, and similar soils: 100 percent

Characteristics of Everett, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash
Slope range: 3 to 20 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.4 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 9 inches; sandy loam
Bw1—9 to 13 inches; gravelly sandy loam
Bw2—13 to 30 inches; very gravelly coarse sand
C—30 to 60 inches; extremely gravelly coarse sand

Major Uses

Livestock grazing, forage production, forestry

3014—Everett sandy loam, warm, 20 to 40 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Everett, warm, and similar soils: 100 percent

Characteristics of Everett, Warm

Setting
Landform: Hillslopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial outwash
Slope range: 20 to 40 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.4 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6e
Land capability subclass (irrigated): 7e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 9 inches; sandy loam
Bw1—9 to 13 inches; gravelly sandy loam
Bw2—13 to 30 inches; very gravelly coarse sand
C—30 to 60 inches; extremely gravelly coarse sand

Major Uses

Livestock grazing, forage production, forestry

3015—Indianola loamy sand, warm, 3 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Indianola, warm, and similar soils: 100 percent

Characteristics of Indianola, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash
Slope range: 3 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3s
Land capability subclass (irrigated): 4e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loamy sand
Bw1—6 to 17 inches; loamy sand
Bw2—17 to 27 inches; sand
BC—27 to 37 inches; sand
C—37 to 60 inches; sand

Major Uses

Livestock grazing, forage production, forestry

3016—Sucia-Sholander complex, 5 to 20 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Sucia and similar soils: 50 percent
Sholander and similar soils: 40 percent
Dissimilar minor components: 10 percent

Characteristics of Sucia

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 5 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
A—0 to 8 inches; loamy sand
Bw—8 to 17 inches; loamy sand
E—17 to 31 inches; gravelly loamy sand
2Btg—31 to 38 inches; loam
2Cd—38 to 60 inches; silt loam

Characteristics of Sholander

Setting
Landform: Valleys
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 5 to 20 percent
Depth to restrictive feature: 40 to 60 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 3.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
A—0 to 8 inches; gravelly loam
E—8 to 16 inches; gravelly sandy loam
Bg1—16 to 28 inches; gravelly loamy sand
Bg2—28 to 51 inches; gravelly sand
2Cd—51 to 60 inches; loam

Dissimilar Minor Component

Spieden soils
Percentage of map unit: 10 percent
Landform: Drainageways

Major Uses

Livestock grazing, forage production, forestry

4000—Roche-Killebrew-Rock outcrop complex, 5 to 35 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 500 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Roche and similar soils: 40 percent
Killebrew and similar soils: 25 percent
Rock outcrop: 25 percent
Dissimilar minor component: 10 percent

Characteristics of Roche

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 4e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)

Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; loam
Bw1—5 to 15 inches; gravelly sandy loam
2Bw2—15 to 23 inches; loam
2Bg—23 to 39 inches; loam
2Cd—39 to 60 inches; silt loam

Characteristics of Killebrew

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 4.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Land capability subclass (irrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw—5 to 9 inches; sandy loam
2E—9 to 17 inches; gravelly sandy loam
2Btg—17 to 27 inches; silt loam
2Cd—27 to 60 inches; loam

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 10 to 35 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Dissimilar Minor Component

Cady soils
Percentage of map unit: 10 percent
Landform: Hillslopes, mountain slopes

Major Uses

Livestock grazing, forage production, forestry

4002—Laconner gravelly sandy loam, warm, 5 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 650 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Laconner, warm, and similar soils: 90 percent
Dissimilar minor component: 10 percent

Characteristics of Laconner, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Very low (about 2.6 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 3 inches; gravelly sandy loam
Bw1—3 to 10 inches; extremely gravelly coarse sandy loam
Bw2—10 to 20 inches; extremely gravelly loamy sand
C1—20 to 33 inches; very gravelly sand
C2—33 to 39 inches; extremely gravelly loamy sand
2Cd—39 to 60 inches; gravelly fine sandy loam

Dissimilar Minor Component

Rock outcrop
Percentage of map unit: 10 percent

Major Uses

Livestock grazing, forage production, forestry

4003—Hoypus-Whidbey complex, 10 to 30 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Hoypus and similar soils: 50 percent
Whidbey and similar soils: 45 percent
Dissimilar minor component: 5 percent

Characteristics of Hoypus soils

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial outwash
Slope range: 10 to 30 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw1—5 to 20 inches; loamy sand
Bw2—20 to 36 inches; very gravelly loamy sand
C—36 to 60 inches; extremely gravelly sand

Characteristics of Whidbey

Setting
Landform: Hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 10 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 5.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 2 inches; slightly decomposed plant material
A—2 to 6 inches; gravelly loam
Bw—6 to 20 inches; very gravelly sandy loam
Bg—20 to 37 inches; very gravelly sandy loam
2Cd—37 to 60 inches; gravelly sandy loam

Dissimilar Minor Component

Rock outcrop
Percentage of map unit: 5 percent

Major Uses

Livestock grazing, forage production, forestry

4005—Roche-Haro-Rock outcrop complex, 5 to 25 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Roche and similar soils: 45 percent
Haro and similar soils: 40 percent
Rock outcrop: 15 percent

Characteristics of Roche

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 4e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; loam
Bw1—5 to 15 inches; gravelly sandy loam
2Bw2—15 to 23 inches; loam
2Bg—23 to 39 inches; loam
2Cd—39 to 60 inches; silt loam

Characteristics of Haro

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 1.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: PRAIRIE BALD (R002XN202WA)

Common trees
None

Typical profile
A1—0 to 1 inch; loam
A2—1 to 5 inches; gravelly loam
Bw—5 to 11 inches; gravelly sandy loam
R—11 to 21 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 5 to 25 percent
Flooding frequency: None
Ponding frequency: None

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Major Uses

Livestock grazing, forage production, forestry

4006—Alderwood, warm-Hoypus complex, 5 to 20 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 450 feet
Mean annual precipitation: 25 to 40 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Alderwood, warm, and similar soils: 45 percent
Hoypus and similar soils: 45 percent
Dissimilar minor component: 10 percent

Characteristics of Alderwood, Warm

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 20 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Low (about 5.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 10 inches; extremely gravelly sandy loam
Bw—10 to 18 inches; extremely gravelly coarse sandy loam
Bg—18 to 36 inches; extremely gravelly coarse sandy loam
2Cd—36 to 60 inches; gravelly silty clay loam

Characteristics of Hoypus

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial outwash
Slope range: 5 to 20 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None

Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Land capability subclass (irrigated): 6e
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw1—5 to 20 inches; loamy sand
Bw2—20 to 36 inches; very gravelly loamy sand
C—36 to 60 inches; extremely gravelly sand

Dissimilar Minor Component

Sholander soils
Percentage of map unit: 10 percent
Landform: Valleys

Major Uses

Livestock grazing, forage production, forestry

4007—Roche-Mitchellbay complex, 3 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 300 feet
Mean annual precipitation: 20 to 35 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Roche and similar soils: 60 percent
Mitchellbay and similar soils: 30 percent
Dissimilar minor component: 10 percent

Characteristics of Roche

Setting
Landform: Hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 5 to 15 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None

Seasonal high water table (minimum depth): About 12 to 20 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 7.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 4e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; loam
Bw1—5 to 15 inches; gravelly sandy loam
2Bw2—15 to 23 inches; loam
2Bg—23 to 39 inches; loam
2Cd—39 to 60 inches; silt loam

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam
Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Dissimilar Minor Component

Everett soils, warm
Percentage of map unit: 10 percent
Landform: Hillslopes

Major Uses

Livestock grazing, forage production, forestry

4008—Mitchellbay-Rock outcrop-Killebrew complex, 3 to 15 percent slopes

Map Unit Setting

General landscape: Drift plains
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Mitchellbay and similar soils: 45 percent
Rock outcrop: 25 percent
Killebrew and similar soils: 20 percent
Dissimilar minor component: 10 percent

Characteristics of Mitchellbay

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Moderate (about 6.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4w
Land capability subclass (irrigated): 4w
Forage suitability group: Seasonally Wet Soils (G002XN202WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; gravelly sandy loam

Bw—6 to 15 inches; sandy loam
E—15 to 20 inches; sandy loam
2Btg1—20 to 26 inches; loam
2Btg2—26 to 38 inches; loam
2Cd—38 to 60 inches; loam

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 5 to 15 percent
Flooding frequency: None
Ponding frequency: None

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Characteristics of Killebrew

Setting
Landform: Valleys, valleysides
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 3 to 8 percent
Depth to restrictive feature: 20 to 40 inches to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Low to high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 4 to 12 inches (see Water Features table)
Available water capacity (entire profile): Low (about 4.5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Land capability subclass (irrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 5 inches; sandy loam
Bw—5 to 9 inches; sandy loam
2E—9 to 17 inches; gravelly sandy loam
2Btg—17 to 27 inches; silt loam
2Cd—27 to 60 inches; loam

Dissimilar Minor Component

Bazal soils
Percentage of map unit: 10 percent
Landform: Drainageways, valleys

Major Uses

Livestock grazing, forage production, forestry

5000—Cady-Rock outcrop complex, 5 to 30 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 2,400 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Cady and similar soils: 45 percent
Rock outcrop: 35 percent
Dissimilar minor components: 20 percent

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 5 to 30 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Dissimilar Minor Components

Doebay soils
Percentage of map unit: 10 percent
Landform: Mountain slopes, hillslopes

Killebrew soils
Percentage of map unit: 10 percent
Landform: Hillslopes, mountain slopes

Major Uses

Livestock grazing, forage production, forestry

5001—Rock outcrop-Haro complex, 25 to 75 percent slopes

Map Unit Setting

Elevation: 0 to 1,300 feet (fig. 14)
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Rock outcrop: 50 percent
Haro and similar soils: 40 percent
Dissimilar minor component: 10 percent

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 25 to 75 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Figure 14.—Rock outcrop-Haro complex, 25 to 75 percent slopes, in nonforested areas, on the southern part of Lopez Island.

Typical profile
R—0 to 60 inches; unweathered bedrock

Characteristics of Haro

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 1.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: PRAIRIE BALD (R002XN202WA)

Common trees
None

Typical profile
A1—0 to 1 inch; loam
A2—1 to 5 inches; gravelly loam
Bw—5 to 11 inches; gravelly sandy loam
R—11 to 21 inches; unweathered bedrock

Dissimilar Minor Component

Hiddenridge soils
Percentage of map unit: 10 percent
Landform: Hillslopes, mountain slopes

Major Use

Livestock grazing

5002—Doebay, moist-Cady-Doebay complex, 25 to 75 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 1,700 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Doebay, moist, and similar soils: 30 percent
Cady and similar soils: 25 percent
Doebay and similar soils: 25 percent
Dissimilar minor components: 20 percent

Characteristics of Doebay, Moist

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loam
Bw1—6 to 16 inches; fine sandy loam
Bw2—16 to 21 inches; very gravelly sandy loam
C—21 to 35 inches; extremely gravelly sandy loam
R—35 to 45 inches; unweathered bedrock

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Characteristics of Doebay

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained

Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loam
Bw1—6 to 16 inches; fine sandy loam
Bw2—16 to 21 inches; very gravelly sandy loam
C—21 to 35 inches; extremely gravelly sandy loam
R—35 to 45 inches; unweathered bedrock

Dissimilar Minor Components

Rock outcrop
Percentage of map unit: 10 percent

Turtleback soils
Percentage of map unit: 10 percent
Landform: Hillslopes, mountain slopes

Major Use

Forestry

5003—Doebay-Morancreek complex, 5 to 25 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 900 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Doebay and similar soils: 50 percent
Morancreek and similar soils: 30 percent
Dissimilar minor components: 20 percent

Characteristics of Doebay

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loam
Bw1—6 to 16 inches; fine sandy loam
Bw2—16 to 21 inches; very gravelly sandy loam
C—21 to 35 inches; extremely gravelly sandy loam
R—35 to 45 inches; unweathered bedrock

Characteristics of Morancreek

Setting
Landform: Mountain slopes, hillslopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift
Slope range: 5 to 25 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): High
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 16 to 28 inches (see Water Features table)
Available water capacity (entire profile): High (about 9.2 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3w
Land capability subclass (irrigated): 4e
Forage suitability group: Sloping to Steep Soils (G002XN702WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 3 inches; sandy loam
Bw1—3 to 10 inches; sandy loam
Bw2—10 to 21 inches; sandy loam
Bg—21 to 28 inches; sandy loam
C—28 to 60 inches; sandy loam

Dissimilar Minor Components

Cady soils
Percentage of map unit: 10 percent
Landform: Hillslopes, mountain slopes

Rock outcrop
Percentage of map unit: 10 percent

Major Uses

Livestock grazing, forage production, forestry

5004—Pickett-Kahboo-Rock outcrop complex, 25 to 75 percent slopes

Map Unit Setting

General landscape: Mountains, hills
Elevation: 0 to 2,300 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 160 to 220 days

Map Unit Composition

Pickett and similar soils: 60 percent
Kahboo and similar soils: 20 percent
Rock outcrop: 20 percent

Characteristics of Pickett

Setting
Landform: Mountain slopes, hillslopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 25 to 75 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.6 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Western hemlock - Douglas-fir/cascade Oregongrape (F002XN902WA)

Common trees
Douglas-fir, Pacific yew, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 3 inches; very gravelly loam
Bw1—3 to 27 inches; very gravelly fine sandy loam
Bw2—27 to 36 inches; very gravelly coarse sandy loam
R—36 to 46 inches; unweathered bedrock

Characteristics of Kahboo

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 25 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 2.8 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Western hemlock - Douglas-fir/cascade Oregongrape (F002XN902WA)

Common trees
Douglas-fir, Pacific yew, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
Oe—1 to 2 inches; moderately decomposed plant material
A—2 to 9 inches; gravelly fine sandy loam
Bw—9 to 14 inches; gravelly fine sandy loam
R—14 to 24 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 25 to 75 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Major Use

Forestry

5005—Constitution-Skipjack-Kahboo complex, 5 to 25 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 2,300 feet
Mean annual precipitation: 30 to 45 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 160 to 220 days

Map Unit Composition

Constitution and similar soils: 40 percent
Skipjack and similar soils: 25 percent
Kahboo and similar soils: 20 percent
Dissimilar minor components: 15 percent

Characteristics of Constitution

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 5 to 25 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.4 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Ecological site: Western hemlock - Douglas-fir/cascade Oregongrape (F002XN902WA)

Common trees
Douglas-fir, Pacific yew, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; sandy loam

Bw1—6 to 16 inches; gravelly sandy loam
Bw2—16 to 26 inches; gravelly coarse sandy loam
R—26 to 36 inches; unweathered bedrock

Characteristics of Skipjack

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift and volcanic ash
Slope range: 5 to 15 percent
Depth to restrictive feature: None within a depth of 60 inches
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): About 36 to 48 inches (see Water Features table)
Available water capacity (entire profile): High (about 9.6 inches)

Interpretive groups
Land capability subclass (nonirrigated): 3e
Ecological site: Western hemlock - Douglas-fir/cascade Oregongrape (F002XN902WA)

Common trees
Douglas-fir, Pacific yew, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 3 inches; slightly decomposed plant material
Bw1—3 to 32 inches; fine sandy loam
Bw2—32 to 43 inches; gravelly sandy loam
2Bg—43 to 60 inches; gravelly coarse sandy loam

Characteristics of Kahboo

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 5 to 25 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 2.8 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Western hemlock - Douglas-fir/cascade Oregongrape (F002XN902WA)

Common trees
Douglas-fir, Pacific yew, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
Oe—1 to 2 inches; moderately decomposed plant material
A—2 to 9 inches; gravelly fine sandy loam
Bw—9 to 14 inches; gravelly fine sandy loam
R—14 to 24 inches; unweathered bedrock

Dissimilar Minor Components

Aquic Dystroxerepts
Percentage of map unit: 10 percent
Landform: Drainageways

Rock outcrop
Percentage of map unit: 5 percent

Major Use

Forestry

5006—Cady-Doebay-Rock outcrop complex, 25 to 75 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 2,350 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Cady and similar soils: 70 percent
Doebay and similar soils: 15 percent
Rock outcrop: 15 percent

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained

Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Characteristics of Doebay

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loam
Bw1—6 to 16 inches; fine sandy loam
Bw2—16 to 21 inches; very gravelly sandy loam
C—21 to 35 inches; extremely gravelly sandy loam
R—35 to 45 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 25 to 75 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Major Use

Forestry

5007—Haro-Hiddenridge-Rock outcrop complex, 5 to 30 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 1,500 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Haro and similar soils: 50 percent
Hiddenridge and similar soils: 30 percent
Rock outcrop: 20 percent

Characteristics of Haro

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 1.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6s
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: PRAIRIE BALD (R002XN202WA)

Common trees
None

Typical profile
A1—0 to 1 inch; loam
A2—1 to 5 inches; gravelly loam
Bw—5 to 11 inches; gravelly sandy loam
R—11 to 21 inches; unweathered bedrock

Characteristics of Hiddenridge

Setting
Landform: Mountain slopes, hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 15 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4s
Forage suitability group: Droughty Soils (G002XN402WA)
Ecological site: PRAIRIE BALD (R002XN202WA)

Common trees
None

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 3 inches; gravelly coarse sandy loam
A2—3 to 24 inches; very gravelly coarse sandy loam
C—24 to 57 inches; extremely gravelly coarse sandy loam
R—57 to 60 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 5 to 30 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Major Uses

Livestock grazing, forage production

5008—Doebay-Cady-Rock outcrop complex, 10 to 30 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 1,600 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Doebay and similar soils: 40 percent
Cady and similar soils: 35 percent
Rock outcrop: 15 percent
Dissimilar minor component: 10 percent

Characteristics of Doebay

Setting
Landform: Hillslopes, mountain slopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 10 to 30 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loam
Bw1—6 to 16 inches; fine sandy loam
Bw2—16 to 21 inches; very gravelly sandy loam
C—21 to 35 inches; extremely gravelly sandy loam
R—35 to 45 inches; unweathered bedrock

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (range): All aspects

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 10 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 10 to 30 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Dissimilar Minor Component

Aquic Dystroxerepts
Percentage of map unit: 10 percent
Landform: Drainageways

Major Uses

Livestock grazing, forage production, forestry

5009—Haro-Hiddenridge-Rock outcrop complex, 25 to 75 percent slopes

Map Unit Setting

General landscape: Hills, mountains (fig. 15)
Elevation: 0 to 2,000 feet

Figure 15.—Typical area of Haro-Hiddenridge-Rock outcrop complex, 25 to 75 percent slopes, in foreground, on Orcas Island.

Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Haro and similar soils: 50 percent
Hiddenridge and similar soils: 30 percent
Rock outcrop: 20 percent

Characteristics of Haro

Setting
Landform: Mountain slopes, hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Very low (about 1.3 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: PRAIRIE BALD (R002XN202WA)

Common trees
None

Typical profile
A1—0 to 1 inch; loam
A2—1 to 5 inches; gravelly loam
Bw—5 to 11 inches; gravelly sandy loam
R—11 to 21 inches; unweathered bedrock

Characteristics of Hiddenridge

Setting
Landform: Mountain slopes, hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 50 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.1 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: PRAIRIE BALD (R002XN202WA)

Common trees
None

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A1—1 to 3 inches; gravelly coarse sandy loam
A2—3 to 24 inches; very gravelly coarse sandy loam
C—24 to 57 inches; extremely gravelly coarse sandy loam
R—57 to 60 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 25 to 75 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Major Uses

Livestock grazing

5010—Turtleback-Cady-Rock outcrop complex, 25 to 75 percent slopes

Map Unit Setting

General landscape: Mountains, hills
Elevation: 0 to 2,200 feet
Mean annual precipitation: 20 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Turtleback and similar soils: 50 percent
Cady and similar soils: 35 percent
Rock outcrop: 15 percent

Characteristics of Turtleback

Setting
Landform: Mountain slopes, hillslopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High or very high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 5 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 3 inches; slightly decomposed plant material
Bw1—3 to 13 inches; very gravelly very fine sandy loam
Bw2—13 to 40 inches; extremely gravelly sandy loam
C—40 to 48 inches; extremely gravelly loamy sand
R—48 to 58 inches; unweathered bedrock

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 7e
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 25 to 75 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Major Use

Forestry

5015—Doebay, moist-Cady-Rock outcrop complex, 10 to 30 percent slopes

Map Unit Setting

General landscape: Hills, mountains
Elevation: 0 to 1,600 feet
Mean annual precipitation: 25 to 40 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Map Unit Composition

Doebay, moist, and similar soils: 40 percent
Cady and similar soils: 35 percent
Rock outcrop: 15 percent
Dissimilar minor component: 10 percent

Characteristics of Doebay, Moist

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): North
Aspect (range): West to east (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 10 to 30 percent
Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 4.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 4e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Western redcedar - Douglas-fir/salal/swordfern (F002XN903WA)

Common trees
Douglas-fir, bigleaf maple, grand fir, lodgepole pine, red alder, western hemlock, western redcedar

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 6 inches; loam
Bw1—6 to 16 inches; fine sandy loam
Bw2—16 to 21 inches; very gravelly sandy loam
C—21 to 35 inches; extremely gravelly sandy loam
R—35 to 45 inches; unweathered bedrock

Characteristics of Cady

Setting
Landform: Hillslopes, mountain slopes
Aspect (representative): South
Aspect (range): East to west (clockwise)

Properties and qualities
Parent material: Glacial drift mixed with colluvium derived from metasedimentary bedrock
Slope range: 10 to 30 percent
Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Drainage class: Well drained

Capacity to transmit water (Ksat): Moderately high or high (see Physical Properties table)
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches
Available water capacity (entire profile): Low (about 3.7 inches)

Interpretive groups
Land capability subclass (nonirrigated): 6e
Forage suitability group: Shallow to Moderately Deep Soils (G002XN302WA)
Ecological site: Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain (F002XN901WA)

Common trees
Douglas-fir, Garry oak, Pacific madrone, grand fir, lodgepole pine

Typical profile
Oi—0 to 1 inch; slightly decomposed plant material
A—1 to 4 inches; loam
Bw—4 to 16 inches; fine sandy loam
R—16 to 26 inches; unweathered bedrock

Characteristics of Rock Outcrop

Properties and qualities
Slope range: 10 to 30 percent
Flooding frequency: None
Ponding frequency: None
Seasonal high water table (minimum depth): More than 72 inches

Interpretive groups
Land capability subclass (nonirrigated): 8

Typical profile
R—0 to 60 inches; unweathered bedrock

Dissimilar Minor Component

Aquic Dystroxerepts
Percentage of map unit: 10 percent
Landform: Drainageways

Major Uses

Livestock grazing, forage production, forestry

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 to prevent 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 rangeland and forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as 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 gravel, sand, reclamation material, 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.

Soil Survey Information on the Internet

Soil survey reports have traditionally contained tables providing the properties of the soils and interpretations regarding the use of the soils. Some of the tables are included in this report and others are only available online from the Web Soil Survey at http://websoilsurvey.nrcs.usda.gov/app/. Some of the information is provided online instead of in this publication so that the information can be more readily updated. The information on the Web Soil Survey is the official soil survey information.

The information listed below is currently available online for each soil map unit component. This list will expand with time as additional reports and interpretations are developed.

Soil Properties and Qualities

Chemical properties: Content of calcium carbonate, cation-exchange capacity, electrical conductivity (EC), and pH

Soil erosion factors: K-factor (whole soil and rock free), T-factor, wind erodibility group, and wind erodibility index

Physical properties: Available water capacity; bulk density; linear extensibility; content of organic matter, clay, sand, and silt; saturated hydraulic conductivity; surface texture; water content; liquid limit; and plasticity index

Soil qualities and features: Depth to restrictive layer, drainage class, frost action, and hydrologic soil group

Water features: Depth to water table and frequency of flooding and ponding

Suitabilities and Limitations for Use

Building site development: Risk of corrosion of steel and concrete and suitability for shallow excavations, dwellings, and other uses

Construction materials: Potential as a source of gravel, sand, roadfill, topsoil, and other material

Disaster recovery planning: Suitability for disposal of animal carcasses in case of catastrophic mortality, suitability as a location for a composting facility, and other ratings

Land classification: Ecological site name and ID (number), farmland classification (prime, unique, and statewide importance), hydric rating by map unit, and irrigated and nonirrigated capability class and subclass

Land management: Forestry interpretations, including seedling mortality, suitability for hand planting, suitability for log landings, potential for damage by fire, harvest equipment operability, construction limitations for haul roads and landings, and other ratings

Military operations: Vehicle trafficability, suitability for evacuations, and other ratings

Recreational development: Suitability for camp areas, off-road motorcycle trails, paths and trails, picnic areas, and playgrounds

Sanitary facilities: Suitability for septic tank absorption fields, sanitary landfills, sewage lagoons, and daily cover for landfill

Vegetative productivity: Forest productivity, crop productivity index, range production, and yields of irrigated and nonirrigated crops by map unit or component

Waste management: Disposal of wastewater, treatment of wastewater, and land application of sewage sludge

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Building site development: Dwellings and small commercial buildings; and roads and streets, shallow excavations, and lawns and landscaping

Construction materials: Source of reclamation material and roadfill

Land classifications: Land capability classification, prime and other important farmlands, and taxonomic classification of the soils

Land management: Damage by fire and seedling mortality on forestland; forestland planting and harvesting; forestland site preparation; haul roads, log landings, and soil rutting on forestland; and hazard of erosion and suitability for roads on forestland

Recreational development: Camp areas, picnic areas, and playgrounds; and paths, trails, and golf fairways

Sanitary facilities: Landfills and sewage disposal

Soil chemical properties: Cation-exchange capacity and soil reaction

Soil erosion: RUSLE2 related attributes

Soil physical properties: Engineering properties and physical soil properties

Soil qualities and features: Restrictive layer, potential for frost action, and risk of corrosion

Vegetative productivity: Forestland productivity and rangeland productivity

Waste management: Agricultural disposal of manure, food-processing waste, and sewage sludge; agricultural disposal of wastewater by overland flow; agricultural disposal of wastewater by rapid infiltration and slow rate treatment; and large animal carcass disposal

Water features: Hydrologic group, water table, ponding, and flooding

Water management: Pond reservoir areas; embankments, dikes, and levees; aquifer-fed excavated ponds

Yields per Acre

The table “Nonirrigated Yields by Map Unit Component” is described in this section. The average yields per acre shown in the table are those that can be expected of the principal crops under a high level of management. 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 land capability classification of map units in the survey area also is shown in the table.

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 also are considered.

The management needed to obtain the indicated yields of the various crops 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.

Pasture yields are expressed in terms of animal unit months. An animal unit month (AUM) is the amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

The estimated yields reflect the productive capacity of each soil for each of the principal crops. 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 other than those shown in the table 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.

Nonirrigated Yields by Map Unit Component

(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.)

Map symbol and soil name	Land capability	Grass-legume hay	Grass-legume pasture
		Tons	*AUM*
997:			
Pits, gravel	8	---	---
998:			
Water, saline	---	---	---

Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability	Grass-legume hay	Grass-legume pasture
		Tons	AUM
999:			
Water, fresh	---	---	---
1000:			
Sholander	4w	2.00	4.40
Spieden	5w	2.00	4.40
1001:			
Coveland	6w	3.00	6.60
1002:			
Sholander	4w	2.00	4.40
1003:			
Coupeville	6w	3.00	6.60
1004:			
Limepoint	6w	3.00	6.60
Sholander	4w	2.00	4.40
1005:			
Shalcar	5w	3.00	6.60
1006:			
Semiahmoo	5w	3.00	6.60
1009:			
Coveland	6w	3.00	6.60
Mitchellbay	4w	2.50	5.50
1010:			
Deadmanbay	4w	2.50	5.50
Morancreek	3w	2.00	4.40
1013:			
Bazal	5w	3.00	6.60
Mitchellbay	4w	2.50	5.50
1014:			
Beaches	8	---	---
Endoaquents, tidal	7w	---	---
Xerorthents	7s	---	---
1015:			
Deadmanbay	4w	2.50	5.50
Bazal	6w	3.00	6.60
Cady	6s	1.00	2.20
1016:			
Orcas	5w	3.00	6.60
1053:			
Dugualla	6s	---	---

Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability	Grass-legume hay	Grass-legume pasture
		Tons	*AUM*
2000:			
Whidbey	4s	1.00	2.20
2001:			
Mitchellbay	4w	2.50	5.50
2002:			
Sucia	3s	1.50	3.30
2004:			
Mitchellbay	4w	2.50	5.50
2007:			
Alderwood, warm	4s	1.50	3.30
Everett, warm	4s	1.50	3.30
2008:			
Mitchellbay	4w	2.50	5.50
Sholander	4w	2.00	4.40
Bazal	5w	3.00	6.60
2009:			
Limepoint	6w	3.00	6.60
Alderwood, warm	4s	1.50	3.30
Sholander	4w	2.00	4.40
2010:			
Whidbey	4s	1.00	2.20
Hoypus	3s	1.00	2.20
2011:			
Roche	3w	2.00	4.40
Killebrew	6s	1.50	3.30
3000:			
Pilepoint	3w	2.00	4.40
3001:			
Hoypus	4e	1.00	2.20
3002:			
Keystone	3s	1.50	3.30
3005:			
San Juan	4s	2.00	4.40
3006:			
San Juan	6e	2.00	4.40
3007:			
San Juan	4s	2.00	4.40
3008:			
Xerorthents	7e	---	---
Endoaquents, tidal	7w	---	---

Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability	Grass-legume hay	Grass-legume pasture
		Tons	*AUM*
3010:			
San Juan	4s	2.00	4.40
Dune land	8s	---	---
3012:			
Hoypus	6e	1.00	2.20
3013:			
Everett, warm	4s	1.50	3.30
3014:			
Everett, warm	6e	1.50	3.30
3015:			
Indianola, warm	3s	2.00	4.40
3016:			
Sucia	4e	1.50	3.30
Sholander	4w	2.00	4.40
4000:			
Roche	3w	2.00	4.40
Killebrew	6s	1.50	3.30
Rock outcrop	8	---	---
4002:			
Laconner, warm	4s	1.00	2.20
4003:			
Hoypus	4e	1.00	2.20
Whidbey	4s	1.00	2.20
4005:			
Roche	3w	2.00	4.40
Haro	6s	0.50	1.10
Rock outcrop	8	---	---
4006:			
Alderwood, warm	4s	1.50	3.30
Hoypus	4e	1.00	2.20
4007:			
Roche	3w	2.00	4.40
Mitchellbay	4w	2.50	5.50
4008:			
Mitchellbay	4w	2.50	5.50
Rock outcrop	8	---	---
Killebrew	6s	1.50	3.30

Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability	Grass-legume hay	Grass-legume pasture
		Tons	*AUM*
5000:			
Cady	6s	1.00	2.20
Rock outcrop	8	---	---
5001:			
Rock outcrop	8	---	---
Haro	7e	---	---
5002:			
Doebay, moist	7e	---	---
Cady	7e	---	---
Doebay	7e	---	---
5003:			
Doebay	4e	1.50	3.30
Morancreek	3w	2.00	4.40
5004:			
Pickett	7e	---	---
Kahboo	7e	---	---
Rock outcrop	8	---	---
5005:			
Constitution	4e	---	---
Skipjack	3e	---	---
Kahboo	7e	---	---
5006:			
Cady	7e	---	---
Doebay	7e	---	---
Rock outcrop	8	---	---
5007:			
Haro	6s	0.50	1.10
Hiddenridge	4s	1.50	3.30
Rock outcrop	8	---	---
5008:			
Doebay	4e	1.50	3.30
Cady	6e	1.00	2.20
Rock outcrop	8	---	---
5009:			
Haro	7e	---	---
Hiddenridge	7e	1.50	3.30
Rock outcrop	8	---	---

Nonirrigated Yields by Map Unit Component--Continued

Map symbol and soil name	Land capability	Grass-legume hay	Grass-legume pasture
		Tons	*AUM*
5010:			
Turtleback	7e	---	---
Cady	7e	---	---
Rock outcrop	8	---	---
5015:			
Doebay, moist	4e	1.50	3.30
Cady	6e	1.00	2.20
Rock outcrop	8	---	---

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 criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include 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 forestland, or for engineering purposes. The capability classification for each map unit in the survey area is given in the tables "Nonirrigated Yields by Map Unit Component," "Land Capability Classification," and "Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage" and in the section "Detailed Soil Map Units."

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit (USDA, 1961). Only class and subclass are given in this report.

Capability classes, the broadest groups, are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. The classes are defined as follows:

Class 1 soils have slight limitations that restrict their use.

Class 2 soils have moderate limitations that restrict the choice of plants or that require moderate conservation practices.

Class 3 soils have severe limitations that restrict the choice of plants or that require special conservation practices, or both.

Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both.

Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 6 soils have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat.

Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat.

Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes.

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, 2e. The letter *e* shows that the main hazard is the 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 1 there are no subclasses because the soils of this class have few limitations. Class 5 contains only the subclasses indicated by *w, s,* or *c* because the soils in class 5 are subject to little or no erosion. They have other limitations that restrict their use to pasture, rangeland, forestland, wildlife habitat, or recreation.

Land Capability Classification

Map symbol and soil name	Land capability classification	
	Non-irrigated	Irrigated
997:		
Pits, gravel	8	---
998:		
Water, saline	---	---
999:		
Water, fresh	---	---
1000:		
Sholander	4w	4w
Spieden	5w	5w
1001:		
Coveland	6w	6w
1002:		
Sholander	4w	4w
1003:		
Coupeville	6w	6w
1004:		
Limepoint	6w	6w
Sholander	4w	4w
1005:		
Shalcar	5w	5w
1006:		
Semiahmoo	5w	5w

Land Capability Classification--Continued

Map symbol and soil name	Land capability classification	
	Non-irrigated	Irrigated
1009:		
Coveland	6w	6w
Mitchellbay	4w	4w
1010:		
Deadmanbay	4w	4w
Morancreek	3w	4e
1013:		
Bazal	5w	5w
Mitchellbay	4w	4w
1014:		
Beaches	8	---
Endoaquents, tidal	7w	---
Xerorthents	7s	---
1015:		
Deadmanbay	4w	4w
Bazal	6w	6w
Cady	6s	6s
1016:		
Orcas	5w	5w
1053:		
Dugualla	6s	6s
2000:		
Whidbey	4s	4s
2001:		
Mitchellbay	4w	4w
2002:		
Sucia	3s	4e
2004:		
Mitchellbay	4w	4w
2007:		
Alderwood, warm	4s	4s
Everett, warm	4s	4s
2008:		
Mitchellbay	4w	4w
Sholander	4w	4w
Bazal	5w	5w

Land Capability Classification--Continued

Map symbol and soil name	Land capability classification: Non-irrigated	Irrigated
2009:		
Limepoint	6w	6w
Alderwood, warm	4s	4s
Sholander	4w	4w
2010:		
Whidbey	4s	4s
Hoypus	3s	4e
2011:		
Roche	3w	3w
Killebrew	6s	6s
3000:		
Pilepoint	3w	3w
3001:		
Hoypus	4e	6e
3002:		
Keystone	3s	4e
3005:		
San Juan	4s	4s
3006:		
San Juan	6e	7e
3007:		
San Juan	4s	6e
3008:		
Xerorthents	7e	---
Endoaquents, tidal	7w	---
3010:		
San Juan	4s	6e
Dune land	8s	---
3012:		
Hoypus	6e	7e
3013:		
Everett, warm	4s	6e
3014:		
Everett, warm	6e	7e
3015:		
Indianola, warm	3s	4e
3016:		
Sucia	4e	6e
Sholander	4w	4w

Land Capability Classification--Continued

Map symbol and soil name	Land capability classification: Non-irrigated	Land capability classification: Irrigated
4000:		
Roche	3w	4e
Killebrew	6s	6s
Rock outcrop	8	---
4002:		
Laconner, warm	4s	4s
4003:		
Hoypus	4e	6e
Whidbey	4s	6e
4005:		
Roche	3w	4e
Haro	6s	---
Rock outcrop	8	---
4006:		
Alderwood, warm	4s	6e
Hoypus	4e	6e
4007:		
Roche	3w	4e
Mitchellbay	4w	4w
4008:		
Mitchellbay	4w	4w
Rock outcrop	8	---
Killebrew	6s	6s
5000:		
Cady	6s	---
Rock outcrop	8	---
5001:		
Rock outcrop	8	---
Haro	7e	---
5002:		
Doebay, moist	7e	---
Cady	7e	---
Doebay	7e	---
5003:		
Doebay	4e	---
Morancreek	3w	4e

Land Capability Classification--Continued

Map symbol and soil name	Land capability classification: Non-irrigated	Land capability classification: Irrigated
5004:		
Pickett	7e	---
Kahboo	7e	---
Rock outcrop	8	---
5005:		
Constitution	4e	---
Skipjack	3e	---
Kahboo	7e	---
5006:		
Cady	7e	---
Doebay	7e	---
Rock outcrop	8	---
5007:		
Haro	6s	---
Hiddenridge	4s	---
Rock outcrop	8	---
5008:		
Doebay	4e	---
Cady	6e	---
Rock outcrop	8	---
5009:		
Haro	7e	---
Hiddenridge	7e	---
Rock outcrop	8	---
5010:		
Turtleback	7e	---
Cady	7e	---
Rock outcrop	8	---
5015:		
Doebay, moist	4e	---
Cady	6e	---
Rock outcrop	8	---

Prime Farmland and Other Important Farmland

The table in this section lists the map units in the survey area that are considered prime farmland, unique farmland, and farmland of statewide or local importance. This list does not constitute a recommendation for a particular land use.

In an effort to identify the extent and location of important farmland, the Natural Resources Conservation Service, in cooperation with other interested Federal, State, and local government organizations, has inventoried land that can be used for the production of the Nation's food supply.

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. Because the supply of high-quality farmland is limited, the U.S. Department of Agriculture recognizes that responsible levels of government, as well as individuals, should encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil quality, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. The water supply is dependable and of adequate quality. Prime farmland is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from 0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

A recent trend in land use in some areas has been the loss of some prime farmland to industrial and urban uses. The loss of prime farmland to other uses puts pressure on marginal lands, which generally are more erodible, droughty, and less productive and cannot be easily cultivated.

For some soils identified in the table as prime farmland, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures The extent of each map unit is shown in the table "Acreage and Proportionate Extent of the Soils." The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

About 45,000 acres, or about 39 percent of the total acreage, of the survey area meets the requirements for prime farmland.

In some areas, land that does not meet the criteria for prime farmland is considered to be *farmland of statewide importance* for the production of food, feed, fiber, forage, and oilseed crops. The criteria for defining and delineating farmland of statewide importance are determined by the appropriate State agencies. In Washington, the criteria were developed and approved in cooperation with the Washington State Conservation Commission. Generally, this land includes areas of soils that nearly meet the requirements for prime farmland and that economically produce high yields of crops when treated and managed according to acceptable farming methods. Some areas may produce as high a yield as prime farmland if conditions are favorable. Farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

About 8,400 acres, or about 7 percent of the total acreage, of the survey area meets the requirements for farmland of statewide importance.

Prime and Other Important Farmland

(Only the soils considered prime or important farmland are listed. Urban or built-up areas of the soils listed are not considered prime or important farmland.)

Map symbol	Map unit name	Farmland classification
1000	Sholander-Spieden complex, 0 to 5 percent slopes	Prime farmland if irrigated
1001	Coveland loam, 0 to 5 percent slopes	Prime farmland if drained
1002	Sholander gravelly loam, 2 to 8 percent slopes	Prime farmland if irrigated
1003	Coupeville loam, 0 to 5 percent slopes	Prime farmland if drained
1004	Limepoint-Sholander complex, 0 to 8 percent slopes	Prime farmland if drained
1005	Shalcar muck, 0 to 2 percent slopes	Prime farmland if drained
1006	Semiahmoo muck, 0 to 2 percent slopes	Prime farmland if drained
1009	Coveland-Mitchellbay complex, 2 to 15 percent slopes	All areas are prime farmland
1010	Deadmanbay-Morancreek complex, 2 to 15 percent slopes	All areas are prime farmland
1013	Bazal-Mitchellbay complex, 0 to 5 percent slopes	Prime farmland if drained
1016	Orcas peat, 0 to 2 percent slopes	Prime farmland if drained
1053	Dugualla muck, 0 to 2 percent slopes	Prime farmland if drained and either protected from flooding or not frequently flooded during the growing season
2000	Whidbey gravelly loam, 3 to 15 percent slopes	Prime farmland if irrigated
2001	Mitchellbay gravelly sandy loam, 5 to 15 percent slopes	All areas are prime farmland
2002	Sucia loamy sand, 2 to 10 percent slopes	Prime farmland if irrigated
2004	Mitchellbay gravelly sandy loam, 0 to 5 percent slopes	All areas are prime farmland
2007	Alderwood-Everett complex, warm, 5 to 15 percent slopes	Prime farmland if irrigated
2008	Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes	Prime farmland if irrigated and drained
2009	Limepoint-Alderwood, warm-Sholander complex, 2 to 12 percent slopes	Prime farmland if irrigated and drained
2010	Whidbey-Hoypus complex, 2 to 15 percent slopes	Prime farmland if irrigated
2011	Roche-Killebrew complex, 2 to 10 percent slopes	All areas are prime farmland
3000	Pilepoint loam, 2 to 8 percent slopes	Prime farmland if irrigated
3001	Hoypus sandy loam, 3 to 25 percent slopes	Farmland of statewide importance
3002	Keystone sandy loam, 5 to 15 percent slopes	Farmland of statewide importance
3005	San Juan sandy loam, 2 to 8 percent slopes	Prime farmland if irrigated
3007	San Juan sandy loam, 5 to 20 percent slopes	Farmland of statewide importance
3013	Everett sandy loam, warm, 3 to 20 percent slopes	Farmland of statewide importance
3015	Indianola loamy sand, warm, 3 to 15 percent slopes	Prime farmland if irrigated
3016	Sucia-Sholander complex, 5 to 20 percent slopes	Farmland of statewide importance
4002	Laconner gravelly sandy loam, warm, 5 to 15 percent slopes	Prime farmland if irrigated
4003	Hoypus-Whidbey complex, 10 to 30 percent slopes	Farmland of statewide importance
4006	Alderwood, warm-Hoypus complex, 5 to 20 percent slopes	Farmland of statewide importance
4007	Roche-Mitchellbay complex, 3 to 15 percent slopes	All areas are prime farmland
5003	Doebay-Morancreek complex, 5 to 25 percent slopes	Farmland of statewide importance

Forestland Vegetation

By Dennis Robinson, State forester, and Kathryn Smith, forester, Natural Resources Conservation Service.

Forested areas are divided into ecological sites for the purposes of inventory, evaluation, and management. An ecological site is a distinctive kind of land with specific physical characteristics that differs from other kinds of land in its ability to produce a distinctive kind and amount of vegetation.

An ecological site is the product of all the environmental factors responsible for its development, and it has a set of key characteristics that are included in the ecological site description. Ecological sites have characteristic soils that have developed over time. The factors of soil development are parent material, climate, living organisms, topography or landscape position, and time.

The process of plant community development is known as succession. Succession occurs over time and is the result of climate, soil properties, plant growth, and natural disturbances. Plant succession is defined as the progressive replacement of plant communities on an ecological site that tends toward establishment of the historic climax plant community. When a severe natural climatic event or management by man occurs, the vegetation can change away from the historic climax plant community.

All ecological sites have a historic climax plant community (HCPC) which is the basis for classifying each site. The HCPC is defined as the plant community that existed prior to European immigration and settlement. It is the plant community that had developed as a result of all site-forming factors and was best adapted to the combination of environmental factors associated with the site. The historic climax plant community is in dynamic equilibrium with its environment.

The forest ecological site for each soil in the county that supports forestland vegetation is given in the table “Ecological Sites” and in the section “Detailed Soil Map Units.”

Native Forest Ecological Sites

***Pseudotsuga menziesii – Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia* (Douglas-fir – Pacific madrone/oceanspray/western rattlesnake plantain) (F002XN901WA).**—This ecological site is on south-facing slopes and ridges in areas where Rock outcrop occurs. Temperatures are somewhat high and the soil moisture content is low, making this site the hottest and driest conifer site in the region. Additional overstory species in the stands include lodgepole pine, grand fir, and Garry oak. Although this site is part of the regional climax western hemlock zone, Douglas-fir is the climax species and Pacific madrone is a subclimax species. Both Douglas-fir and Pacific madrone are adapted to fire; the historic fire regime was apparently one of low to moderate intensity every 30 to 100 years. When stressed, Douglas-fir trees can produce copious amounts of seed for natural regeneration. This process leads to stands that have Douglas-fir trees of many ages. Pacific madrone is top-killed by fire, but it easily resprouts from underground burls if it receives enough sunlight. The understory vegetation consists of oceanspray with baldhip and nootka rose, cascade Oregongrape, salal, western brackenfern, snowberry, rattlesnake plantain, and bleeding heart.

***Tsuga heterophylla – Pseudotsuga menziesii/Mahonia nervosa* (Western hemlock – Douglas-fir/cascade Oregongrape) (F002XN902WA)**.—This ecological site is on north- and east-facing slopes and in other moist, semiprotected areas. Both western hemlock and Douglas-fir are vulnerable to various root diseases, leaving small- to moderate-sized openings when clusters of trees are killed. Western hemlock is very shade tolerant, much more so than is Douglas-fir. With a prolonged lack of disturbance, the Douglas-fir component could be completely eliminated from these forests in rare cases. The estimated fire regime on this site is a frequency of 150 to 300 years. Western hemlock is a shallow-rooted species and thus is susceptible to both windthrow and fire. If either of these disturbances occur, Douglas-fir generally is retained. Common understory species are cascade Oregongrape, baldhip rose, prickly currant, western swordfern, and feathery false lily of the valley. The understory commonly is sparse because of the dense foliage of western hemlock.

Thuja plicata – Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum **(Western redcedar – Douglas-fir/salal/western swordfern) (F002XN903WA).**—Western redcedar is the dominant overstory species for this somewhat moist to moist ecological site, and Douglas-fir commonly is codominant. Grand fir, red alder, western hemlock, lodgepole pine, and bigleaf maple may be present but only as minor components. In the absence of a major disturbance, the heavy shade of western redcedar forests favors the gradual replacement of Douglas-fir with the more shade-tolerant redcedar. The most common natural disturbance on this site is small pockets of windthrown overstory trees. The resulting openings in the canopy allow some sunlight to reach the forest floor, which benefits the normally sparse understory. The historic fire regime was one of low frequency (150 to 300 years or more) and moderate to high intensity. These fires are, in effect, stand-replacing, although individual trees survive, providing a seed source. The understory commonly is sparse, especially in mid-successional stands (50 to 150 years), because of the canopy of redcedar. Western swordfern is the most common understory species, but salal, baldhip rose, snowberry, cascade Oregongrape, and stinging nettle also are included in the understory.

Picea sitchensis – Alnus rubra/Rubus spectabilis/Equisetum arvense **(Sitka spruce – red alder/salmonberry/field horsetail) (F002XN904WA).**—This ecological site is comprised primarily of Sitka spruce and red alder, which thrive in very moist to wet areas. Sitka spruce is more shade-tolerant than is red alder. The main natural disturbances on this site are windthrow of Sitka spruce and mortality of short-lived alders. Red alder, a pioneer species, commonly becomes seeded first on a disturbed site and Sitka spruce regenerates under the canopy of red alder. In this environment, Sitka spruce generally is protected and trees can become quite large in diameter and height. Disturbance from fire is infrequent because these wet sites do not tend to burn. If fires occur, they are of low intensity. Other species that may be a component of this ecological site are black cottonwood and lodgepole pine. Western hemlock, western redcedar, and grand fir may be on small hummocks or nurse logs, which provide a drier microclimate. The understory species include field and scouringrush horsetail, salmonberry, slough sedge, western swordfern, cluster rose, and stinging nettle.

Grassland Vegetation

By Marty Chaney, area agronomist, Natural Resources Conservation Service.

Grassland in San Juan County is comprised of sites that support native grasses and forbs and sites that have been converted from native prairies or forestland to tilled and seeded pastures that support introduced forage species.

Native prairies are maintained by both biotic and abiotic pressures. Fire, including those caused by humans and lightning, influenced the development of all of the prairie soils, regardless of location. Human-caused fires were periodic and were used to stimulate the growth of carbohydrate-rich forbs which were harvested by Native American tribes. The nutritious regrowth of grasses and forbs also attracted wild game. Fire also controlled the invasion of woody plants that can out-compete and replace grasses and forbs as the dominant species. Human influence continues to be a major factor affecting the grassland communities. Farming, livestock grazing, conversion to woodland, reduction of fire occurrence, removal of active management, and development of homesites all have a significant effect on native grassland communities.

The major abiotic factors influencing the plant communities include the prevailing winds, which can maintain a cooler local microclimate and affect soil temperatures; proximity to marine waters, which can cause cooling of the local microclimate; aspect, which can cause local microclimates to be either warmer and drier (south- and west-facing slopes) or cooler and wetter (north- and east-facing slopes); elevation, as the average daily high and low temperatures decrease as elevation increases; and soil properties, such as texture and available water capacity. Precipitation also has a major influence on the plant communities in San Juan County, which is in the rainshadow of the Olympic Mountains. The county receives significantly less precipitation than the surrounding mainland. Not only does this influence species survival, but it also affects the growing season. Soils warm up more quickly in spring with a lower amount of cold rain, but the growing season can be shorter on shallow or sandy soils because less moisture is available in summer.

The ecological site and forage suitability group for each soil in the county that supports grassland vegetation are given in the tables "Ecological Sites" and "Forage Suitablity Groups, Land Capability Classification, and Yields per Acre of Forage" and in the section "Detailed Soil Map Units."

Native Grassland Ecological Sites

The following paragraphs summarize the major native grassland ecological sites in the county. No plant community is static; biotic and abiotic factors present at any time can cause transitions, either abrupt or gradual, from one plant community, or state, to another. Sometimes the transitions are gradual, and the effects can be reversed by merely ceasing the activity causing the transition pressure. The transitions commonly are abrupt (such as fire or tillage), however, and only a major input of energy such as fire, mechanical activity, or use of chemicals can move the community from the new state back to a previous state.

Ecological sites other than those listed in this section may occur in areas of soils that are too limited in extent to map at the scale used for this soil survey. Information on other western Washington ecological sites is available in the Natural Resources Conservation Service Field Office Technical Guide (eFOTG), Section II, Part F (http://efotg.nrcs.usda.gov/efotg_locator.aspx?map—WA).

PUGET BALD (R002XN202WA).—Soils that support this native plant community typically are on south- and west-facing slopes. They generally are shallow and have a very dark A horizon. Haro and Hiddenridge soils support this community. Areas that support this ecological site were historically kept free of extensive brush and tree cover by burning. Typical native plant species include Roemer's fescue (*Festuca idahoensis v. roemeri*), camas (*Camassia quamash*), prairie junegrass (*Koeleria macrantha*), California oatgrass (*Danthonia californica*), field chickweed (*Cerastium arvense ssp strictum*) and Oregon white (Garry) oak (*Quercus garryana*). In some areas, the soils are influenced by various abiotic factors such as prevailing winds (especially across marine waters), proximity to unprotected marine waters, or elevation, which will cause the areas to be cooler than is typical of the climate that generally is associated with these soils. These areas are referred to as the cold phase in the ecological site description. The effect on the plant community generally is the absence of Oregon white oak.

XERIC PRAIRIE (R002XN502WA).—Soils that support this native plant community typically are on glacial plains. They generally are deep and coarse-textured with good internal drainage and a very dark A horizon. They commonly contain a significant amount of sand. Areas that support this ecological site were historically kept free of extensive brush and tree cover by burning. Generally, oak occurs on aspects protected from strong marine winds and it regenerates slowly. San Juan and Pilepoint soils support this plant community. Typical native plant species include Roemer's fescue (*Festuca idahoensis v. roemeri*), camas (*Camassia quamash*), blue wildrye (*Elymus glaucus*), slender wheatgrass (*Elymus trachycaulus*), field chickweed (*Cerastium arvense ssp strictum*), and Oregon white (Garry) oak (*Quercus garryana*). In some areas, the soils are influenced by various abiotic factors such as prevailing winds (especially across marine waters), proximity to unprotected marine waters, or elevation, which will cause these areas to be cooler than is typical of the climate generally associated with these soils. These areas are referred to as the cold phase in the ecological site description. The effect of this cooler regime on the plant community generally is the absence of Oregon white oak.

BOG or FEN (R002XN603WA).—Soils that support this native plant community typically are in depressional areas and have an accumulation of organic matter and a high water table. These soils generally have a water table at or near the soil surface for much of winter and spring, and the water table commonly is at or within a few feet of the soil surface for the remainder of the year. The soils typically are nutrient-poor and are very acidic in the upper part. Semiahmoo, Shalcar, and Orcas soils support this plant community. The areas may have historically been kept free of extensive brush and tree cover by burning. Typical native plant species include Labrador tea (*Ledum groenlandicum*), salal (*Gaultheria shallon*), spirea (*Spiraea douglasii*), sedges (*Carex spp.*), and a minor amount of lodgepole pine (*Pinus contorta*).

SALT WATER BLUFF (R002XN702WA).—Soils that support this native plant community typically are on steep bluffs directly above unprotected marine waters. This ecological site may also occur on flatter slopes adjacent to or at the toeslopes of the bluffs. The soils generally are sandy and droughty with a very dark A horizon. Typical soils that support this plant community are Xerorthents. These soils are influenced by the "cold phase" abiotic factors such as prevailing winds (especially across marine waters) and proximity to unprotected marine waters, which cause the areas to be cooler than is typical of the climate generally associated with the soils. The effect on the plant community generally is the absence of Oregon white oak (*Quercus garryana*). When compared to other native prairie plant communities, this community generally has more red fescue (*Festuca rubra*) and less Roemer's fescue (*Festuca roemeri*). Other common native plants are barestem desert parsley (*Lomatium nudicaule*) and great camas (*Camassia leichtlinii*)

HIGH SALT MARSH (R002XN703WA).—Soils that support this native plant community typically are adjacent to marine waters and are affected by extreme high tides and saltwater intrusion. This plant community is at higher elevations immediately adjacent to the Low Salt Marsh plant community. The soils characteristically are nearly level and have an internal water table very close to the soil surface year round. Typical soils that support this plant community are the Dugualla soils. This ecological site is in areas that are cooler than the rest of the immediate Puget Trough area, because it is exposed to prevailing winds from across unprotected marine waters. Typical native plant species include American dunegrass (*Leymus mollis*), tufted hairgrass (*Deschampsia caespitosa*), red fescue (*Festuca rubra*), Oregon gumweed (*Grindellia stricta*), Douglas aster (*Aster subspicatus*), fat hen (*Atriplex patula*) and Pacific silverweed (*Potentilla pacifica*).

LOW SALT MARSH (R002XN713WA).—Soils that support this native plant community typically are adjacent to marine waters and are affected by daily high tides and saltwater intrusion. The soils characteristically are nearly level and have an internal water table very close to the soil surface year round. Typical soils that support this plant community are Endoaquents, tidal. This ecological site occurs at lower elevations immediately adjacent to the High Salt Marsh plant community. It is in areas that are cooler than the rest of the immediate Puget Trough area, because it is exposed to prevailing winds from across unprotected marine waters. Typical native plant species include saltgrass (*Distichlis spicata*), seaside arrowgrass (*Triglochin maritimum*), Lyngby sedge (*Carex lyngbyei*), pickleweed (*Salicornia virginica*), fat hen (*Atriplex patula*) and seaside plantain (*Plantago maritima*).

Agricultural Grassland Forage Suitability Groups

By Marty Chaney, area agronomist, Natural Resources Conservation Service.

Most of the soils mapped in San Juan County will support a vigorous plant community of introduced agricultural grass and forb species. Many of the soils will also support other types of agricultural crops, although restrictions such as slope, available water capacity, and a high water table during the growing season can affect the types of crops that can be grown successfully. Soils that originally supported a native plant community of trees and shrubs commonly will also support a vigorous community of these agricultural species after they have been cleared, tilled, drained if necessary, and seeded. Soil amendments, such as lime and fertilizer, commonly are needed until the plant community is established. These amendments are also needed periodically afterward to keep the desired forage species vigorous and productive. Soils that developed under a native prairie community can be tilled and seeded to introduced grass species and little additional amendments are needed. Currently, most sites that still support a native prairie plant community also have several non-native species in the plant community. Management of this mixed community influences the dominance of a particular suite of species, either native or introduced.

A summary of the forage suitability groups in the county is given in the following paragraphs.

Wet Soils (G002XN102WA).—The soils in this group typically have a high water table (less than 6 inches below the soil surface) for a significant portion of the year.

The period of use for these soils is severely limited by saturation, which can occur from October to June. These soils may not be ready for traffic by livestock or equipment until one to two months after most other soils (April to June). Saturation is influenced by topography, soil texture, and surrounding land uses; thus, each pasture must be evaluated individually to establish a period of use that will not damage the plants or soils. Overly mature forage can result from delayed grazing or harvesting. Intensive grazing and/or clipping reduces selective grazing. The soils commonly have some type of artificial drainage, either ditches or subsurface drains, which can reduce the period of saturation.

The soils in this group receive runoff and subsurface flow because of their position on the landscape and they have good available water capacity; thus, the growing season extends through most of the drought period in summer. Natural soil fertility is high. Because of these characteristics, yields are high. The soils provide excellent summer pasture once they are no longer saturated.

Seasonally Wet Soils (G002XN202WA).—The soils in this group typically have a seasonal high water table within 12 inches of the soil surface in winter and early in spring.

The period of use is limited by saturation, which occurs throughout winter and spring. Areas of the soils on flood plains and in depressions may not be ready for traffic by livestock or equipment until May. Areas on terraces and slopes are ready for traffic by mid-April to late in April in most years. Saturation is influenced by topography, soil texture, and surrounding land uses; htus, each pasture must be evaluated individually to establish a period of use that will not damage the plants or soils. Overly mature forage can result from delayed grazing or harvesting. Intensive grazing and/or clipping reduces selective grazing. These soils commonly have some type of artificial drainage, either ditches or subsurface drains, which can reduce the period of saturation.

The soils in this group receive runoff and subsurface flow because of their position on the landscape and they have good available water capacity; thus, the growing season extends through most of the drought period in summer. The soils on slopes, however, dry out sooner and have a somewhat shorter growing season. Natural soil fertility is high. Because of these characteristics, yields are moderately high. The soils provide excellent summer pasture once they are no longer saturated.

Shallow to Moderately Deep Soils (G002XN302WA).—The soils in this group typically have a restrictive layer of dense material or bedrock at a depth of 15 to 40 inches below the soil surface.

The restrictive layer can cause a high subsurface water table to develop rapidly during the rainy season. The water table is generally a concern from November through March, although the depth to the water table during this period fluctuates depending on rainfall and depth to the restrictive layer. Grazing and mechanical traffic when the soils are saturated can cause compaction and damage to the roots and crown of plants. Production of forage is diminished in June, and there is almost no production in July through September. The available water capacity is limited in these shallow and moderately deep soils, depending on the depth to the restrictive layer and the texture of the soil above this layer (coarser textured soils hold less water available for plants).

The soils in this group commonly are suitable for use as pasture in spring and fall, because the sloping soils drain water more rapidly and livestock can graze early and late forage growth with minimal risk of soil compaction. Spring growth commonly starts earlier on these soils because they warm up more rapidly.

Droughty Soils (G002XN402WA).—The soils in this group typically are coarse textured and have a high amount of sand and gravel, resulting in a low available water capacity.

Because of the limited available water capacity, forage production significantly declines early in June and almost no production occurs in July through early in October. There is also an increased risk for leaching of fertilizers and other chemicals below the root zone.

The soils in this group commonly are well suited for use as pasture in spring and fall. The soils also tend to warm up earlier in spring, and forage growth commonly begins slightly sooner on these soils than on soils that have a higher content of water. Areas of these soils on gentle slopes are well suited for use as winter confinement areas, although some plant damage can occur and supplemental feed is required.

Sloping to Steep Soils (G002XN702WA).—The soils in this group typically have moderate available water capacity and are not restricted by a high water table, but slopes of more than 8 percent can cause management restrictions.

These soils generally are limited mostly by the difficulty of using equipment on the steeper slopes for practices such as clipping, subsoiling, and reseeding. Achieving uniform livestock distribution and forage use can also be difficult because of the steeper slopes. Because the available water capacity is moderate to good, the growing season extends through most of the drought period in summer, although pastures at the top of a slope or on steeper slopes dry out sooner. Some areas can become saturated in winter, but generally for only short periods during and immediately after periods of heavy rainfall.

The soils in this group are well suited to use as pasture in spring and fall. Livestock can graze on early and late forage growth with minimal risk of soil compaction. Spring growth commonly starts earlier on these soils because they warm up more rapidly.

Information on other western Washington forage suitability groups can be found in the Natural Resources Conservation Service field office technical guide (eFOTG), Section II, Part F. The link to the locator map for counties in Washington is http://efotg.nrcs.usda.gov/efotg_locator.aspx?map—WA

Local publications developed for pasture management in western Washington and Oregon include the following:

The Pasture Calendar for Western Washington and Oregon (Washington State University or Oregon State University Cooperative Extension, 2006)

Pasture and Hayland Renovation for Western Washington and Oregon EB 1870 (http://cru.cahe.wsu.edu/CEPublications/eb1870/eb1870.pdf)

Haymaking on the West Side EB 1897 (http://cru.cahe.wsu.edu/CEPublications/eb1897/eb1897.pdf)

Managing Small Acre Horse Farms EC 1558 (http://extension.oregonstate.edu/catalog/pdf/ec/ec1558.pdf)

Agricultural Crops

Other agricultural species grown in the area include vegetables, berries, potatoes, grains, orchard crops, nursery crops, herbs, and flowers for cutting. For estimated yields and information about producing these crops, consult the local offices of Washington State University Cooperative Extension or the Conservation District.

Ecological Sites

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
997:				
Pits, gravel------------	100	---	---	---
998:				
Water, saline-----------	100	---	---	---
999:				
Water, fresh------------	100	---	---	---
1000:				
Sholander---------------	45	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Spieden-----------------	35	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Spieden, drained--------	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Sucia-------------------	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
1001:				
Coveland----------------	70	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Coveland, drained-------	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Coupeville--------------	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Sucia-------------------	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
1002:				
Sholander---------------	85	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
1002:				
Whidbey-----------------	15	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
1003:				
Coupeville--------------	80	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Coupeville, drained-----	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Coveland----------------	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
1004:				
Limepoint---------------	60	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Sholander---------------	20	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Limepoint, drained------	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Shalcar-----------------	10	R002XN603WA	BOG or FEN	BOG or FEN
1005:				
Shalcar-----------------	80	R002XN603WA	BOG or FEN	BOG or FEN
Shalcar, drained--------	10	R002XN603WA	BOG or FEN	BOG or FEN
Semiahmoo---------------	10	R002XN603WA	BOG or FEN	BOG or FEN
1006:				
Semiahmoo---------------	80	R002XN603WA	BOG or FEN	BOG or FEN
Semiahmoo, drained------	10	R002XN603WA	BOG or FEN	BOG or FEN
Shalcar-----------------	10	R002XN603WA	BOG or FEN	BOG or FEN
1009:				
Coveland----------------	70	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
1009:				
Mitchellbay	25	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Rock outcrop	5	---	---	---
1010:				
Deadmanbay	55	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Morancreek	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Bazal	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Rock outcrop	5	---	---	---
1013:				
Bazal	50	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Mitchellbay	40	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Bazal, drained	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
1014:				
Beaches	40	---	---	---
Endoaquents, tidal	25	R002XN713WA	LOW SALT MARSH	LOW SALT MARSH
Xerorthents	25	R002XN702WA	SALT WATER BLUFF	SALT WATER BLUFF
Rock outcrop	10	---	---	---
1015:				
Deadmanbay	45	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
1015:				
Bazal	35	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Cady	20	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
1016:				
Orcas	100	R002XN603WA	BOG or FEN	BOG or FEN
1053:				
Dugualla	80	R002XN703WA	HIGH SALT MARSH	HIGH SALT MARSH
Dugualla, protected	10	R002XN703WA	HIGH SALT MARSH	HIGH SALT MARSH
Endoaquents, tidal	10	R002XN713WA	LOW SALT MARSH	LOW SALT MARSH
2000:				
Whidbey	90	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Hoypus	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
2001:				
Mitchellbay	85	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Killebrew	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop	5	---	---	---
2002:				
Sucia	90	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Sholander	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
2004:				
Mitchellbay	90	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Coupeville	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
2007:				
Alderwood, warm	60	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Everett, warm	40	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
2008:				
Mitchellbay	35	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Sholander	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Bazal	20	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Killebrew	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Hoypus	5	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
2009:				
Limepoint	40	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
Alderwood, warm	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
2009:				
Sholander	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
2010:				
Whidbey	60	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Hoypus	40	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
2011:				
Roche	60	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Killebrew	25	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Mitchellbay	15	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
3000:				
Pilepoint	90	R002XN502WA	XERIC PRAIRIE <70" PZ	XERIC PRAIRIE
Rock outcrop	10	---	---	---
3001:				
Hoypus	100	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
3002:				
Keystone	100	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
3005:				
San Juan	100	R002XN502WA	XERIC PRAIRIE <70" PZ	XERIC PRAIRIE

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
3006:				
San Juan----------------	100	R002XN502WA	XERIC PRAIRIE <70" PZ	XERIC PRAIRIE
3007:				
San Juan----------------	100	R002XN502WA	XERIC PRAIRIE <70" PZ	XERIC PRAIRIE
3008:				
Xerorthents-------------	70	R002XN702WA	SALT WATER BLUFF	SALT WATER BLUFF
Endoaquents, tidal------	20	R002XN703WA	HIGH SALT MARSH	HIGH SALT MARSH
Beaches-----------------	10	---	---	---
3010:				
San Juan----------------	60	R002XN502WA	XERIC PRAIRIE <70" PZ	XERIC PRAIRIE
Dune land---------------	30	---	---	---
Blownout land-----------	10	---	---	---
3012:				
Hoypus------------------	95	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop------------	5	---	---	---
3013:				
Everett, warm-----------	100	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
3014:				
Everett, warm-----------	100	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
3015:				
Indianola, warm---------	100	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
3016:				
Sucia-------------------	50	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
3016:				
Sholander	40	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Spieden	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail
4000:				
Roche	40	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Killebrew	25	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop	25	---	---	---
Cady	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
4002:				
Laconner, warm	90	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop	10	---	---	---
4003:				
Hoypus	50	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Whidbey	45	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop	5	---	---	---
4005:				
Roche	45	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
4005:				
Haro	40	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
Rock outcrop	15	---	---	---
4006:				
Alderwood, warm	45	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Hoypus	45	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Sholander	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
4007:				
Roche	60	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Mitchellbay	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Everett, warm	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
4008:				
Mitchellbay	45	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Rock outcrop	25	---	---	---
Killebrew	20	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Bazal	10	F002XN904WA	*Picea sitchensis-Alnus rubra/Rubus spectabilis/Equisetum arvense*	Sitka spruce - red alder/salmonberry/field horsetail

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
5000:				
Cady	45	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop	35	---	---	---
Doebay	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Killebrew	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
5001:				
Rock outcrop	50	---	---	---
Haro	40	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
Hiddenridge	10	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
5002:				
Doebay, moist	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Cady	25	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Doebay	25	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop	10	---	---	---
Turtleback	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
5003:				
Doebay	50	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
5003:				
Morancreek--------------	30	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Cady--------------------	10	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop------------	10	---	---	---
5004:				
Pickett-----------------	60	F002XN902WA	*Tsuga heterophylla-Pseudotsuga menziesii/Mahonia nervosa*	Western hemlock - Douglas-fir/cascade Oregongrape
Kahboo------------------	20	F002XN902WA	*Tsuga heterophylla-Pseudotsuga menziesii/Mahonia nervosa*	Western hemlock - Douglas-fir/cascade Oregongrape
Rock outcrop------------	20	---	---	---
5005:				
Constitution------------	40	F002XN902WA	*Tsuga heterophylla-Pseudotsuga menziesii/Mahonia nervosa*	Western hemlock - Douglas-fir/cascade Oregongrape
Skipjack----------------	25	F002XN902WA	*Tsuga heterophylla-Pseudotsuga menziesii/Mahonia nervosa*	Western hemlock - Douglas-fir/cascade Oregongrape
Kahboo------------------	20	F002XN902WA	*Tsuga heterophylla-Pseudotsuga menziesii/Mahonia nervosa*	Western hemlock - Douglas-fir/cascade Oregongrape
Aquic Dystroxerepts-----	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
Rock outcrop------------	5	---	---	---
5006:				
Cady--------------------	70	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Doebay------------------	15	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop------------	15	---	---	---

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
5007:				
Haro--------------------	50	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
Hiddenridge-------------	30	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
Rock outcrop------------	20	---	---	---
5008:				
Doebay------------------	40	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Cady--------------------	35	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop------------	15	---	---	---
Aquic Dystroxerepts-----	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern
5009:				
Haro--------------------	50	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
Hiddenridge-------------	30	R002XN202WA	PUGET BALD - QUGA4/FERO	PUGET BALD
Rock outcrop------------	20	---	---	---
5010:				
Turtleback--------------	50	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Cady--------------------	35	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop------------	15	---	---	---
5015:				
Doebay, moist-----------	40	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Ecological Sites--Continued

Map symbol and soil name	Pct. of map unit	Ecological site ID	Ecological site scientific name	Ecological site common name
5015:				
Cady----------------------	35	F002XN901WA	*Pseudotsuga menziesii-Arbutus menziesii/Holodiscus discolor/Goodyera oblongifolia*	Douglas-fir - Pacific madrone/oceanspray/rattlesnake plantain
Rock outcrop------------	15	---	---	---
Aquic Dystroxerepts-----	10	F002XN903WA	*Thuja plicata-Pseudotsuga menziesii/Gaultheria shallon/Polystichum munitum*	Western redcedar - Douglas-fir/salal/swordfern

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage

(Yields in the "N" columns are for nonirrigated areas; those in the "I" columns are for irrigated areas. 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.)

Map symbol and soil name	Forage suitability group	Land capability		Grass-legume hay		Grass-legume pasture	
		N	I	N	I	N	I
				Tons	*Tons*	*AUM*	*AUM*
997:							
Pits, gravel	---	8	---	---	---	---	---
998:							
Water, saline	---	---	---	---	---	---	---
999:							
Water, fresh	---	---	---	---	---	---	---
1000:							
Sholander	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---
Spieden	Wet Soils (G002XN102WA)	5w	5w	2.00	---	4.40	---
Spieden, drained	Seasonally Wet Soils (G002XN202WA)	4w	4w	3.50	---	7.70	---
Sucia	Droughty Soils (G002XN402WA)	4s	4s	1.50	---	3.30	---
1001:							
Coveland	Seasonally Wet Soils (G002XN202WA)	6w	6w	3.00	---	6.60	---
Coveland, drained	Seasonally Wet Soils (G002XN202WA)	4w	4w	4.00	---	8.80	---
Coupeville	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
Sucia	Droughty Soils (G002XN402WA)	4s	4s	1.50	---	3.30	---
1002:							
Sholander	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---
Whidbey	Droughty Soils (G002XN402WA)	4s	4s	1.00	---	2.20	---
1003:							
Coupeville	Wet Soils (G002XN102WA)	5w	6w	3.00	---	6.60	---
Coupeville, drained	Seasonally Wet Soils (G002XN202WA)	4w	4w	5.00	---	11.00	---
Coveland	Seasonally Wet Soils (G002XN202WA)	5w	5w	3.00	---	6.60	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability		Grass-legume hay		Grass-legume pasture	
		N	I	N	I	N	I
				Tons	*Tons*	*AUM*	*AUM*
1004:							
Limepoint	Wet Soils (G002XN102WA)	6w	6w	3.00	---	6.60	---
Sholander	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---
Limepoint, drained	Seasonally Wet Soils (G002XN202WA)	4w	4w	5.00	---	11.00	---
Shalcar	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
1005:							
Shalcar	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
Shalcar, drained	Seasonally Wet Soils (G002XN202WA)	5w	5w	6.00	---	13.20	---
Semiahmoo	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
1006:							
Semiahmoo	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
Semiahmoo, drained	Seasonally Wet Soils (G002XN202WA)	5w	5w	6.00	---	13.20	---
Shalcar	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
1009:							
Coveland	Seasonally Wet Soils (G002XN202WA)	6w	6w	3.00	---	6.60	---
Mitchellbay	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Rock outcrop	---	8	---	---	---	---	---
1010:							
Deadmanbay	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Morancreek	Sloping to Steep Soils (G002XN702WA)	3w	4e	2.00	---	4.40	---
Bazal	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
Rock outcrop	---	8	---	---	---	---	---
1013:							
Bazal	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
Mitchellbay	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Bazal, drained	Seasonally Wet Soils (G002XN202WA)	4w	4w	5.00	---	11.00	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability N	Land capability I	Grass-legume hay N	Grass-legume hay I	Grass-legume pasture N	Grass-legume pasture I
				Tons	*Tons*	*AUM*	*AUM*
1014:							
Beaches-----------------	---	8	---	---	---	---	---
Endoaquents, tidal------	---	7w	---	---	---	---	---
Xerorthents-------------	---	7s	---	---	---	---	---
Rock outcrop------------	---	8	---	---	---	---	---
1015:							
Deadmanbay--------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Bazal-------------------	Wet Soils (G002XN102WA)	6w	6w	3.00	---	6.60	---
Cady--------------------	Shallow to Moderately Deep Soils (G002XN302WA)	6s	6s	1.00	---	2.20	---
1016:							
Orcas-------------------	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
1053:							
Dugualla----------------	---	6s	6s	---	---	---	---
Dugualla, protected-----	Wet Soils (G002XN102WA)	6s	6s	3.00	---	6.60	---
Endoaquents, tidal------	---	8w	---	---	---	---	---
2000:							
Whidbey-----------------	Droughty Soils (G002XN402WA)	4s	4s	1.00	---	2.20	---
Hoypus------------------	Droughty Soils (G002XN402WA)	4s	4s	1.00	---	2.20	---
2001:							
Mitchellbay-------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Killebrew---------------	Shallow to Moderately Deep Soils (G002XN302WA)	6s	6s	1.50	---	3.30	---
Rock outcrop------------	---	8	---	---	---	---	---
2002:							
Sucia-------------------	Droughty Soils (G002XN402WA)	3s	4e	1.50	---	3.30	---
Sholander---------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability		Grass-legume hay		Grass-legume pasture	
		N	I	N	I	N	I
				Tons	*Tons*	*AUM*	*AUM*
2004:							
Mitchellbay-------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Coupeville--------------	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
2007:							
Alderwood, warm---------	Droughty Soils (G002XN402WA)	4s	4s	1.50	---	3.30	---
Everett, warm-----------	Droughty Soils (G002XN402WA)	4s	4s	1.50	---	3.30	---
2008:							
Mitchellbay-------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Sholander---------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---
Bazal-------------------	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
Killebrew---------------	Shallow to Moderately Deep Soils (G002XN302WA)	6s	6s	1.50	---	3.30	---
Hoypus------------------	Droughty Soils (G002XN402WA)	4s	4s	1.00	---	2.20	---
2009:							
Limepoint---------------	Wet Soils (G002XN102WA)	6w	6w	3.00	---	6.60	---
Alderwood, warm---------	Droughty Soils (G002XN402WA)	4s	4s	1.50	---	3.30	---
Sholander---------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---
2010:							
Whidbey-----------------	Droughty Soils (G002XN402WA)	4s	4s	1.00	---	2.20	---
Hoypus------------------	Droughty Soils (G002XN402WA)	3s	4e	1.00	---	2.20	---
2011:							
Roche-------------------	Shallow to Moderately Deep Soils (G002XN302WA)	3w	3w	2.00	---	4.40	---
Killebrew---------------	Shallow to Moderately Deep Soils (G002XN302WA)	6s	6s	1.50	---	3.30	---
Mitchellbay-------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
3000:							
Pilepoint---------------	Droughty Soils (G002XN402WA)	3w	3w	2.00	---	4.40	---
Rock outcrop------------	---	8	---	---	---	---	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability N	Land capability I	Grass-legume hay N	Grass-legume hay I	Grass-legume pasture N	Grass-legume pasture I
				Tons	*Tons*	*AUM*	*AUM*
3001:							
Hoypus	Droughty Soils (G002XN402WA)	4e	6e	1.00	---	2.20	---
3002:							
Keystone	Droughty Soils (G002XN402WA)	3s	4e	1.50	---	3.30	---
3005:							
San Juan	Droughty Soils (G002XN402WA)	4s	4s	2.00	---	4.40	---
3006:							
San Juan	Droughty Soils (G002XN402WA)	6e	7e	2.00	---	4.40	---
3007:							
San Juan	Droughty Soils (G002XN402WA)	4s	6e	2.00	---	4.40	---
3008:							
Xerorthents	---	7e	---	---	---	---	---
Endoaquents, tidal	---	7w	---	---	---	---	---
Beaches	---	8	---	---	---	---	---
3010:							
San Juan	Droughty Soils (G002XN402WA)	4s	6e	2.00	---	4.40	---
Dune land	---	8s	---	---	---	---	---
Blownout land	---	8	---	---	---	---	---
3012:							
Hoypus	Droughty Soils (G002XN402WA)	6e	7e	1.00	---	2.20	---
Rock outcrop	---	8	---	---	---	---	---
3013:							
Everett, warm	Droughty Soils (G002XN402WA)	4s	6e	1.50	---	3.30	---
3014:							
Everett, warm	Droughty Soils (G002XN402WA)	6e	7e	1.50	---	3.30	---
3015:							
Indianola, warm	Droughty Soils (G002XN402WA)	3s	4e	2.00	---	4.40	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability		Grass-legume hay		Grass-legume pasture	
		N	I	N	I	N	I
				Tons	*Tons*	*AUM*	*AUM*
3016:							
Sucia-------------------	Droughty Soils (G002XN402WA)	4s	6e	1.50	---	3.30	---
Sholander---------------	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.00	---	4.40	---
Spieden-----------------	Wet Soils (G002XN102WA)	6w	6w	2.00	---	4.40	---
4000:							
Roche-------------------	Shallow to Moderately Deep Soils (G002XN302WA)	3w	4e	2.00	---	4.40	---
Killebrew---------------	Shallow to Moderately Deep Soils (G002XN302WA)	6s	6s	1.50	---	3.30	---
Rock outcrop------------	---	8	---	---	---	---	---
Cady--------------------	Shallow to Moderately Deep Soils (G002XN302WA)	6e	---	1.00	---	2.20	---
4002:							
Laconner, warm----------	Droughty Soils (G002XN402WA)	4s	4s	1.00	---	2.20	---
Rock outcrop------------	---	8	---	---	---	---	---
4003:							
Hoypus------------------	Droughty Soils (G002XN402WA)	4e	6e	1.00	---	2.20	---
Whidbey-----------------	Droughty Soils (G002XN402WA)	4s	6e	1.00	---	2.20	---
Rock outcrop------------	---	8	---	---	---	---	---
4005:							
Roche-------------------	Shallow to Moderately Deep Soils (G002XN302WA)	3w	4e	2.00	---	4.40	---
Haro--------------------	Shallow to Moderately Deep Soils (G002XN302WA)	6s	---	0.50	---	1.10	---
Rock outcrop------------	---	8	---	---	---	---	---
4006:							
Alderwood, warm---------	Droughty Soils (G002XN402WA)	4s	6e	1.50	---	3.30	---
Hoypus------------------	Droughty Soils (G002XN402WA)	4e	6e	1.00	---	2.20	---
Sholander---------------	Seasonally Wet Soils (G002XN202WA)	4s	4s	2.00	---	4.40	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability		Grass-legume hay		Grass-legume pasture	
		N	I	N	I	N	I
				Tons	*Tons*	*AUM*	*AUM*
4007:							
Roche	Shallow to Moderately Deep Soils (G002XN302WA)	3w	4e	2.00	---	4.40	---
Mitchellbay	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Everett, warm	Droughty Soils (G002XN402WA)	4s	4s	1.50	---	3.30	---
4008:							
Mitchellbay	Seasonally Wet Soils (G002XN202WA)	4w	4w	2.50	---	5.50	---
Rock outcrop	---	8	---	---	---	---	---
Killebrew	Shallow to Moderately Deep Soils (G002XN302WA)	6s	6s	1.50	---	3.30	---
Bazal	Wet Soils (G002XN102WA)	5w	5w	3.00	---	6.60	---
5000:							
Cady	Shallow to Moderately Deep Soils (G002XN302WA)	6s	---	1.00	---	2.20	---
Rock outcrop	---	8	---	---	---	---	---
Doebay	Shallow to Moderately Deep Soils (G002XN302WA)	4e	---	1.50	---	3.30	---
Killebrew	Shallow to Moderately Deep Soils (G002XN302WA)	6s	---	1.50	---	3.30	---
5001:							
Rock outcrop	---	8	---	---	---	---	---
Haro	---	7e	---	---	---	---	---
Hiddenridge	---	7e	---	---	---	---	---
5002:							
Doebay, moist	---	7e	---	---	---	---	---
Cady	---	7e	---	---	---	---	---
Doebay	---	7e	---	---	---	---	---
Rock outcrop	---	8	---	---	---	---	---
Turtleback	---	7e	---	---	---	---	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability N	Land capability I	Grass-legume hay N	Grass-legume hay I	Grass-legume pasture N	Grass-legume pasture I
				Tons	*Tons*	*AUM*	*AUM*
5003:							
Doebay	Shallow to Moderately Deep Soils (G002XN302WA)	4e	---	1.50	---	3.30	---
Morancreek	Sloping to Steep Soils (G002XN702WA)	3w	4e	2.00	---	4.40	---
Cady	Shallow to Moderately Deep Soils (G002XN302WA)	6e	---	1.00	---	2.20	---
Rock outcrop	---	8	---	---	---	---	---
5004:							
Pickett	---	7e	---	---	---	---	---
Kahboo	---	7e	---	---	---	---	---
Rock outcrop	---	8	---	---	---	---	---
5005:							
Constitution	---	4e	---	---	---	---	---
Skipjack	---	3e	---	---	---	---	---
Kahboo	---	7e	---	---	---	---	---
Aquic Dystroxerepts	---	6e	---	---	---	---	---
Rock outcrop	---	8	---	---	---	---	---
5006:							
Cady	---	7e	---	---	---	---	---
Doebay	---	7e	---	---	---	---	---
Rock outcrop	---	8	---	---	---	---	---
5007:							
Haro	Shallow to Moderately Deep Soils (G002XN302WA)	6s	---	0.50	---	1.10	---
Hiddenridge	Droughty Soils (G002XN402WA)	4s	---	1.50	---	3.30	---
Rock outcrop	---	8	---	---	---	---	---

Forage Suitability Groups, Land Capability Classification, and Yields per Acre of Forage--Continued

Map symbol and soil name	Forage suitability group	Land capability N	Land capability I	Grass-legume hay N	Grass-legume hay I	Grass-legume pasture N	Grass-legume pasture I
				Tons	*Tons*	*AUM*	*AUM*
5008:							
Doebay	Shallow to Moderately Deep Soils (G002XN302WA)	4e	---	1.50	---	3.30	---
Cady	Shallow to Moderately Deep Soils (G002XN302WA)	6e	---	1.00	---	2.20	---
Rock outcrop	---	8	---	---	---	---	---
Aquic Dystroxerepts	Seasonally Wet Soils (G002XN202WA)	6e	---	2.00	---	4.40	---
5009:							
Haro	---	7e	---	---	---	---	---
Hiddenridge	---	7e	---	---	---	---	---
Rock outcrop	---	8	---	---	---	---	---
5010:							
Turtleback	---	7e	---	---	---	---	---
Cady	---	7e	---	---	---	---	---
Rock outcrop	---	8	---	---	---	---	---
5015:							
Doebay, moist	Shallow to Moderately Deep Soils (G002XN302WA)	4e	---	1.50	---	3.30	---
Cady	Shallow to Moderately Deep Soils (G002XN302WA)	6e	---	1.00	---	2.20	---
Rock outcrop	---	8	---	---	---	---	---
Aquic Dystroxerepts	Seasonally Wet Soils (G002XN202WA)	6e	---	2.00	---	4.40	---

Forestland Productivity

The table described in this section can help forest owners or managers plan the use of soils for wood crops. The *potential productivity* of merchantable or *common trees* on a soil is expressed as a site index and as a volume number. The *site index* is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The site index applies to fully stocked, even-aged, unmanaged stands. Commonly grown trees are those that forest managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability. More detailed information regarding site index is available in the "National Forestry Manual," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

The *site index standard deviation* (SD) is the standard deviation of the site index measurements. The SD provides a measure of the statistical dispersion of the site index data. It is given only if three or more plots were used to calculate the average site index. The *site index base age* is the tree age on which the site index is based.

The *volume of wood fiber*, a number, is the maximum growth rate for the most important tree species. This number, expressed as cubic feet per acre per year and calculated at the age of culmination of the mean annual increment (CMAI), indicates the amount of fiber produced in a fully stocked, even-aged, unmanaged stand.

The *CMAI* is the tree age at which the culmination of the mean annual increment is reached.

Forestland Productivity

(Absence of an entry indicates that the soil is not forested or that data were not available.)

Map symbol and soil name	Potential productivity					
	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
997: Pits, gravel	---	---	---	---	---	---
998: Water, saline	---	---	---	---	---	---
999: Water, fresh	---	---	---	---	---	---
1000: Sholander	Bigleaf maple	---	---	---	---	---
	Douglas-fir	97	7.2	50	136	90
	Grand fir	97	---	50	147	91
	Lodgepole pine	---	---	---	---	---
	Red alder	97	---	50	113	40
	Red alder	61	---	20	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		Yrs	Cu ft/ac/yr	Yrs
1000:						
Spieden-----------------	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	63	---	20	---	---
	Red alder-----------	98	---	50	115	40
	Sitka spruce--------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	---	---	---	---	---
1001:						
Coveland----------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	102	12.7	50	140	90
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	103	---	100	126	100
	Red alder-----------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	75	---	50	---	---
1002:						
Sholander---------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	97	7.2	50	136	90
	Grand fir-----------	97	---	50	147	91
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	97	---	50	113	40
	Red alder-----------	61	---	20	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	70	---	50	---	---
1003:						
Coupeville--------------	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	55	---	20	---	---
	Red alder-----------	85	---	50	92	40
	Sitka spruce--------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	---	---	---	---	---
1004:						
Limepoint---------------	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	57	4.4	20	---	---
	Red alder-----------	89	7.3	50	99	40
	Sitka spruce--------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	69	---	50	---	---
Sholander---------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	97	7.2	50	136	90
	Grand fir-----------	97	---	50	147	91
	Lodgepole pine------	---	---	100	---	---
	Red alder-----------	61	---	20	---	---
	Red alder-----------	97	---	50	113	40
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	70	---	50	---	---
1005:						
Shalcar-----------------	---	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
1006:						
Semiahmoo	---	---	---	---	---	---
1009:						
Coveland	Bigleaf maple	---	---	---	---	---
	Douglas-fir	102	12.7	50	140	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	103	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	75	---	50	---	---
Mitchellbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	85	8.5	50	107	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	104	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
1010:						
Deadmanbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	104	---	50	143	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	75	---	50	---	---
Morancreek	Bigleaf maple	---	---	---	---	---
	Douglas-fir	118	---	50	171	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	75	---	50	---	---
1013:						
Bazal	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	80	---	50	84	40
	Red alder	50	---	20	---	---
	Sitka spruce	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	---	---	---	---	---
Mitchellbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	85	8.5	50	107	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	104	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
1014:						
Beaches	---	---	---	---	---	---
Endoaquents, tidal	---	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity					
	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
1014:						
Xerorthents-------------	---	---	---	---	---	---
1015:						
Deadmanbay--------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	104	---	50	143	90
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	75	---	50	---	---
Bazal-------------------	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	50	---	20	---	---
	Red alder-----------	80	---	50	84	40
	Sitka spruce--------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	---	---	---	---	---
Cady--------------------	Douglas-fir---------	66	2.2	50	71	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	70	---	100	70	100
	Pacific madrone-----	---	---	---	---	---
1016:						
Orcas-------------------	---	---	---	---	---	---
1053:						
Dugualla----------------	---	---	---	---	---	---
2000:						
Whidbey-----------------	Douglas-fir---------	77	7.6	50	92	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	76	---	100	81	100
	Pacific madrone-----	---	---	---	---	---
2001:						
Mitchellbay-------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	85	8.5	50	107	90
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	104	---	100	126	100
	Red alder-----------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	70	---	50	---	---
2002:						
Sucia-------------------	Douglas-fir---------	86	---	50	109	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	101	---	100	126	100
	Pacific madrone-----	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity					
	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
2004:						
Mitchellbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	85	8.5	50	107	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	104	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
2007:						
Alderwood, warm	Bigleaf maple	---	---	---	---	---
	Douglas-fir	97	---	50	130	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	72	---	50	---	---
Everett, warm	Bigleaf maple	---	---	---	---	---
	Douglas-fir	108	6.9	50	150	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	69	2.5	50	---	---
2008:						
Mitchellbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	85	8.5	50	107	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	104	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
Sholander	Bigleaf maple	---	---	---	---	---
	Douglas-fir	97	7.2	50	136	90
	Grand fir	97	---	50	147	91
	Lodgepole pine	---	---	---	---	---
	Red alder	97	---	50	113	40
	Red alder	61	---	20	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
Bazal	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	50	---	20	---	---
	Red alder	80	---	50	84	40
	Sitka spruce	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
2009:						
Limepoint---------------	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	57	4.4	20	---	---
	Red alder-----------	89	7.3	50	99	40
	Sitka spruce--------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	69	---	50	---	---
Alderwood, warm---------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	97	---	50	130	90
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	72	---	50	---	---
Sholander---------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	97	7.2	50	136	90
	Grand fir-----------	97	---	50	147	91
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	61	---	20	---	---
	Red alder-----------	97	---	50	113	40
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	70	---	50	---	---
2010:						
Whidbey-----------------	Douglas-fir---------	77	7.6	50	92	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	76	---	100	81	100
	Pacific madrone-----	---	---	---	---	---
Hoypus------------------	Douglas-fir---------	76	11.3	50	90	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	86	---	100	100	100
	Pacific madrone-----	---	---	---	---	---
2011:						
Roche-------------------	Douglas-fir---------	89	11.2	50	114	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	100	---	100	126	100
	Pacific madrone-----	---	---	---	---	---
Killebrew---------------	Douglas-fir---------	69	---	50	76	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	--
	Lodgepole pine------	86	---	100	100	100
	Pacific madrone-----	---	---	---	---	---
3000:						
Pilepoint---------------	---	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		Yrs	Cu ft/ac/yr	Yrs
3001:						
Hoypus	Douglas-fir	76	11.3	50	90	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	86	---	100	100	100
	Pacific madrone	---	---	---	---	---
3002:						
Keystone	Douglas-fir	95	---	50	125	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	90	---	100	108	100
	Pacific madrone	---	---	---	---	---
3005:						
San Juan	---	---	---	---	---	---
3006:						
San Juan	---	---	---	---	---	---
3007:						
San Juan	---	---	---	---	---	---
3008:						
Xerorthents	---	---	---	---	---	---
Endoaquents, tidal	---	---	---	---	---	---
3010:						
San Juan	---	---	---	---	---	---
Dune land	---	---	---	---	---	---
3012:						
Hoypus	Douglas-fir	76	11.3	50	90	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	86	---	100	100	100
	Pacific madrone	---	---	---	---	---
3013:						
Everett, warm	Bigleaf maple	---	---	---	---	---
	Douglas-fir	108	6.9	50	150	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	69	2.5	50	---	---
3014:						
Everett, warm	Bigleaf maple	---	---	---	---	---
	Douglas-fir	108	6.9	50	150	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	69	2.5	50	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		Yrs	Cu ft/ac/yr	Yrs
3015:						
Indianola, warm	Bigleaf maple	---	---	---	---	---
	Douglas-fir	105	---	50	145	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
3016:						
Sucia	Douglas-fir	86	---	50	109	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	101	---	100	126	100
	Pacific madrone	---	---	---	---	---
Sholander	Bigleaf maple	---	---	---	---	---
	Douglas-fir	97	7.2	50	136	90
	Grand fir	97	---	50	147	91
	Lodgepole pine	---	---	---	---	---
	Red alder	61	---	20	---	---
	Red alder	97	---	50	113	40
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
4000:						
Roche	Douglas-fir	89	11.2	50	109	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	100	---	100	126	100
	Pacific madrone	---	---	---	---	---
Killebrew	Douglas-fir	69	---	50	76	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	86	---	100	100	100
	Pacific madrone	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---
4002:						
Laconner, warm	Douglas-fir	75	---	50	88	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	--
	Lodgepole pine	75	---	100	79	100
	Pacific madrone	---	---	---	---	---
4003:						
Hoypus	Douglas-fir	76	11.3	50	90	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	86	---	100	100	100
	Pacific madrone	---	---	---	---	---
Whidbey	Douglas-fir	77	7.6	50	92	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	76	---	100	81	100
	Pacific madrone	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		Yrs	Cu ft/ac/yr	Yrs
4005:						
Roche	Douglas-fir	89	11.2	50	109	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	100	---	100	126	100
	Pacific madrone	---	---	---	---	---
Haro	---	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---
4006:						
Alderwood, warm	Bigleaf maple	---	---	---	---	---
	Douglas-fir	97	---	50	130	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	72	---	50	---	---
Hoypus	Douglas-fir	76	11.3	50	90	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	86	---	100	100	100
	Pacific madrone	---	---	---	---	---
4007:						
Roche	Douglas-fir	89	11.2	50	114	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	100	---	100	126	100
	Pacific madrone	---	---	---	---	---
Mitchellbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	85	8.5	50	107	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	104	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
4008:						
Mitchellbay	Bigleaf maple	---	---	---	---	---
	Douglas-fir	85	8.5	50	107	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	104	---	100	126	100
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	70	---	50	---	---
Rock outcrop	---	---	---	---	---	---
Killebrew	Douglas-fir	69	---	50	76	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	86	---	100	100	100
	Pacific madrone	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
5000:						
Cady	Douglas-fir	66	2.2	50	71	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	70	---	100	70	100
	Pacific madrone	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---
5001:						
Rock outcrop	---	---	---	---	---	---
Haro	---	---	---	---	---	---
5002:						
Doebay, moist	Bigleaf maple	---	---	---	---	---
	Douglas-fir	88	---	50	113	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	61	---	50	---	---
Cady	Douglas-fir	66	2.2	50	71	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	70	---	100	70	100
	Pacific madrone	---	---	---	---	---
Doebay	Douglas-fir	80	---	50	98	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	80	---	100	88	100
	Pacific madrone	---	---	---	---	---
5003:						
Doebay	Douglas-fir	80	---	50	98	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	80	---	100	88	100
	Pacific madrone	---	---	---	---	---
Morancreek	Bigleaf maple	---	---	---	---	---
	Douglas-fir	118	---	50	171	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	---	---	---	---	---
	Western redcedar	75	---	50	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity: Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
5004:						
Pickett	Douglas-fir	98	---	50	132	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	--
	Pacific yew	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	90	---	50	---	---
	Western redcedar	---	---	---	---	---
Kahboo	Douglas-fir	80	---	50	98	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Pacific yew	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	70	---	50	---	---
	Western redcedar	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---
5005:						
Constitution	Douglas-fir	100	---	50	136	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Pacific yew	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	90	---	50	---	---
	Western redcedar	---	---	---	---	---
Skipjack	Douglas-fir	113	---	50	160	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Pacific yew	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	95	---	50	---	---
	Western redcedar	---	---	---	---	---
Kahboo	Douglas-fir	80	---	50	98	90
	Grand fir	---	---	---	---	---
	Lodgepole pine	---	---	---	---	---
	Pacific yew	---	---	---	---	---
	Red alder	---	---	---	---	---
	Western hemlock	70	---	50	---	---
	Western redcedar	---	---	---	---	---
5006:						
Cady	Douglas-fir	66	2.2	50	71	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	70	---	100	70	100
	Pacific madrone	---	---	---	---	---
Doebay	Douglas-fir	80	---	50	98	90
	Garry oak	---	---	---	---	---
	Grand fir	---	---	---	---	---
	Lodgepole pine	80	---	100	88	100
	Pacific madrone	---	---	---	---	---
Rock outcrop	---	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity					
	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI age
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
5007:						
Haro---------------------	---	---	---	---	---	---
Hiddenridge--------------	---	---	---	---	---	---
Rock outcrop-------------	---	---	---	---	---	---
5008:						
Doebay-------------------	Douglas-fir---------	80	---	50	98	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	80	---	100	88	100
	Pacific madrone-----	---	---	---	---	---
Cady---------------------	Douglas-fir---------	66	2.2	50	71	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	70	---	100	70	100
	Pacific madrone-----	---	---	---	---	---
Rock outcrop-------------	---	---	---	---	---	---
5009:						
Haro---------------------	---	---	---	---	---	---
Hiddenridge--------------	---	---	---	---	---	---
Rock outcrop-------------	---	---	---	---	---	---
5010:						
Turtleback---------------	Douglas-fir---------	83	10.8	50	103	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	93	4.0	100	114	100
	Pacific madrone-----	---	---	---	---	---
Cady---------------------	Douglas-fir---------	66	2.2	50	71	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	70	---	100	70	100
	Pacific madrone-----	---	---	---	---	---
Rock outcrop-------------	---	---	---	---	---	---
5015:						
Doebay, moist------------	Bigleaf maple-------	---	---	---	---	---
	Douglas-fir---------	88	---	50	113	90
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	---	---	---	---	---
	Red alder-----------	---	---	---	---	---
	Western hemlock-----	---	---	---	---	---
	Western redcedar----	61	---	50	---	---
Cady---------------------	Douglas-fir---------	66	2.2	50	71	90
	Garry oak-----------	---	---	---	---	---
	Grand fir-----------	---	---	---	---	---
	Lodgepole pine------	70	---	100	70	100
	Pacific madrone-----	---	---	---	---	---

Forestland Productivity--Continued

Map symbol and soil name	Potential productivity					
	Common trees	Site index average	Site index standard deviation*	Site index base age	Volume of wood fiber (CMAI)	CMAI age
		Ft		*Yrs*	*Cu ft/ac/yr*	*Yrs*
5015:						
Rock outcrop------------	---	---	---	---	---	---

*The site index standard deviation provides a measure of the statistical dispersion of the site index data. The standard deviation is given only if three or more plots were used to calculate the average site index.

Hydric Soils

The table described in this section lists the map unit components that are rated as hydric soils in the survey area. This list can help in planning land uses; however, onsite investigation is recommended to determine the hydric soils on a specific site (National Research Council, 1995; Hurt and others, 2003).

The three essential characteristics of wetlands are hydrophytic vegetation, hydric soils, and wetland hydrology (Cowardin and others, 1979; U.S. Army Corps of Engineers, 1987; National Research Council, 1995; Tiner, 1985). Criteria for all of the characteristics must be met for areas to be identified as wetlands. Undrained hydric soils that have natural vegetation should support a dominant population of ecological wetland plant species. Hydric soils that have been converted to other uses should be capable of being restored to wetlands.

Hydric soils are defined by the National Technical Committee for Hydric Soils (NTCHS) as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register, 1994). These soils, under natural conditions, are either saturated or inundated long enough during the growing season to support the growth and reproduction of hydrophytic vegetation.

The NTCHS definition identifies general soil properties that are associated with wetness. In order to determine whether a specific soil is a hydric soil or nonhydric soil, however, more specific information, such as information about the depth and duration of the water table, is needed. Thus, criteria that identify those estimated soil properties unique to hydric soils have been established (Federal Register, 2002). These criteria are used to identify map unit components that normally are associated with wetlands. The criteria used are selected estimated soil properties that are described in “Soil Taxonomy” (Soil Survey Staff, 1999) and “Keys to Soil Taxonomy” (Soil Survey Staff, 2003) and in the “Soil Survey Manual” (Soil Survey Division Staff, 1993).

If soils are wet enough for a long enough period of time to be considered hydric, they should exhibit certain properties that can be easily observed in the field. These visible properties are indicators of hydric soils. The indicators used to make onsite determinations of hydric soils are specified in “Field Indicators of Hydric Soils in the United States” (Hurt and others, 2003).

Hydric soils are identified by examining and describing the soil to a depth of about 20 inches. This depth may be greater if determination of an appropriate indicator so requires. It is always recommended that soils be excavated and described to the depth necessary for an understanding of the redoximorphic processes. Then, using the completed soil descriptions, soil scientists can compare the soil features required by each indicator and specify which indicators have been matched with the conditions observed in the soil. The soil can be identified as a hydric soil if at least one of the approved indicators is present.

Map units that are dominantly made up of hydric soils may have small areas, or inclusions, of nonhydric soils in the higher positions on the landform, and map units dominantly made up of nonhydric soils may have inclusions of hydric soils in the lower positions on the landform.

The criteria for hydric soils are represented by codes in the table (for example, 2B3). Definitions for the codes are as follows:

1. All Histels except for Folistels, and Histosols except for Folists.
2. Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, Pachic subgroups, or Cumulic subgroups that:
   A. are somewhat poorly drained and have a water table at the surface (0.0 feet) during the growing season, or
   B. are poorly drained or very poorly drained and have either:
      1) a water table at the surface (0.0 feet) during the growing season if textures are coarse sand, sand, or fine sand in all layers within a depth of 20 inches, or
      2) a water table at a depth of 0.5 foot or less during the growing season if saturated hydraulic conductivity (Ksat) is equal to or greater than 6.0 in/hr in all layers within a depth of 20 inches, or
      3) a water table at a depth of 1.0 foot or less during the growing season if saturated hydraulic conductivity (Ksat) is less than 6.0 in/hr in any layer within a depth of 20 inches.
3. Soils that are frequently ponded for long or very long duration during the growing season.
4. Soils that are frequently flooded for long or very long duration during the growing season.

Hydric Soils

(Only the map units and map unit components that are rated as hydric are given in the table. Absense of an entry indicates that data were not available.)

Map symbol and map unit name	Component	Percent-age of map unit	Landform	Hydric rating	Hydric criteria
1000: Sholander-Spieden complex, 0 to 5 percent slopes	Spieden	35	Drainageways	Yes	2B3
	Spieden, drained	10	Drainageways	Yes	2B3
1001: Coveland loam, 0 to 5 percent slopes	Coveland	70	Hillslopes, valleys	Yes	2A
	Coupeville	10	Valleys	Yes	2B3
	Coveland, drained	10	Hillslopes, valleys	Yes	2A
1003: Coupeville loam, 0 to 5 percent slopes	Coupeville	80	Valleys	Yes	2B3
	Coupeville, drained	10	Valleys	Yes	2B3
	Coveland	10	Hillslopes, valleys	Yes	2A
1004: Limepoint-Sholander complex, 0 to 8 percent slopes	Limepoint	60	Drainageways, valleys	Yes	2B3
	Limepoint, drained	10	Drainageways, valleys	Yes	2B3
	Shalcar	10	Depressions	Yes	1, 3
1005: Shalcar muck, 0 to 2 percent slopes	Shalcar	80	Depressions	Yes	1, 3
	Semiahmoo	10	Depressions	Yes	1, 3
	Shalcar, drained	10	Depressions	Yes	1

Hydric Soils--Continued

Map symbol and map unit name	Component	Percent-age of map unit	Landform	Hydric rating	Hydric criteria
1006: Semiahmoo muck, 0 to 2 percent slopes	Semiahmoo	80	Depressions	Yes	1, 3
	Semiahmoo, drained	10	Depressions	Yes	1, 3
	Shalcar	10	Depressions	Yes	1, 3
1009: Coveland-Mitchellbay complex, 2 to 15 percent slopes	Coveland	70	Hillslopes, valleys	Yes	2A
1010: Deadmanbay-Morancreek complex, 2 to 15 percent slopes	Bazal	10	Drainageways, valleys	Yes	2B3
1013: Bazal-Mitchellbay complex, 0 to 5 percent slopes	Bazal	50	Drainageways, valleys	Yes	2B3
	Bazal, drained	10	Drainageways, valleys	Yes	2B3
1014: Beaches-Endoaquents, tidal-Xerorthents association, 0 to 5 percent slopes	Endoaquents, tidal	25	Beaches	Yes	2B1
1015: Deadmanbay-Bazal-Cady complex, 2 to 20 percent slopes	Bazal	35	Drainageways	Yes	2B3
1016: Orcas peat, 0 to 2 percent slopes	Orcas	100	Depressions	Yes	1, 3
1053: Dugualla muck, 0 to 2 percent slopes	Dugualla	80	Depressions, lagoons	Yes	1
	Dugualla, protected	10	Depressions, lagoons	Yes	1, 3
	Endoaquents, tidal	10	Beaches	Yes	2B1

Hydric Soils--Continued

Map symbol and map unit name	Component	Percent-age of map unit	Landform	Hydric rating	Hydric criteria
2004: Mitchellbay gravelly sandy loam, 0 to 5 percent slopes	Coupeville	10	Valleys	Yes	2B3
2008: Mitchellbay-Sholander-Bazal complex, 0 to 8 percent slopes	Bazal	20	Drainageways, valleys	Yes	2B3
2009: Limepoint-Alderwood, warm-Sholander complex, 2 to 12 percent slopes	Limepoint	40	Drainageways, valleys	Yes	2B3
3008: Xerorthents-Endoaquents, tidal association, 0 to 100 percent slopes	Endoaquents, tidal	20	Beaches	Yes	2B1
3016: Sucia-Sholander complex, 5 to 20 percent slopes	Spieden	10	Drainageways	Yes	2B3
4008: Mitchellbay-Rock outcrop-Killebrew complex, 3 to 15 percent slopes	Bazal	10	Drainageways, valleys	Yes	2B3

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

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 particle-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 are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Soil Properties

The table described in this section gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

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 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the Glossary.

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-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, CL-ML.

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 particle-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.

Engineering Properties

(Absence of an entry indicates that the data were not estimated.)

Map symbol and soil name	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*	
997:												
Pits, gravel----	0-60	Cobbles, gravel			---	---	---	---	---	---	---	---
998:												
Water, saline---	---	---	---	---	---	---	---	---	---	---	---	---
999:												
Water, fresh----	---	---	---	---	---	---	---	---	---	---	---	---
1000:												
Sholander-------	0-8	Gravelly loam	GM, ML, OL	A-2, A-4, A-5	0-10	0-20	60-100	55-100	40-95	30-75	30-50	5-10
	8-16	Loamy sand, gravelly sandy loam	SM, SC-SM	A-1, A-2	0-5	0-15	60-100	55-100	25-75	10-35	0-25	NP-5
	16-28	Gravelly loamy sand, sand	SP-SM, SM	A-2, A-1	0-10	0-15	55-100	50-100	25-75	5-35	0-20	NP
	28-51	Gravelly sand, loamy sand	SP-SM, SM	A-2, A-1	0-10	0-15	60-100	55-100	30-75	5-35	0-20	NP
	51-60	Gravelly sandy loam, loam	CL, CL-ML, SC-SM	A-2, A-4	0	0	85-100	80-100	45-95	25-75	15-30	5-10
Spieden---------	0-4	Mucky silt loam	OH, OL	A-4, A-5	0	0-10	70-100	65-100	65-100	50-100	35-70	NP-10
	4-11	Loam, silt loam	ML, OH	A-4, A-5	0	0-10	70-100	65-100	60-100	50-90	30-55	NP-10
	11-24	Sand, gravelly loamy sand	SM, SP-SM	A-2, A-1	0	0-10	60-100	55-100	30-75	5-30	0-20	NP
	24-36	Sand, gravelly loamy coarse sand	SP-SM, SM	A-2, A-1	0	0-10	60-100	55-100	30-75	5-30	0-20	NP
	36-48	Loamy sand, coarse sand	SM, SP-SM	A-2, A-1	0	0-10	80-100	75-100	40-70	5-30	0-20	NP
	48-60	Loamy sand, coarse sand	SM, SP-SM	A-2, A-1	0	0-10	80-100	75-100	40-70	5-30	0-20	NP
1001:												
Coveland--------	0-4	Loam	ML, SM, OH	A-4, A-5	0	0	75-100	70-100	60-95	40-75	30-50	NP-10
	4-9	Loam, sandy loam, silt loam	ML, SC-SM	A-1, A-4, A-7	0	0	75-100	70-100	40-100	20-100	25-50	5-15
	9-20	Sandy loam, loam, loamy sand	CL, SC-SM, SM	A-1, A-2, A-6	0	0	85-100	80-100	40-95	15-75	15-35	NP-15
	20-36	Silty clay loam, silt loam, loam	CL	A-7, A-4, A-6	0	0	85-100	80-100	65-100	50-100	30-45	10-25
	36-44	Silty clay loam, loam, silt loam	CL	A-7, A-4, A-6	0	0	85-100	80-100	65-100	50-100	30-45	10-25
	44-60	Silty clay loam, loam, silt loam	ML	A-7, A-4, A-6	0	0	85-100	80-100	65-100	50-100	30-50	5-15

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				*Pct*	*Pct*					*Pct*	
1002:												
Sholander-------	0-8	Gravelly loam	GM, ML, OL	A-2, A-4, A-5	0-10	0-20	60-100	55-100	40-95	30-75	30-50	5-10
	8-16	Loamy sand, gravelly sandy loam	SM, SC-SM	A-1, A-2	0-5	0-15	60-100	55-100	25-75	10-35	0-25	NP-5
	16-28	Gravelly loamy sand, sand	SP-SM, SM	A-2, A-1	0-10	0-15	55-100	50-100	25-75	5-35	0-20	NP
	28-51	Gravelly sand, loamy sand	SP-SM, SM	A-2, A-1	0-10	0-15	60-100	55-100	30-75	5-35	0-20	NP
	51-60	Gravelly sandy loam, loam	CL, CL-ML, SC-SM	A-2, A-4	0	0	85-100	80-100	45-95	25-75	15-30	5-10
1003:												
Coupeville------	0-7	Loam	ML, OH	A-4, A-5	0	0	95-100	90-100	75-95	55-75	30-50	NP-10
	7-12	Loam, sandy loam, silt loam	SM, OH	A-5, A-2, A-4	0	0	95-100	90-100	55-100	25-90	25-50	NP-10
	12-20	Clay loam, loam, sandy clay loam	SC, CL	A-2, A-4, A-6	0	0	90-100	85-100	65-100	30-80	30-45	10-25
	20-34	Clay loam, loam, silty clay loam	CL	A-4, A-6, A-7	0	0	90-100	85-100	65-100	50-95	30-45	10-25
	34-50	Silty clay loam, loam, clay loam	CL	A-4, A-6, A-7	0	0	90-100	85-100	65-100	50-95	30-45	10-25
	50-60	Silt loam, loam, silty clay loam	CL	A-4, A-6, A-7	0	0	90-100	85-100	75-100	50-95	30-45	10-25
1004:												
Limepoint-------	0-6	Mucky silt loam	OH, OL	A-5	0	0	75-100	70-100	65-100	50-100	40-70	NP-10
	6-14	Loam, gravelly silt loam	ML, GM	A-2, A-4, A-5	0	0	50-100	45-100	40-95	30-75	30-50	NP-10
	14-31	Loamy coarse sand, gravelly loam, sand	SM, SP, SC, SC-SM	A-1, A-2, A-4	0	0	55-100	50-100	25-75	0-40	0-30	NP-10
	31-49	Loam, gravelly sandy loam, sand	CL-ML, CL, GP	A-1, A-4, A-2	0	0	50-100	45-100	30-95	0-75	0-30	NP-10
	49-58	Sandy loam, loam, gravelly sand	SM, GP-GM, SC	A-4, A-2, A-1	0	0	50-100	45-100	45-70	5-40	0-30	NP-10
	58-60	Silty clay loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	70-100	55-100	25-50	10-30
Sholander-------	0-8	Gravelly loam	GM, ML, OL	A-2, A-4, A-5	0-10	0-20	60-100	55-100	40-95	30-75	30-50	5-10
	8-16	Loamy sand, gravelly sandy loam	SM, SC-SM	A-1, A-2	0-5	0-15	60-100	55-100	25-75	10-35	0-25	NP-5
	16-28	Gravelly loamy sand, sand	SP-SM, SM	A-2, A-1	0-10	0-15	55-100	50-100	25-75	5-35	0-20	NP
	28-51	Gravelly sand, loamy sand	SP-SM, SM	A-2, A-1	0-10	0-15	60-100	55-100	30-75	5-35	0-20	NP
	51-60	Gravelly sandy loam, loam	CL, CL-ML, SC-SM	A-2, A-4	0	0	85-100	80-100	45-95	25-75	15-30	5-10

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
1005:												
Shalcar----------	0-3	Muck	PT	A-8	0	0	100	100	85-100	80-100	---	---
	3-11	Muck	PT	A-8	0	0	100	100	85-100	80-100	---	---
	11-22	Muck	PT	A-8	0	0	100	100	85-100	80-100	---	---
	22-27	Fine sandy loam, silt loam, sandy loam	SM, CL-ML, CL	A-2, A-4	0	0-10	95-100	90-100	55-95	25-95	0-30	NP-10
	27-44	Silt loam, sand, loam	SM, CL-ML, CL	A-4, A-2	0	0-10	95-100	90-100	55-95	25-95	0-30	NP-10
	44-60	Silt loam, sandy loam	CL, CL-ML, SC-SM, SM	A-2, A-4	0	0-10	95-100	90-100	55-100	25-100	0-30	NP-10
1006:												
Semiahmoo-------	0-9	Muck	PT	A-8	0	0	100	100	85-100	85-100	---	---
	9-10	Silt loam	ML	A-4	0	0	100	100	90-100	70-100	0-35	NP-5
	10-30	Muck	PT	A-8	0	0	100	100	85-100	85-100	---	---
	30-48	Muck	PT	A-8	0	0	100	100	85-100	85-100	---	---
	48-60	Muck	PT	A-8	0	0	100	100	85-100	85-100	---	---
	60-72	Mucky peat	PT	A-8	0	0	100	100	85-100	85-100	---	---
	72-84	Mucky peat	PT	A-8	0	0	100	100	85-100	85-100	---	---
1009:												
Coveland--------	0-4	Loam	ML, SM, OH	A-4, A-5	0	0	75-100	70-100	60-95	40-75	30-50	NP-10
	4-9	Loam, sandy loam, silt loam	ML, SC-SM	A-1, A-4, A-7	0	0	75-100	70-100	40-100	20-100	25-50	5-15
	9-20	Sandy loam, loam, loamy sand	CL, SC-SM, SM	A-1, A-2, A-6	0	0	85-100	80-100	40-95	15-75	15-35	NP-15
	20-36	Silty clay loam, silt loam, loam	CL	A-7, A-4, A-6	0	0	85-100	80-100	65-100	50-100	30-45	10-25
	36-44	Silty clay loam, loam, silt loam	CL	A-7, A-4, A-6	0	0	85-100	80-100	65-100	50-100	30-45	10-25
	44-60	Silty clay loam, loam, silt loam	ML	A-7, A-4, A-6	0	0	85-100	80-100	65-100	50-100	30-50	5-15
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15

Engineering Properties--Continued

Map symbol and soil name	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	
1010:												
Deadmanbay------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-100	70-100	65-100	50-100	---	---
	1-5	Silt loam	OH, ML	A-7, A-4	0	0	75-100	70-100	65-100	50-100	30-50	5-15
	5-16	Loam, silt loam	CL, SC-SM	A-4, A-6, A-7	0	0	75-100	70-100	60-100	40-100	20-45	5-20
	16-29	Sandy loam, gravelly loamy sand, loamy coarse sand	GP-GM, SM, SC	A-2, A-1, A-4	0	0	55-100	50-100	25-75	10-40	0-25	NP-10
	29-57	Loam, silt loam, gravelly silty clay loam	CL, GC	A-7, A-6	0	0	65-100	60-100	50-100	35-100	30-45	10-25
	57-60	Silty clay loam, silt loam, loam	CL	A-7, A-6, A-4	0	0	85-100	80-100	65-100	50-100	30-45	10-25
Morancreek------	0-1	Slightly decomposed plant material	PT	A-8	0	0	85-100	80-100	45-70	25-40	---	---
	1-3	Sandy loam	SM	A-2, A-4, A-5	0-10	0-10	85-100	80-100	45-70	25-40	30-50	NP-5
	3-10	Sandy loam, silt loam, gravelly loam	ML, SC-SM, CL-ML, SM	A-2, A-4, A-1	0-10	0-20	60-100	55-100	30-100	15-100	15-35	NP-10
	10-21	Sandy loam, silt loam, gravelly loam	CL, CL-ML, SC-SM, SM	A-2, A-4, A-1	0-10	0-20	60-100	55-100	30-100	15-100	15-30	NP-10
	21-28	Sandy loam, gravelly coarse sandy loam, loamy fine sand	SC-SM, SM	A-1, A-2, A-4	0-5	0-15	60-95	55-90	30-80	15-40	15-25	NP-5
	28-60	Sandy loam, gravelly coarse sandy loam, loamy fine sand	SC-SM, SM	A-1, A-2, A-4	0-5	0-15	60-100	55-100	30-90	15-50	15-25	NP-5
1013:												
Bazal-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	70-100	40-100	---	---
	1-4	Mucky loam	OH, SM	A-5, A-4	0	0	100	100	70-100	40-100	40-80	5-10
	4-10	Fine sandy loam, silt loam, loam	SM, ML, OH	A-5, A-4	0	0	95-100	90-100	65-100	35-100	35-55	5-10
	10-17	Silt loam, fine sandy loam, loam	SM, CL, ML	A-2, A-4	0	0	75-100	70-100	50-100	30-100	0-35	NP-10
	17-24	Loam, loamy sand, loamy coarse sand	SM, CL	A-4, A-2, A-1	0	0	80-100	75-100	40-95	15-75	0-30	NP-10
	24-39	Clay loam, silt loam, loam	CL	A-4, A-6, A-7	0	0	90-100	85-100	65-100	50-100	30-45	10-20
	39-60	Clay loam, silt loam, loam	CL	A-4, A-6	0	0	90-100	85-100	75-100	55-100	30-40	10-20

Engineering Properties--Continued

Map symbol and soil name	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*	
1013:												
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15
1014:												
Beaches---------	0-60	Stratified sand to gravel			---	---	---	---	---	---	---	---
Endoaquents, tidal----------	0-29	Gravelly sand	SM, SP-SM	A-1, A-2	0	0-10	80-95	75-90	40-70	5-15	0-15	NP
	29-48	Extremely gravelly coarse sand, very gravelly coarse sand	GP, GP-GM, SP-SM	A-1	0	0-10	20-65	15-60	5-45	0-10	0-15	NP
	48-60	Very gravelly coarse sand, extremely gravelly coarse sand	GW, GW-GM	A-1	0	0-10	10-55	5-50	0-45	0-5	0-15	NP
Xerorthents-----	0-1	Very gravelly sand	GW-GM, GW	A-1	0	0-25	30-55	25-50	15-45	0-5	0-15	NP
	1-20	Very gravelly sand, extremely gravelly coarse sand	GW, GW-GM	A-1	0	0-20	20-55	15-50	5-45	0-5	0-15	NP
	20-60	Extremely gravelly coarse sand, very gravelly sand	GW, GP-GM	A-1	0	0-20	20-55	15-50	5-45	0-5	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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	
1015:												
Deadmanbay------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-100	70-100	65-100	50-100	---	---
	1-5	Silt loam	OH, ML	A-4, A-7	0	0	75-100	70-100	65-100	50-100	30-50	5-15
	5-16	Loam, silt loam	CL, SC-SM	A-4, A-6, A-7	0	0	75-100	70-100	60-100	40-100	20-45	5-20
	16-29	Sandy loam, gravelly loamy sand, loamy coarse sand	GP-GM, SM, SC	A-2, A-1, A-4	0	0	55-100	50-100	25-75	10-40	0-25	NP-10
	29-57	Loam, silt loam, gravelly silty clay loam	CL, GC	A-7, A-6	0	0	65-100	60-100	50-100	35-100	30-45	10-25
	57-60	Silty clay loam, silt loam, loam	CL	A-7, A-6, A-4	0	0	85-100	80-100	65-100	50-100	30-45	10-25
Bazal-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	70-100	40-100	---	---
	1-4	Mucky loam	OH, SM	A-5, A-4	0	0	100	100	70-100	40-100	40-80	5-10
	4-10	Fine sandy loam, silt loam, loam	SM, ML, OH	A-5, A-4	0	0	95-100	90-100	65-100	35-100	35-55	5-10
	10-17	Silt loam, fine sandy loam, loam	SM, CL, ML	A-2, A-4	0	0	75-100	70-100	50-100	30-100	0-35	NP-10
	17-24	Loam, loamy sand, loamy coarse sand	SM, CL	A-4, A-2, A-1	0	0	80-100	75-100	40-95	15-75	0-30	NP-10
	24-39	Clay loam, silt loam, loam	CL	A-4, A-6, A-7	0	0	90-100	85-100	65-100	50-100	30-45	10-20
	39-60	Clay loam, silt loam, loam	CL	A-4, A-6	0	0	90-100	85-100	75-100	55-100	30-40	10-20
Cady------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---
1016:												
Orcas-----------	0-3	Peat	PT	A-8	0	0	100	100	85-100	80-100	---	---
	3-12	Peat	PT	A-8	0	0	100	100	85-100	80-100	---	---
	12-60	Peat	PT	A-8	0	0	100	100	85-100	80-100	---	---
1053:												
Dugualla--------	0-11	Muck	PT	A-8	0	0	100	100	100	100	---	---
	11-20	Muck	PT	A-8	0	0	100	100	100	100	---	---
	20-26	Muck	PT	A-8	0	0	90-100	65-100	65-100	65-100	---	---
	26-60	Muck	PT	A-8	0	0	100	100	100	100	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
2000:												
Whidbey---------	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	2-6	Gravelly loam	GM, OL	A-2, A-4, A-5	0-10	0-40	35-95	30-90	25-85	20-70	30-50	NP-10
	6-20	Very gravelly loam, very gravelly coarse sandy loam, very gravelly sandy loam	GC-GM, GM, GP-GM	A-4, A-2, A-1	0-10	0-25	25-60	20-55	10-50	5-40	15-35	NP-10
	20-37	Very gravelly loamy sand, very gravelly sandy loam	GC, GM, GC-GM, GP-GM	A-2, A-1	0-5	0-25	35-65	30-60	15-45	5-25	15-30	NP-10
	37-60	Very gravelly coarse sandy loam, very gravelly sandy clay loam, gravelly sandy loam	SC, SC-SM, SM	A-1, A-2, A-4, A-6	0-5	0-15	60-90	55-85	35-80	15-50	20-35	NP-15
2001:												
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15
2002:												
Sucia-----------	0-8	Loamy sand	SM	A-1, A-2	0	0	85-100	80-100	40-75	15-30	0-30	NP-5
	8-17	Gravelly sand, loamy sand	SM, SP-SM	A-1, A-2	0	0-15	60-100	55-100	30-75	5-30	0-25	NP
	17-31	Sand, gravelly loamy sand	SM, SP-SM	A-1, A-2	0	0-15	80-100	75-100	35-75	5-30	0-20	NP
	31-38	Loam, sandy clay loam, clay loam	CL, SC	A-6, A-7	0	0	100	100	80-100	35-80	30-45	10-25
	38-60	Loam, sandy loam, silt loam	CL, SC	A-2, A-6, A-7	0	0	85-100	80-100	45-100	25-100	30-45	10-25

Engineering Properties--Continued

Map symbol and soil name	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	
2004:												
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15
2007:												
Alderwood, warm	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	85-100	80-100	---	---
	1-10	Extremely gravelly sandy loam	GW-GM, SM, GP-GM	A-1, A-2	0-10	0-10	30-75	25-70	10-40	5-20	30-50	NP-10
	10-18	Very gravelly sandy loam, extremely gravelly coarse sandy loam	GM, GP-GM, GW-GM	A-1, A-2	0-10	0-25	30-50	25-45	10-35	5-20	20-35	NP-10
	18-36	Very gravelly sandy loam, extremely gravelly coarse sandy loam	GM, GP-GC, GP-GM	A-1	0-5	0-30	20-60	15-55	5-35	5-20	15-30	NP-5
	36-60	Gravelly loam, silt loam, gravelly silty clay loam	GC, CL	A-4, A-6, A-7	0	0-5	45-90	40-90	35-85	25-80	30-45	10-25
Everett, warm---	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	85-100	50-100	---	---
	2-9	Sandy loam	SM	A-1, A-2	0	0	80-95	75-90	40-65	20-35	30-45	NP-5
	9-13	Gravelly sandy loam, loamy sand, very gravelly coarse sandy loam	SC-SM, SM, GP-GM	A-1, A-2	0-10	0-10	50-95	45-90	20-70	5-35	0-30	NP-5
	13-30	Extremely gravelly loamy coarse sand, very gravelly coarse sand	GW-GM, SM, GP	A-1, A-2	0-10	0-10	25-85	20-80	10-60	0-25	0-15	NP
	30-60	Fine sand, very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GW-GM	A-1	0-10	0-10	20-40	15-35	10-30	0-15	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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*	
2008:												
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15
Sholander-------	0-8	Gravelly loam	GM, ML, OL	A-2, A-4, A-5	0-10	0-20	60-100	55-100	40-95	30-75	30-50	5-10
	8-16	Loamy sand, gravelly sandy loam	SM, SC-SM	A-1, A-2	0-5	0-15	60-100	55-100	25-75	10-35	0-25	NP-5
	16-28	Gravelly loamy sand, sand	SP-SM, SM	A-2, A-1	0-10	0-15	55-100	50-100	25-75	5-35	0-20	NP
	28-51	Gravelly sand, loamy sand	SP-SM, SM	A-2, A-1	0-10	0-15	60-100	55-100	30-75	5-35	0-20	NP
	51-60	Gravelly sandy loam, loam	CL, CL-ML, SC-SM	A-2, A-4	0	0	85-100	80-100	45-95	25-75	15-30	5-10
Bazal-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	70-100	40-100	---	---
	1-4	Mucky loam	OH, SM	A-5, A-4	0	0	100	100	70-100	40-100	40-80	5-10
	4-10	Fine sandy loam, silt loam, loam	SM, ML, OH	A-5, A-4	0	0	95-100	90-100	65-100	35-100	35-55	5-10
	10-17	Silt loam, fine sandy loam, loam	SM, CL, ML	A-2, A-4	0	0	75-100	70-100	50-100	30-100	0-35	NP-10
	17-24	Loam, loamy sand, loamy coarse sand	SM, CL	A-4, A-2, A-1	0	0	80-100	75-100	40-95	15-75	0-30	NP-10
	24-39	Clay loam, silt loam, loam	CL	A-4, A-6, A-7	0	0	90-100	85-100	65-100	50-100	30-45	10-20
	39-60	Clay loam, silt loam, loam	CL	A-4, A-6	0	0	90-100	85-100	75-100	55-100	30-40	10-20

Engineering Properties--Continued

Map symbol and soil name	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*	
2009:												
Limepoint-------	0-6	Mucky silt loam	OH, OL	A-5	0	0	75-100	70-100	65-100	50-100	40-70	NP-10
	6-14	Loam, gravelly silt loam	ML, GM	A-2, A-4, A-5	0	0	50-100	45-100	40-95	30-75	30-50	NP-10
	14-31	Loamy coarse sand, gravelly loam, sand	SM, SP, SC, SC-SM	A-1, A-2, A-4	0	0	55-100	50-100	25-75	0-40	0-30	NP-10
	31-49	Loam, gravelly sandy loam, sand	CL-ML, CL, GP	A-1, A-4, A-2	0	0	50-100	45-100	30-95	0-75	0-30	NP-10
	49-58	Sandy loam, loam, gravelly sand	SM, GP-GM, SC	A-2, A-1, A-4	0	0	50-100	45-100	45-70	5-40	0-30	NP-10
	58-60	Silty clay loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	70-100	55-100	25-50	10-30
Alderwood, warm	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	85-100	80-100	---	---
	1-10	Extremely gravelly sandy loam	SM, GP-GM, GW-GM	A-1, A-2	0-10	0-10	30-75	25-70	10-40	5-20	30-50	NP-10
	10-18	Very gravelly sandy loam, extremely gravelly coarse sandy loam	GM, GP-GM, GW-GM	A-1, A-2	0-10	0-25	30-50	25-45	10-35	5-20	20-35	NP-10
	18-36	Very gravelly sandy loam, extremely gravelly coarse sandy loam	GM, GP-GC, GP-GM	A-1	0-5	0-30	20-60	15-55	5-35	5-20	15-30	NP-5
	36-60	Gravelly loam, silt loam, gravelly silty clay loam	GC, CL	A-4, A-6, A-7	0	0-5	45-90	40-90	35-85	25-80	30-45	10-25
Sholander-------	0-8	Gravelly loam	GM, ML, OL	A-2, A-4, A-5	0-10	0-20	60-100	55-100	40-95	30-75	30-50	5-10
	8-16	Loamy sand, gravelly sandy loam	SM, SC-SM	A-1, A-2	0-5	0-15	60-100	55-100	25-75	10-35	0-25	NP-5
	16-28	Gravelly loamy sand, sand	SP-SM, SM	A-2, A-1	0-10	0-15	55-100	50-100	25-75	5-35	0-20	NP
	28-51	Gravelly sand, loamy sand	SP-SM, SM	A-2, A-1	0-10	0-15	60-100	55-100	30-75	5-35	0-20	NP
	51-60	Gravelly sandy loam, loam	CL, CL-ML, SC-SM	A-2, A-4	0	0	85-100	80-100	45-95	25-75	15-30	5-10

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
2010:												
Whidbey---------	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	2-6	Gravelly loam	GM, OL	A-2, A-4, A-5	0-10	0-40	35-95	30-90	25-85	20-70	30-50	NP-10
	6-20	Very gravelly loam, very gravelly coarse sandy loam, very gravelly sandy loam	GC-GM, GM, GP-GM	A-4, A-2, A-1	0-10	0-25	25-60	20-55	10-50	5-40	15-35	NP-10
	20-37	Very gravelly loamy sand, very gravelly sandy loam	GC, GM, GC-GM, GP-GM	A-2, A-1	0-5	0-25	35-65	30-60	15-45	5-25	15-30	NP-10
	37-60	Very gravelly coarse sandy loam, very gravelly sandy clay loam, gravelly sandy loam	SC, SC-SM, SM	A-1, A-2, A-4, A-6	0-5	0-15	60-90	55-85	35-80	15-50	20-35	NP-15
Hoypus----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-5	Sandy loam	SC-SM, SM	A-1, A-2	0	0-10	80-95	75-90	40-65	20-35	0-40	NP-5
	5-20	Loamy sand, very gravelly loamy sand, very gravelly sandy loam	SM, SW-SM	A-2, A-1	0-10	0-15	50-95	45-90	20-70	5-35	0-30	NP
	20-36	Very gravelly loamy sand, very gravelly sand	GP-GM, GW	A-1	0-10	0-15	20-55	15-50	5-45	0-15	0-15	NP
	36-60	Extremely gravelly sand, very gravelly loamy sand	GW, GP-GM	A-1	0-10	0-15	20-55	15-50	10-45	0-15	0-15	NP
2011:												
Roche-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-100	70-100	60-95	40-75	---	---
	1-5	Loam	ML, SM, OL	A-4, A-5	0	0	75-100	70-100	60-95	40-75	30-50	NP-10
	5-15	Loamy sand, loam, gravelly sandy loam	SC-SM, ML, SM, GM	A-1, A-2, A-4	0	0	50-100	50-100	25-95	15-75	0-30	NP-10
	15-23	Gravelly sandy loam, loam	CL, SC-SM, GP-GM	A-1, A-2, A-4	0	0-5	50-100	40-100	20-95	5-75	0-30	NP-10
	23-39	Gravelly sandy loam, loam	SM, SC-SM, CL	A-4, A-2, A-1	0	0-5	60-100	50-100	30-95	15-75	15-30	NP-10
	39-60	Sandy loam, gravelly loam, silt loam	CL, SC-SM	A-2, A-4, A-1	0	0-5	60-100	55-100	35-100	15-100	20-30	5-10

Engineering Properties--Continued

Map symbol and soil name	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*	
2011:												
Killebrew-------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-95	70-90	40-65	20-35	---	---
	1-5	Sandy loam	SM	A-1, A-2	0	0	75-95	70-90	40-65	20-35	30-50	NP-10
	5-9	Sandy loam, gravelly loam	SM, GM, ML	A-2, A-1, A-4	0	0-10	50-95	45-90	30-85	15-60	15-35	NP-10
	9-17	Gravelly sandy loam, loam	SM, SC-SM, CL	A-2, A-1, A-4	0	0-5	60-100	55-95	35-85	15-60	15-30	NP-10
	17-27	Silt loam, loam	CL, GC	A-4, A-6, A-7	0	0	60-100	55-95	50-90	40-80	30-45	10-20
	27-60	Silt loam, gravelly sandy loam, loam	CL, GC	A-6, A-4	0	0	60-100	55-95	35-90	35-80	30-45	10-20
3000:												
Pilepoint-------	0-4	Loam	ML, OL	A-4, A-5	0	0	75-100	70-100	60-95	50-75	30-50	NP-5
	4-13	Loam, gravelly sandy loam	GM, ML	A-1, A-2, A-4, A-5	0	0	45-100	40-100	25-95	15-75	30-45	NP-5
	13-22	Gravelly loamy sand, very gravelly sandy loam	SM, GM, GP-GM	A-2, A-1	0	0-10	32-77	20-70	10-50	5-30	0-30	NP-5
	22-29	Gravelly loam, gravelly loamy sand, gravelly sandy loam	ML, GM, SM	A-2, A-4, A-1	0	0-10	51-100	45-100	25-85	15-75	0-25	NP-5
	29-36	Loam, silty clay loam, silt loam	CL	A-6, A-4, A-7	0	0	75-100	70-100	65-100	50-100	30-45	10-25
	36-46	Silt loam, loam	CL	A-6, A-4, A-7	0	0	80-100	75-100	65-100	50-100	30-45	10-25
	46-60	Silt loam, loam	CL	A-4, A-6, A-7	0	0	80-100	75-100	65-100	50-100	30-45	10-25
3001:												
Hoypus----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-5	Sandy loam	SC-SM, SM	A-1, A-2	0	0-10	80-95	75-90	40-65	20-35	0-40	NP-5
	5-20	Loamy sand, very gravelly loamy sand, very gravelly sandy loam	SM, SW-SM	A-2, A-1	0-10	0-15	50-95	45-90	20-70	5-35	0-30	NP
	20-36	Very gravelly loamy sand, very gravelly sand	GP-GM, GW	A-1	0-10	0-15	20-55	15-50	5-45	0-15	0-15	NP
	36-60	Extremely gravelly sand, very gravelly loamy sand	GW, GP-GM	A-1	0-10	0-15	20-55	15-50	10-45	0-15	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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*	
3002:												
Keystone--------	0-1	Slightly decomposed plant material	PT	A-8	0	0	50-100	45-100	25-75	10-40	---	---
	1-3	Sandy loam	SM, SW-SM	A-2, A-1	0	0	60-100	45-100	25-75	10-40	0-40	NP-5
	3-8	Gravelly loamy sand, sandy loam	SW-SM, SM	A-1, A-2	0	0	60-100	45-100	25-75	10-40	0-30	NP-5
	8-19	Gravelly sand, loamy sand	SP, SC-SM, SM	A-1, A-2	0	0	60-100	50-100	25-70	0-30	0-20	NP-5
	19-34	Gravelly sand, very gravelly loamy sand	SP, SP-SM, SM	A-2, A-1	0-15	0-15	60-100	50-100	25-70	0-30	0-15	NP
	34-60	Coarse sand, loamy sand	SP, SP-SM, SM	A-2, A-1	0-15	0-15	55-100	50-100	25-70	0-30	0-15	NP
3005:												
San Juan--------	0-4	Sandy loam	SM	A-2, A-4, A-1	0	0-10	75-100	70-100	40-70	20-40	0-40	NP-5
	4-13	Gravelly loamy sand, loam, sandy loam	GP-GM, OL, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-40	NP-5
	13-19	Sandy loam, loam, gravelly loamy sand	ML, GP-GM, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-35	NP-5
	19-27	Gravelly loamy coarse sand, gravelly sandy loam, very gravelly loamy sand	GW-GM, SM	A-2, A-1	0	0-10	30-80	25-75	15-50	5-30	0-30	NP
	27-41	Extremely gravelly loamy coarse sand, very gravelly loamy sand, extremely gravelly coarse sand	GP-GM, GM, GP	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP
	41-62	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	15-55	10-50	5-45	0-15	0-15	NP
	62-70	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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*	
3006:												
San Juan--------	0-4	Sandy loam	SM	A-2, A-4, A-1	0	0-10	75-100	70-100	40-70	20-40	0-40	NP-5
	4-13	Gravelly loamy sand, loam, sandy loam	GP-GM, OL, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-40	NP-5
	13-19	Sandy loam, loam, gravelly loamy sand	ML, GP-GM, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-35	NP-5
	19-27	Gravelly loamy coarse sand, gravelly sandy loam, very gravelly loamy sand	GW-GM, SM	A-2, A-1	0	0-10	30-80	25-75	15-50	5-30	0-30	NP
	27-41	Extremely gravelly loamy coarse sand, very gravelly loamy sand, extremely gravelly coarse sand	GP-GM, GM, GP	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP
	41-62	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	15-55	10-50	5-45	0-15	0-15	NP
	62-70	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP
3007:												
San Juan--------	0-4	Sandy loam	SM	A-2, A-4, A-1	0	0-10	75-100	70-100	40-70	20-40	0-40	NP-5
	4-13	Gravelly loamy sand, loam, sandy loam	GP-GM, OL, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-40	NP-5
	13-19	Sandy loam, loam, gravelly loamy sand	ML, GP-GM, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-35	NP-5
	19-27	Gravelly loamy coarse sand, gravelly sandy loam, very gravelly loamy sand	GW-GM, SM	A-2, A-1	0	0-10	30-80	25-75	15-50	5-30	0-30	NP
	27-41	Extremely gravelly loamy coarse sand, very gravelly loamy sand, extremely gravelly coarse sand	GP-GM, GM, GP	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP
	41-62	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GP-GM, GM, GP	A-1	0	0-20	15-55	10-50	5-45	0-15	0-15	NP
	62-70	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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	
3008:												
Xerorthents-----	0-1	Very gravelly sand	GW-GM, GW	A-1	0	0-25	30-55	25-50	15-45	0-5	0-15	NP
	1-20	Very gravelly sand, extremely gravelly coarse sand	GW, GW-GM	A-1	0	0-20	20-55	15-50	5-45	0-5	0-15	NP
	20-60	Extremely gravelly coarse sand, very gravelly sand	GW, GP-GM	A-1	0	0-20	20-55	15-50	5-45	0-5	0-15	NP
Endoaquents, tidal----------	0-29	Gravelly sand	SM, SP-SM	A-1, A-2	0	0-10	80-95	75-90	40-70	5-15	0-15	NP
	29-48	Extremely gravelly coarse sand, very gravelly coarse sand	GP, GP-GM, SP-SM	A-1	0	0-10	20-65	15-60	5-45	0-10	0-15	NP
	48-60	Very gravelly coarse sand, extremely gravelly coarse sand	GW, GW-GM	A-1	0	0-10	10-55	5-50	0-45	0-5	0-15	NP
3010:												
San Juan--------	0-4	Sandy loam	SM	A-2, A-4, A-1	0	0-10	75-100	70-100	40-70	20-40	0-40	NP-5
	4-13	Gravelly loamy sand, loam, sandy loam	OL, SM, GP-GM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-40	NP-5
	13-19	Sandy loam, loam, gravelly loamy sand	ML, GP-GM, SM	A-1, A-4, A-2	0	0-10	50-100	45-100	25-95	10-75	0-35	NP-5
	19-27	Gravelly loamy coarse sand, gravelly sandy loam, very gravelly loamy sand	GW-GM, SM	A-2, A-1	0	0-10	30-80	25-75	15-50	5-30	0-30	NP
	27-41	Extremely gravelly loamy coarse sand, very gravelly loamy sand, extremely gravelly coarse sand	GP-GM, GM, GP	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP
	41-62	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	15-55	10-50	5-45	0-15	0-15	NP
	62-70	Very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GP-GM	A-1	0	0-20	20-55	15-50	5-45	0-15	0-15	NP
Dune land-------	0-60	Fine sand	SP, SP-SM, SM	A-2, A-3	0	0	100	100	60-80	0-25	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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	
3012:												
Hoypus----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-5	Sandy loam	SC-SM, SM	A-1, A-2	0	0-10	80-95	75-90	40-65	20-35	0-40	NP-5
	5-20	Loamy sand, very gravelly loamy sand, very gravelly sandy loam	SM, SW-SM	A-2, A-1	0-10	0-15	50-95	45-90	20-70	5-35	0-30	NP
	20-36	Very gravelly loamy sand, very gravelly sand	GP-GM, GW	A-1	0-10	0-15	20-55	15-50	5-45	0-15	0-15	NP
	36-60	Extremely gravelly sand, very gravelly loamy sand	GW, GP-GM	A-1	0-10	0-15	20-55	15-50	10-45	0-15	0-15	NP
3013:												
Everett, warm---	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	85-100	50-100	---	---
	2-9	Sandy loam	SM	A-1, A-2	0	0	80-95	75-90	40-65	20-35	30-45	NP-5
	9-13	Gravelly sandy loam, loamy sand, very gravelly coarse sandy loam	SC-SM, SM, GP-GM	A-1, A-2	0-10	0-10	50-95	45-90	20-70	5-35	0-30	NP-5
	13-30	Extremely gravelly loamy coarse sand, very gravelly coarse sand	GW-GM, SM, GP	A-1, A-2	0-10	0-10	25-85	20-80	10-60	0-25	0-15	NP
	30-60	Fine sand, very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GW-GM	A-1	0-10	0-10	20-40	15-35	10-30	0-15	0-15	NP
3014:												
Everett, warm---	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	85-100	50-100	---	---
	2-9	Sandy loam	SM	A-1, A-2	0	0	80-95	75-90	40-65	20-35	30-45	NP-5
	9-13	Gravelly sandy loam, loamy sand, very gravelly coarse sandy loam	SC-SM, SM, GP-GM	A-1, A-2	0-10	0-10	50-95	45-90	20-70	5-35	0-30	NP-5
	13-30	Extremely gravelly loamy coarse sand, very gravelly coarse sand	GW-GM, SM, GP	A-1, A-2	0-10	0-10	25-85	20-80	10-60	0-25	0-15	NP
	30-60	Fine sand, very gravelly loamy coarse sand, extremely gravelly coarse sand	GM, GP, GW-GM	A-1	0-10	0-10	20-40	15-35	10-30	0-15	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
3015:												
Indianola, warm	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loamy sand	SM	A-1, A-2	0	0	95-100	90-100	45-75	15-30	0-40	NP-5
	6-17	Loamy sand, loamy fine sand	SM	A-1, A-2, A-4	0	0	95-100	90-100	45-90	15-50	0-30	NP-5
	17-27	Loamy fine sand, sand	SM, SP-SM, SC-SM	A-2, A-4, A-1	0	0	85-100	80-100	40-90	5-50	0-25	NP-5
	27-37	Loamy sand, sand	SP-SM, SM, SC-SM	A-1, A-2	0	0	90-100	85-100	40-75	5-30	0-20	NP-5
	37-60	Sand, loamy sand	SC-SM, SM, SP-SM	A-1, A-2	0	0	90-100	85-100	40-75	5-30	0-20	NP-5
3016:												
Sucia-----------	0-8	Loamy sand	SM	A-1, A-2	0	0	85-100	80-100	40-75	15-30	0-30	NP-5
	8-17	Gravelly sand, loamy sand	SM, SP-SM	A-1, A-2	0	0-15	60-100	55-100	30-75	5-30	0-25	NP
	17-31	Sand, gravelly loamy sand	SM, SP-SM	A-1, A-2	0	0-15	80-100	75-100	35-75	5-30	0-20	NP
	31-38	Loam, sandy clay loam, clay loam	CL, SC	A-6, A-7	0	0	100	100	80-100	35-80	30-45	10-25
	38-60	Loam, sandy loam, silt loam	CL, SC	A-2, A-6, A-7	0	0	85-100	80-100	45-100	25-100	30-45	10-25
Sholander-------	0-8	Gravelly loam	GM, ML, OL	A-2, A-4, A-5	0-10	0-20	60-100	55-100	40-95	30-75	30-50	5-10
	8-16	Loamy sand, gravelly sandy loam	SM, SC-SM	A-1, A-2	0-5	0-15	60-100	55-100	25-75	10-35	0-25	NP-5
	16-28	Gravelly loamy sand, sand	SP-SM, SM	A-2, A-1	0-10	0-15	55-100	50-100	25-75	5-35	0-20	NP
	28-51	Gravelly sand, loamy sand	SP-SM, SM	A-2, A-1	0-10	0-15	60-100	55-100	30-75	5-35	0-20	NP
	51-60	Gravelly sandy loam, loam	CL, CL-ML, SC-SM	A-2, A-4	0	0	85-100	80-100	45-95	25-75	15-30	5-10
4000:												
Roche-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-100	70-100	60-95	40-75	---	---
	1-5	Loam	ML, SM, OL	A-4, A-5	0	0	75-100	70-100	60-95	40-75	30-50	NP-10
	5-15	Loamy sand, loam, gravelly sandy loam	ML, SM, GM, SC-SM	A-1, A-2, A-4	0	0	50-100	50-100	25-95	15-75	0-30	NP-10
	15-23	Gravelly sandy loam, loam	CL, SC-SM, GP-GM	A-1, A-2, A-4	0	0-5	50-100	40-100	20-95	5-75	0-30	NP-10
	23-39	Gravelly sandy loam, loam	SM, SC-SM, CL	A-4, A-2, A-1	0	0-5	60-100	50-100	30-95	15-75	15-30	NP-10
	39-60	Sandy loam, gravelly loam, silt loam	CL, SC-SM	A-2, A-4, A-1	0	0-5	60-100	55-100	35-100	15-100	20-30	5-10

Engineering Properties--Continued

Map symbol and soil name	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*	
4000:												
Killebrew-------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-95	70-90	40-65	20-35	---	---
	1-5	Sandy loam	SM	A-1, A-2	0	0	75-95	70-90	40-65	20-35	30-50	NP-10
	5-9	Sandy loam, gravelly loam	SM, GM, ML	A-2, A-1, A-4	0	0-10	50-95	45-90	30-85	15-60	15-35	NP-10
	9-17	Gravelly sandy loam, loam	SM, SC-SM, CL	A-2, A-1, A-4	0	0-5	60-100	55-95	35-85	15-60	15-30	NP-10
	17-27	Silt loam, loam	CL, GC	A-4, A-6, A-7	0	0	60-100	55-95	50-90	40-80	30-45	10-20
	27-60	Silt loam, gravelly sandy loam, loam	CL, GC	A-6, A-4	0	0	60-100	55-95	35-90	35-80	30-45	10-20
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
4002:												
Laconner, warm--	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-70	30-40	---	---
	1-3	Gravelly sandy loam	GM, SM	A-2, A-1, A-4	0	0	50-75	45-70	30-65	15-50	0-40	NP-5
	3-10	Extremely gravelly coarse sandy loam, gravelly loamy sand	GM, SM, GP-GM	A-2, A-1	0	0-30	25-75	20-70	10-50	5-30	0-30	NP-5
	10-20	Gravelly sandy loam, extremely gravelly loamy sand	SM, GM, GP, SC-SM	A-1, A-2	0	0-30	10-75	5-70	0-50	0-30	0-25	NP-5
	20-33	Gravelly loamy sand, very gravelly sand	GM, SM, GP	A-1, A-2	0	0-15	35-80	30-75	15-60	0-25	0-20	NP
	33-39	Very gravelly sand, extremely gravelly loamy sand	GM, GP-GM, GP	A-1	0	0-20	10-55	5-50	0-45	0-15	0-20	NP
	39-60	Very gravelly loamy sand, gravelly fine sandy loam	GM, SC-SM, SM, GP-GM	A-4, A-2, A-1	0	0-5	40-85	35-80	15-65	5-45	0-20	NP-5

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number--				Liquid limit	Plas-ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
	In				Pct	Pct					Pct	
4003:												
Hoypus----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-5	Sandy loam	SC-SM, SM	A-1, A-2	0	0-10	80-95	75-90	40-65	20-35	0-40	NP-5
	5-20	Loamy sand, very gravelly loamy sand, very gravelly sandy loam	SM, SW-SM	A-2, A-1	0-10	0-15	50-95	45-90	20-70	5-35	0-30	NP
	20-36	Very gravelly loamy sand, very gravelly sand	GP-GM, GW	A-1	0-10	0-15	20-55	15-50	5-45	0-15	0-15	NP
	36-60	Extremely gravelly sand, very gravelly loamy sand	GW, GP-GM	A-1	0-10	0-15	20-55	15-50	10-45	0-15	0-15	NP
Whidbey---------	0-2	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	2-6	Gravelly loam	GM, OL	A-2, A-4, A-5	0-10	0-40	35-95	30-90	25-85	20-70	30-50	NP-10
	6-20	Very gravelly loam, very gravelly coarse sandy loam, very gravelly sandy loam	GC-GM, GM, GP-GM	A-4, A-2, A-1	0-10	0-25	25-60	20-55	10-50	5-40	15-35	NP-10
	20-37	Very gravelly loamy sand, very gravelly sandy loam	GC, GM, GC-GM, GP-GM	A-2, A-1	0-5	0-25	35-65	30-60	15-45	5-25	15-30	NP-10
	37-60	Very gravelly coarse sandy loam, very gravelly sandy clay loam, gravelly sandy loam	SC, SC-SM, SM	A-1, A-2, A-4, A-6	0-5	0-15	60-90	55-85	35-80	15-50	20-35	NP-15
4005:												
Roche-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-100	70-100	60-95	40-75	---	---
	1-5	Loam	ML, SM, OL	A-4, A-5	0	0	75-100	70-100	60-95	40-75	30-50	NP-10
	5-15	Loamy sand, loam, gravelly sandy loam	ML, SM, GM, SC-SM	A-1, A-2, A-4	0	0	50-100	50-100	25-95	15-75	0-30	NP-10
	15-23	Gravelly sandy loam, loam	CL, SC-SM, GP-GM	A-1, A-2, A-4	0	0-5	50-100	40-100	20-95	5-75	0-30	NP-10
	23-39	Gravelly sandy loam, loam	SM, SC-SM, CL	A-4, A-2, A-1	0	0-5	60-100	50-100	30-95	15-75	15-30	NP-10
	39-60	Sandy loam, gravelly loam, silt loam	CL, SC-SM	A-2, A-4, A-1	0	0-5	60-100	55-100	35-100	15-100	20-30	5-10

Engineering Properties--Continued

Map symbol and soil name	Depth	USDA texture	Classification: Unified	Classification: AASHTO	Fragments: >10 inches	Fragments: 3-10 inches	Percentage passing sieve number--: 4	10	40	200	Liquid limit	Plas- ticity index
	In				*Pct*	*Pct*					*Pct*	
4005:												
Haro------------	0-1	Loam	GM, ML, OH	A-4, A-5	0	0-10	70-100	70-100	60-95	40-75	30-50	5-10
	1-5	Gravelly sandy loam, gravelly loam	GP-GM, GM, ML	A-2, A-4, A-1, A-5	0	0-10	45-100	40-100	25-95	10-75	25-45	NP-10
	5-11	Gravelly sandy loam, gravelly loam	GM, SC-SM, SM	A-1, A-2, A-4	0	0-10	50-100	45-100	30-70	15-40	15-35	NP-10
	11-21	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
4006:												
Alderwood, warm	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	85-100	80-100	---	---
	1-10	Extremely gravelly sandy loam	GW-GM, SM, GP-GM	A-1, A-2	0-10	0-10	30-75	25-70	10-40	5-20	30-50	NP-10
	10-18	Very gravelly sandy loam, extremely gravelly coarse sandy loam	GM, GP-GM, GW-GM	A-1, A-2	0-10	0-25	30-50	25-45	10-35	5-20	20-35	NP-10
	18-36	Very gravelly sandy loam, extremely gravelly coarse sandy loam	GM, GP-GC, GP-GM	A-1	0-5	0-30	20-60	15-55	5-35	5-20	15-30	NP-5
	36-60	Gravelly loam, silt loam, gravelly silty clay loam	GC, CL	A-7, A-4, A-6	0	0-5	45-90	40-90	35-85	25-80	30-45	10-25
Hoypus----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-5	Sandy loam	SC-SM, SM	A-1, A-2	0	0-10	80-95	75-90	40-65	20-35	0-40	NP-5
	5-20	Loamy sand, very gravelly loamy sand, very gravelly sandy loam	SM, SW-SM	A-2, A-1	0-10	0-15	50-95	45-90	20-70	5-35	0-30	NP
	20-36	Very gravelly loamy sand, very gravelly sand	GP-GM, GW	A-1	0-10	0-15	20-55	15-50	5-45	0-15	0-15	NP
	36-60	Extremely gravelly sand, very gravelly loamy sand	GW, GP-GM	A-1	0-10	0-15	20-55	15-50	10-45	0-15	0-15	NP

Engineering Properties--Continued

Map symbol and soil name	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*	
4007:												
Roche-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-100	70-100	60-95	40-75	---	---
	1-5	Loam	ML, SM, OL	A-4, A-5	0	0	75-100	70-100	60-95	40-75	30-50	NP-10
	5-15	Loamy sand, loam, gravelly sandy loam	ML, SM, GM, SC-SM	A-1, A-2, A-4	0	0	50-100	50-100	25-95	15-75	0-30	NP-10
	15-23	Gravelly sandy loam, loam	CL, SC-SM, GP-GM	A-1, A-2, A-4	0	0-5	50-100	40-100	20-95	5-75	0-30	NP-10
	23-39	Gravelly sandy loam, loam	SM, SC-SM, CL	A-4, A-2, A-1	0	0-5	60-100	50-100	30-95	15-75	15-30	NP-10
	39-60	Sandy loam, gravelly loam, silt loam	CL, SC-SM	A-2, A-4, A-1	0	0-5	60-100	55-100	35-100	15-100	20-30	5-10
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15
4008:												
Mitchellbay-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Gravelly sandy loam	SM, GM	A-4, A-2, A-1, A-5	0	0	50-100	45-100	30-70	15-40	30-50	NP-10
	6-15	Sandy loam, gravelly loam	ML, SM, GM	A-4, A-2, A-1	0	0	50-100	45-100	30-95	15-75	20-35	NP-10
	15-20	Sandy loam, loam	SC-SM, SM, CL-ML	A-4, A-2, A-1	0	0	85-100	80-100	40-95	15-75	15-25	NP-5
	20-26	Loam, silt loam, silty clay loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	26-38	Loam, silt loam	CL	A-4, A-6, A-7	0	0	85-100	80-100	65-100	50-100	30-45	10-20
	38-60	Loam, silt loam	CL, CL-ML	A-6, A-4	0	0	85-100	80-100	65-100	50-100	25-40	5-15
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
4008:												
Killebrew-------	0-1	Slightly decomposed plant material	PT	A-8	0	0	75-95	70-90	40-65	20-35	---	---
	1-5	Sandy loam	SM	A-1, A-2	0	0	75-95	70-90	40-65	20-35	30-50	NP-10
	5-9	Sandy loam, gravelly loam	SM, GM, ML	A-2, A-1, A-4	0	0-10	50-95	45-90	30-85	15-60	15-35	NP-10
	9-17	Gravelly sandy loam, loam	SM, SC-SM, CL	A-2, A-1, A-4	0	0-5	60-100	55-95	35-85	15-60	15-30	NP-10
	17-27	Silt loam, loam	CL, GC	A-4, A-6, A-7	0	0	60-100	55-95	50-90	40-80	30-45	10-20
	27-60	Silt loam, gravelly sandy loam, loam	CL, GC	A-6, A-4	0	0	60-100	55-95	35-90	35-80	30-45	10-20
5000:												
Cady------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
5001:												
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
Haro------------	0-1	Loam	GM, ML, OH	A-4, A-5	0	0-10	70-100	70-100	60-95	40-75	30-50	5-10
	1-5	Gravelly sandy loam, gravelly loam	GP-GM, GM, ML	A-2, A-4, A-1, A-5	0	0-10	45-100	40-100	25-95	10-75	25-45	NP-10
	5-11	Gravelly sandy loam, gravelly loam	GM, SC-SM, SM	A-1, A-2, A-4	0	0-10	50-100	45-100	30-70	15-40	15-35	NP-10
	11-21	Unweathered bedrock			---	---	---	---	---	---	---	---
5002:												
Doebay, moist---	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loam	ML, SM, OH	A-4, A-5	0	0	75-95	70-90	60-85	40-70	30-50	NP-10
	6-16	Fine sandy loam, gravelly sandy loam	SC-SM, SM, GM	A-2, A-4, A-1	0	0	50-85	45-80	30-75	15-50	20-35	NP-10
	16-21	Very gravelly loam, very gravelly sandy loam	GC, GW-GM, GC-GM	A-2, A-4, A-1	0-10	0-20	30-55	25-50	10-45	5-45	15-30	NP-10
	21-35	Extremely gravelly sandy loam, very gravelly coarse sandy loam	GC-GM, GP, GP-GC	A-1	0-10	0-20	20-40	15-35	5-20	0-15	0-25	NP-5
	35-45	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
5002:												
Cady------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---
Doebay----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loam	ML, SM, OH	A-4, A-5	0	0	75-95	70-90	60-85	40-70	30-50	NP-10
	6-16	Fine sandy loam, gravelly sandy loam	SC-SM, SM, GM	A-2, A-4, A-1	0	0	50-85	45-80	30-75	15-50	20-35	NP-10
	16-21	Very gravelly loam, very gravelly sandy loam	GC, GW-GM, GC-GM	A-2, A-4, A-1	0-10	0-20	30-55	25-50	10-45	5-45	15-30	NP-10
	21-35	Extremely gravelly sandy loam, very gravelly coarse sandy loam	GC-GM, GP, GP-GC	A-1	0-10	0-20	20-40	15-35	5-20	0-15	0-25	NP-5
	35-45	Unweathered bedrock			---	---	---	---	---	---	---	---
5003:												
Doebay----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loam	ML, SM, OH	A-4, A-5	0	0	75-95	70-90	60-85	40-70	30-50	NP-10
	6-16	Fine sandy loam, gravelly sandy loam	SC-SM, SM, GM	A-2, A-4, A-1	0	0	50-85	45-80	30-75	15-50	20-35	NP-10
	16-21	Very gravelly loam, very gravelly sandy loam	GC, GW-GM, GC-GM	A-2, A-4, A-1	0-10	0-20	30-55	25-50	10-45	5-45	15-30	NP-10
	21-35	Extremely gravelly sandy loam, very gravelly coarse sandy loam	GC-GM, GP, GP-GC	A-1	0-10	0-20	20-40	15-35	5-20	0-15	0-25	NP-5
	35-45	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
5003:												
Morancreek------	0-1	Slightly decomposed plant material	PT	A-8	0	0	85-100	80-100	45-70	25-40	---	---
	1-3	Sandy loam	SM	A-2, A-4, A-5	0-10	0-10	85-100	80-100	45-70	25-40	30-50	NP-5
	3-10	Sandy loam, silt loam, gravelly loam	ML, SC-SM, CL-ML, SM	A-2, A-4, A-1	0-10	0-20	60-100	55-100	30-100	15-100	15-35	NP-10
	10-21	Sandy loam, silt loam, gravelly loam	CL, CL-ML, SC-SM, SM	A-2, A-4, A-1	0-10	0-20	60-100	55-100	30-100	15-100	15-30	NP-10
	21-28	Sandy loam, gravelly coarse sandy loam, loamy fine sand	SC-SM, SM	A-1, A-2, A-4	0-5	0-15	60-95	55-90	30-80	15-40	15-25	NP-5
	28-60	Sandy loam, gravelly coarse sandy loam, loamy fine sand	SC-SM, SM	A-1, A-2, A-4	0-5	0-15	60-100	55-100	30-90	15-50	15-25	NP-5
5004:												
Pickett---------	0-1	Slightly decomposed plant material	PT	A-8	0	0	25-45	20-40	15-35	10-30	---	---
	1-3	Very gravelly loam	GP-GM, GM	A-1, A-2	0	0-40	25-45	20-40	15-35	10-30	30-50	NP-5
	3-27	Very gravelly fine sandy loam, extremely gravelly coarse sandy loam, gravelly loam	GC-GM, GM	A-4, A-2, A-1	0-20	0-30	20-65	15-60	5-50	5-40	20-35	NP-5
	27-36	Very gravelly coarse sandy loam, extremely gravelly sandy loam	GM, GP-GM	A-2, A-1	0-10	0-30	30-70	25-65	10-50	5-30	15-30	NP-5
	36-46	Unweathered bedrock			---	---	---	---	---	---	---	---
Kahboo----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	70-100	65-100	50-100	30-55	---	---
	1-2	Moderately decomposed plant material	PT	A-8	0	0	70-100	65-100	50-100	30-55	---	---
	2-9	Gravelly fine sandy loam	SC-SM, GM, ML	A-4, A-2	0	0-15	70-100	65-100	50-85	30-55	20-35	NP-10
	9-14	Gravelly sandy loam, gravelly loam, gravelly fine sandy loam	GC-GM, GM, ML	A-4, A-2, A-1	0	0-30	45-100	40-100	30-95	15-75	20-35	NP-10
	14-24	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
5005:												
Constitution----	0-1	Slightly decomposed plant material	PT	A-8	0	0	65-100	60-100	35-70	15-40	---	---
	1-6	Sandy loam	SM	A-2, A-4, A-1	0	0	65-100	60-100	35-70	15-40	30-50	NP-10
	6-16	Gravelly sandy loam, fine sandy loam, loam	ML, GC-GM, GP-GM	A-2, A-1, A-4	0-15	0-15	45-100	40-100	25-85	10-60	20-35	NP-10
	16-26	Gravelly coarse sandy loam, fine sandy loam, sandy loam	GM, GC-GM, CL	A-4, A-2, A-1	0-10	0	50-100	50-100	30-85	15-60	15-30	NP-10
	26-36	Unweathered bedrock			---	---	---	---	---	---	---	---
Skipjack--------	0-3	Slightly decomposed plant material	PT	A-8	0	0	70-100	65-100	50-80	30-55	---	---
	3-32	Fine sandy loam	SM, ML	A-2, A-4	0-15	0	70-100	65-100	50-80	30-55	20-35	NP-10
	32-43	Gravelly sandy loam, loam, fine sandy loam	GM, SM, CL, SC-SM	A-4, A-2, A-1	0-15	0-25	45-100	40-100	30-85	15-65	15-30	NP-10
	43-60	Gravelly coarse sandy loam	SM, SC-SM, SC, GM	A-1, A-2, A-4	0-10	0-15	55-100	50-100	30-70	15-40	0-30	NP-10
Kahboo----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	70-100	65-100	50-100	30-55	---	---
	1-2	Moderately decomposed plant material	PT	A-8	0	0	70-100	65-100	50-100	30-55	---	---
	2-9	Gravelly fine sandy loam	SC-SM, GM, ML	A-4, A-2	0	0-15	70-100	65-100	50-85	30-55	20-35	NP-10
	9-14	Gravelly sandy loam, gravelly loam, gravelly fine sandy loam	GC-GM, GM, ML	A-4, A-2, A-1	0	0-30	45-100	40-100	30-95	15-75	20-35	NP-10
	14-24	Unweathered bedrock			---	---	---	---	---	---	---	---
5006:												
Cady-----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
5006:												
Doebay----------	0-1	Slightly decomposed plant material	PT,	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loam	ML, SM, OH	A-4, A-5	0	0	75-95	70-90	60-85	40-70	30-50	NP-10
	6-16	Fine sandy loam, gravelly sandy loam	SC-SM, SM, GM	A-4, A-2, A-1	0	0	50-85	45-80	30-75	15-50	20-35	NP-10
	16-21	Very gravelly sandy loam, Very gravelly loam	GC-GM, GC, GW-GM	A-2, A-1, A-4	0-10	0-20	30-55	25-50	10-45	5-45	15-30	NP-10
	21-35	Extremely gravelly sandy loam, Very gravelly coarse sandy loam	GP-GC, GC-GM, GP	A-1	0-10	0-20	20-40	15-35	5-20	0-15	0-25	NP-5
	35-45	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
5007:												
Haro------------	0-1	Loam	GM, ML, OH	A-4, A-5	0	0-10	70-100	70-100	60-95	40-75	30-50	5-10
	1-5	Gravelly sandy loam, gravelly loam	GP-GM, GM, ML	A-1, A-5, A-2, A-4	0	0-10	45-100	40-100	25-95	10-75	25-45	NP-10
	5-11	Gravelly sandy loam, gravelly loam	GM, SC-SM, SM	A-1, A-2, A-4	0	0-10	50-100	45-100	30-70	15-40	15-35	NP-10
	11-21	Unweathered bedrock			---	---	---	---	---	---	---	---
Hiddenridge-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	80-100	60-95	---	---
	1-3	Gravelly coarse sandy loam	GM, SM	A-2, A-1, A-5	0	0	55-95	50-90	30-85	15-50	30-50	NP-10
	3-24	Very gravelly coarse sandy loam, gravelly sandy loam, gravelly loam	GW-GM, GM	A-2, A-5, A-1	0	0	30-70	25-65	10-65	5-40	25-45	NP-10
	24-57	Very gravelly coarse sandy loam, extremely gravelly coarse sandy loam, very gravelly sandy loam	GC, GP, GP-GM	A-2, A-1	0	0-20	15-50	10-45	5-30	0-15	0-30	NP-10
	57-60	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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	
5008:												
Doebay----------	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loam	ML, SM, OH	A-4, A-5	0	0	75-95	70-90	60-85	40-70	30-50	NP-10
	6-16	Fine sandy loam, gravelly sandy loam	SC-SM, SM, GM	A-2, A-4, A-1	0	0	50-85	45-80	30-75	15-50	20-35	NP-10
	16-21	Very gravelly loam, very gravelly sandy loam	GC, GW-GM, GC-GM	A-2, A-4, A-1	0-10	0-20	30-55	25-50	10-45	5-45	15-30	NP-10
	21-35	Extremely gravelly sandy loam, very gravelly coarse sandy loam	GC-GM, GP, GP-GC	A-1	0-10	0-20	20-40	15-35	5-20	0-15	0-25	NP-5
	35-45	Unweathered bedrock			---	---	---	---	---	---	---	---
Cady------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
5009:												
Haro------------	0-1	Loam	GM, ML, OH	A-4, A-5	0	0-10	70-100	70-100	60-95	40-75	30-50	5-10
	1-5	Gravelly sandy loam, gravelly loam	GP-GM, GM, ML	A-2, A-4, A-1, A-5	0	0-10	45-100	40-100	25-95	10-75	25-45	NP-10
	5-11	Gravelly sandy loam, gravelly loam	SM, GM, SC-SM	A-1, A-2, A-4	0	0-10	50-100	45-100	30-70	15-40	15-35	NP-10
	11-21	Unweathered bedrock			---	---	---	---	---	---	---	---
Hiddenridge-----	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	80-100	60-95	---	---
	1-3	Gravelly coarse sandy loam	GM, SM	A-2, A-1, A-5	0	0	55-95	50-90	30-85	15-50	30-50	NP-10
	3-24	Very gravelly coarse sandy loam, gravelly sandy loam, gravelly loam	GW-GM, GM	A-2, A-5, A-1	0	0	30-70	25-65	10-65	5-40	25-45	NP-10
	24-57	Very gravelly coarse sandy loam, extremely gravelly coarse sandy loam, very gravelly sandy loam	GC, GP, GP-GM	A-2, A-1	0	0-20	15-50	10-45	5-30	0-15	0-30	NP-10
	57-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
5009:												
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
5010:												
Turtleback------	0-3	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	3-13	Very gravelly very fine sandy loam, very gravelly sandy loam	GW-GM, GM	A-1	0-15	0-25	25-45	20-40	10-40	5-25	15-35	NP-10
	13-40	Very gravelly loamy sand, extremely gravelly sandy loam	GM, GW-GM, GP, GC-GM	A-1	0-20	0-20	20-50	15-45	10-35	0-20	15-35	NP-10
	40-48	Very gravelly sandy loam, extremely gravelly loamy sand	GC-GM, GM, GP, GW-GM	A-1	0-15	0-15	20-40	15-35	10-30	0-15	0-25	NP-5
	48-58	Unweathered bedrock			---	---	---	---	---	---	---	---
Cady------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---
5015:												
Doebay, moist---	0-1	Slightly decomposed plant material	PT	A-8	0	0	100	100	60-100	50-90	---	---
	1-6	Loam	ML, SM, OH	A-4, A-5	0	0	75-95	70-90	60-85	40-70	30-50	NP-10
	6-16	Fine sandy loam, gravelly sandy loam	SC-SM, SM, GM	A-2, A-4, A-1	0	0	50-85	45-80	30-75	15-50	20-35	NP-10
	16-21	Very gravelly loam, very gravelly sandy loam	GC, GW-GM, GC-GM	A-2, A-4, A-1	0-10	0-20	30-55	25-50	10-45	5-45	15-30	NP-10
	21-35	Extremely gravelly sandy loam, very gravelly coarse sandy loam	GC-GM, GP, GP-GC	A-1	0-10	0-20	20-40	15-35	5-20	0-15	0-25	NP-5
	35-45	Unweathered bedrock			---	---	---	---	---	---	---	---

Engineering Properties--Continued

Map symbol and soil name	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*	
5015:												
Cady------------	0-1	Slightly decomposed plant material	PT	A-8	0	0	90-100	85-100	75-95	55-75	---	---
	1-4	Loam	ML, OH	A-4, A-5	0-10	0-10	90-100	85-100	75-95	55-75	30-50	5-10
	4-16	Medium gravelly coarse sandy loam, fine sandy loam, gravelly loam	ML, SC-SM, GP-GM	A-1, A-2, A-4	0-5	0-15	40-100	35-100	10-95	10-75	20-35	NP-10
	16-26	Unweathered bedrock			---	---	---	---	---	---	---	---
Rock outcrop----	0-60	Unweathered bedrock			---	---	---	---	---	---	---	---

Physical Soil Properties

The table described in this section shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the 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.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In the table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In the table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In the table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving 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 $^1/_3$- or $^1/_{10}$-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each 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 linear extensibility, 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. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (K_{sat}) refers to the ability of a soil to transmit water or air. The estimates in the table indicate the rate of water movement, in inches per hour, when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hyraulic conductivity is considered in the design of soil drainage systems and septic tank absorption fields.

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 soil layer. The capacity varies, depending on soil properties that affect retention of water. 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.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the table, 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 in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and saturated hydraulic conductivity (Ksat). Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual 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 susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook," which is available in local offices of the Natural Resources Conservation Service or on the Internet.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Physical Soil Properties

(Entries under "Erosion factors--T" apply to the entire profile. Entries under "Wind erodibility group" and "Wind erodibility index" apply only to the surface layer. Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
997:														
Pits, gravel	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
998:														
Water, saline	---	---	---	---	---	---	---	---	---	---	---	---	---	---
999:														
Water, fresh	---	---	---	---	---	---	---	---	---	---	---	---	---	---
1000:														
Sholander	0-8	30-55	30-50	8-18	1.10-1.45	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.15	.24	4	5	56
	8-16	60-85	5-35	2-12	1.50-1.80	2-6	0.07-0.13	0.0-2.9	0.2-1.0	.05	.17			
	16-28	60-90	5-30	0-8	1.50-1.70	6-20	0.03-0.08	0.0-2.9	0.2-1.0	.02	.05			
	28-51	65-95	0-30	0-5	1.50-1.70	20-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.05			
	51-60	35-70	30-50	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.28	.37			
Spieden	0-4	20-45	50-75	6-18	0.80-1.20	0.2-0.6	0.26-0.37	0.0-2.9	10-25	.28	.37	5	3	86
	4-11	25-50	30-65	6-18	0.80-1.45	0.2-6	0.15-0.21	0.0-2.9	7.0-12	.28	.37			
	11-24	80-95	0-20	0-5	1.50-1.70	6-101	0.04-0.08	0.0-2.9	0.2-1.0	.05	.10			
	24-36	80-95	0-20	0-5	1.50-1.70	6-101	0.03-0.07	0.0-2.9	0.2-1.0	.02	.02			
	36-48	80-100	0-20	0-5	1.50-1.70	6-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.02			
	48-60	80-100	0-20	0-5	1.50-1.70	6-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.02			
1001:														
Coveland	0-4	30-50	30-50	7-18	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.20	.24	4	5	56
	4-9	15-65	25-70	10-25	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	2.0-7.0	.20	.24			
	9-20	15-80	15-80	5-25	1.60-1.80	0.6-6	0.09-0.13	0.0-2.9	0.2-1.0	.20	.24			
	20-36	15-50	30-65	18-35	1.50-1.75	0.06-2	0.16-0.21	3.0-5.9	0.2-1.0	.02	.05			
	36-44	15-50	30-65	18-35	1.50-1.75	0.06-2	0.16-0.21	3.0-5.9	0.2-1.0	.49	.55			
	44-60	15-50	30-65	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.49	.55			
1002:														
Sholander	0-8	30-55	30-50	8-18	1.10-1.45	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.15	.24	4	5	56
	8-16	60-85	5-35	2-12	1.50-1.80	2-6	0.07-0.13	0.0-2.9	0.2-1.0	.05	.17			
	16-28	60-90	5-30	0-8	1.50-1.70	6-20	0.03-0.08	0.0-2.9	0.2-1.0	.02	.05			
	28-51	65-95	0-30	0-5	1.50-1.70	20-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.05			
	51-60	35-70	30-50	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.28	.37			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
1003:														
Coupeville----------	0-7	35-50	30-50	5-18	0.80-1.20	0.6-2	0.16-0.18	0.0-2.9	7.0-12	.24	.24	4	5	56
	7-12	25-65	20-60	5-18	0.80-1.45	0.6-2	0.11-0.21	0.0-2.9	5.0-10	.24	.24			
	12-20	30-60	15-45	20-32	1.50-1.75	0.2-2	0.12-0.21	3.0-5.9	0.2-1.0	.37	.37			
	20-34	15-40	30-55	20-35	1.50-1.75	0.06-0.6	0.14-0.21	3.0-5.9	0.2-1.0	.37	.37			
	34-50	15-40	30-55	20-35	1.50-1.75	0.06-0.6	0.14-0.21	3.0-5.9	0.2-1.0	.37	.37			
	50-60	10-40	35-65	20-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.43	.43			
1004:														
Limepoint-----------	0-6	15-50	50-80	7-18	0.80-1.20	0.2-2	0.15-0.21	0.0-2.9	10-25	.37	.37	4	5	56
	6-14	15-50	30-75	7-18	0.80-1.20	0.2-2	0.10-0.21	0.0-2.9	5.0-10	.20	.24			
	14-31	50-100	0-50	0-18	1.25-1.50	0.6-101	0.02-0.18	0.0-2.9	0.2-1.0	.02	.02			
	31-49	35-100	0-50	2-18	1.20-1.50	0.6-101	0.02-0.18	0.0-2.9	0.2-1.0	.32	.37			
	49-58	35-100	0-50	2-18	1.25-1.50	0.6-101	0.02-0.18	0.0-2.9	0.2-1.0	.20	.24			
	58-60	15-45	30-80	15-40	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.43			
Sholander-----------	0-8	30-55	30-50	8-18	1.10-1.45	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.15	.24	4	5	56
	8-16	60-85	5-35	2-12	1.50-1.80	2-6	0.07-0.13	0.0-2.9	0.2-1.0	.05	.17			
	16-28	60-90	5-30	0-8	1.50-1.70	6-20	0.03-0.08	0.0-2.9	0.2-1.0	.02	.05			
	28-51	65-95	0-30	0-5	1.50-1.70	20-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.05			
	51-60	35-70	30-50	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.28	.37			
1005:														
Shalcar-------------	0-3	5-20	50-80	15-40	0.10-0.30	0.6-2	0.30-0.60	---	15-40	.02	.02	2	2	134
	3-11	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	15-40	.02	.02			
	11-22	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	15-40	.02	.02			
	22-27	25-70	15-70	2-18	1.20-1.50	0.2-6	0.13-0.15	0.0-2.9	0.5-1.0	.32	.32			
	27-44	25-100	5-70	2-18	1.20-1.50	0.6-20	0.19-0.21	0.0-2.9	0.5-1.0	.55	.55			
	44-60	25-70	15-70	2-18	1.20-1.50	0.2-6	0.11-0.13	0.0-2.9	0.5-1.0	.24	.24			
1006:														
Semiahmoo-----------	0-9	5-20	50-80	15-40	0.10-0.30	0.6-2	0.30-0.60	---	60-80	.02	.02	5	2	134
	9-10	20-30	70-80	0-5	0.80-1.20	0.2-0.6	0.35-0.45	0.0-2.9	1.0-9.0	.37	.37			
	10-30	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	60-80	.02	.02			
	30-48	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			
	48-60	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			
	60-72	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			
	72-84	5-20	50-80	15-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
1009:														
Coveland------------	0-4	30-50	30-50	7-18	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.20	.24	4	5	56
	4-9	15-65	25-70	10-25	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	2.0-7.0	.20	.24			
	9-20	15-80	15-80	5-25	1.60-1.80	0.6-6	0.09-0.13	0.0-2.9	0.2-1.0	.20	.24			
	20-36	15-50	30-65	18-35	1.50-1.75	0.06-2	0.16-0.21	3.0-5.9	0.2-1.0	.02	.05			
	36-44	15-50	30-65	18-35	1.50-1.75	0.06-2	0.16-0.21	3.0-5.9	0.2-1.0	.49	.55			
	44-60	15-50	30-65	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.49	.55			
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			
1010:														
Deadmanbay----------	0-1	20-35	50-75	8-20	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-5	20-35	50-75	8-20	0.80-1.20	0.2-0.6	0.16-0.21	0.0-2.9	7.0-12	.28	.37			
	5-16	20-45	35-70	8-27	0.80-1.20	0.2-2	0.25-0.37	0.0-5.9	1.0-4.0	.32	.43			
	16-29	60-95	10-35	1-15	1.50-1.70	2-20	0.03-0.13	0.0-2.9	0.2-1.0	.02	.02			
	29-57	10-30	40-70	18-35	1.50-1.75	0.06-0.6	0.11-0.21	3.0-5.9	0.2-1.0	.20	.49			
	57-60	10-30	40-70	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.49			
Morancreek----------	0-1	50-80	5-45	4-12	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-3	50-80	5-45	4-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.24	.24			
	3-10	20-80	10-60	4-14	1.10-1.45	2-6	0.12-0.37	0.0-2.9	1.0-4.0	.24	.24			
	10-21	20-80	10-60	4-14	1.10-1.45	2-6	0.12-0.37	0.0-2.9	0.5-2.0	.24	.24			
	21-28	50-85	5-45	5-14	1.60-1.80	2-6	0.05-0.13	0.0-2.9	0.2-1.0	.20	.24			
	28-60	50-85	5-45	4-12	1.60-1.80	2-6	0.05-0.13	0.0-2.9	0.2-1.0	.24	.24			
1013:														
Bazal---------------	0-1	15-65	25-60	10-20	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-4	15-65	25-60	10-20	0.80-1.20	0.6-2	0.28-0.32	0.0-2.9	10-25	.20	.20			
	4-10	15-65	25-60	10-20	0.80-1.20	2-6	0.20-0.25	0.0-2.9	7.0-12	.17	.20			
	10-17	15-65	25-60	3-18	0.80-1.45	2-6	0.16-0.21	0.0-2.9	1.0-4.0	.20	.24			
	17-24	45-80	15-30	2-19	1.50-1.70	2-20	0.04-0.07	0.0-2.9	0.2-1.0	.02	.02			
	24-39	20-45	30-50	18-33	1.50-1.75	0.2-0.6	0.14-0.18	3.0-5.9	0.2-1.0	.37	.43			
	39-60	15-45	30-70	19-30	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.43			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
1013:														
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			
1014:														
Beaches-------------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
Endoaquents, tidal--	0-29	70-100	0-25	0-3	1.50-1.70	20-101	0.01-0.06	0.0-2.9	0.5-1.2	.02	.05	5	1	220
	29-48	85-100	0-15	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.05			
	48-60	85-100	0-15	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-0.8	.02	.05			
Xerorthents---------	0-1	75-95	0-10	0-3	1.25-1.50	20-101	0.01-0.04	0.0-2.9	3.0-6.0	.02	.02	5	1	220
	1-20	80-100	0-5	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.05			
	20-60	80-100	0-5	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.05			
1015:														
Deadmanbay----------	0-1	20-35	50-75	8-20	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-5	20-35	50-75	8-20	0.80-1.20	0.2-0.6	0.16-0.21	0.0-2.9	7.0-12	.28	.37			
	5-16	20-45	35-70	8-27	0.80-1.20	0.2-2	0.25-0.37	0.0-5.9	1.0-4.0	.32	.43			
	16-29	60-95	10-35	1-15	1.50-1.70	2-20	0.03-0.13	0.0-2.9	0.2-1.0	.02	.02			
	29-57	10-30	40-70	18-35	1.50-1.75	0.06-0.6	0.11-0.21	3.0-5.9	0.2-1.0	.20	.49			
	57-60	10-30	40-70	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.49			
Bazal---------------	0-1	15-65	25-60	10-20	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-4	15-65	25-60	10-20	0.80-1.20	0.6-2	0.28-0.32	0.0-2.9	10-25	.20	.20			
	4-10	15-65	25-60	10-20	0.80-1.20	2-6	0.20-0.25	0.0-2.9	7.0-12	.17	.20			
	10-17	15-65	25-60	3-18	0.80-1.45	2-6	0.16-0.21	0.0-2.9	1.0-4.0	.20	.24			
	17-24	45-80	15-30	2-19	1.50-1.70	2-20	0.04-0.07	0.0-2.9	0.2-1.0	.02	.02			
	24-39	20-45	30-50	18-33	1.50-1.75	0.2-0.6	0.14-0.18	3.0-5.9	0.2-1.0	.37	.43			
	39-60	15-45	30-70	19-30	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.43			
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
1016:														
Orcas---------------	0-3	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	85-100	.02	.02	5	7	38
	3-12	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	85-100	.02	.02			
	12-60	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	85-100	.02	.02			
1053:														
Dugualla------------	0-11	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02	5	2	134
	11-20	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			
	20-26	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			
	26-60	---	---	10-35	0.10-0.30	0.6-2	0.30-0.60	---	70-90	.02	.02			
2000:														
Whidbey-------------	0-2	30-80	10-45	6-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	2-6	30-80	10-45	6-15	0.80-1.20	2-6	0.09-0.32	0.0-2.9	7.0-12	.15	.28			
	6-20	35-75	10-45	4-15	1.10-1.45	2-20	0.03-0.16	0.0-2.9	1.0-4.0	.05	.24			
	20-37	55-80	5-40	5-18	1.60-1.80	2-20	0.02-0.11	0.0-2.9	0.2-1.0	.05	.24			
	37-60	50-75	5-30	9-24	1.70-1.90	0.00-0.06	0.05-0.14	0.0-2.9	0.2-1.0	.10	.24			
2001:														
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			
2002:														
Sucia---------------	0-8	72-88	5-23	2-8	1.25-1.50	6-20	0.05-0.08	0.0-2.9	7.0-12	.05	.05	4	2	134
	8-17	72-95	5-23	0-5	1.25-1.50	6-101	0.04-0.14	0.0-2.9	1.0-4.0	.10	.10			
	17-31	72-95	5-23	0-5	1.50-1.70	6-101	0.03-0.08	0.0-2.9	0.2-1.0	.05	.10			
	31-38	25-70	10-45	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.37	.37			
	38-60	10-60	10-65	18-35	1.70-1.90	0.2-0.6	0.00-0.00	3.0-5.9	0.2-1.0	.55	.55			
2004:														
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
2007:														
Alderwood, warm-----	0-1	50-70	20-40	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-10	50-70	20-40	5-15	1.10-1.45	2-6	0.04-0.10	0.0-2.9	7.0-12	.02	.15			
	10-18	50-70	20-40	5-15	1.10-1.45	2-6	0.04-0.08	0.0-2.9	1.0-4.0	.02	.10			
	18-36	50-70	20-35	5-15	1.60-1.80	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	36-60	10-30	45-70	18-35	1.70-1.90	0.00-0.06	0.12-0.21	3.0-5.9	0.2-1.0	.24	.49			
Everett, warm-------	0-2	50-75	10-45	0-25	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	2-9	50-75	10-35	5-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.10	.15			
	9-13	50-85	5-35	2-12	1.10-1.45	2-6	0.12-0.23	0.0-2.9	1.0-4.0	.10	.17			
	13-30	70-95	5-25	0-5	1.10-1.50	6-20	0.01-0.05	0.0-2.9	0.5-3.0	.02	.05			
	30-60	70-95	5-25	0-4	1.50-1.60	6-101	0.01-0.03	0.0-2.9	0.2-1.0	.02	.02			
2008:														
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			
Sholander-----------	0-8	30-55	30-50	8-18	1.10-1.45	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.15	.24	4	5	56
	8-16	60-85	5-35	2-12	1.50-1.80	2-6	0.07-0.13	0.0-2.9	0.2-1.0	.05	.17			
	16-28	60-90	5-30	0-8	1.50-1.70	6-20	0.03-0.08	0.0-2.9	0.2-1.0	.02	.05			
	28-51	65-95	0-30	0-5	1.50-1.70	20-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.05			
	51-60	35-70	30-50	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.28	.37			
Bazal---------------	0-1	15-65	25-60	10-20	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-4	15-65	25-60	10-20	0.80-1.20	0.6-2	0.28-0.32	0.0-2.9	10-25	.20	.20			
	4-10	15-65	25-60	10-20	0.80-1.20	2-6	0.20-0.25	0.0-2.9	7.0-12	.17	.20			
	10-17	15-65	25-60	3-18	0.80-1.45	2-6	0.16-0.21	0.0-2.9	1.0-4.0	.20	.24			
	17-24	45-80	15-30	2-19	1.50-1.70	2-20	0.04-0.07	0.0-2.9	0.2-1.0	.02	.02			
	24-39	20-45	30-50	18-33	1.50-1.75	0.2-0.6	0.14-0.18	3.0-5.9	0.2-1.0	.37	.43			
	39-60	15-45	30-70	19-30	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.43			
2009:														
Limepoint-----------	0-6	15-50	50-80	7-18	0.80-1.20	0.2-2	0.15-0.21	0.0-2.9	10-25	.37	.37	4	5	56
	6-14	15-50	30-75	7-18	0.80-1.20	0.2-2	0.10-0.21	0.0-2.9	5.0-10	.20	.24			
	14-31	50-100	0-50	0-18	1.25-1.50	0.6-101	0.02-0.18	0.0-2.9	0.2-1.0	.02	.02			
	31-49	35-100	0-50	2-18	1.20-1.50	0.6-101	0.02-0.18	0.0-2.9	0.2-1.0	.32	.37			
	49-58	35-100	0-50	2-18	1.25-1.50	0.6-101	0.02-0.18	0.0-2.9	0.2-1.0	.20	.24			
	58-60	15-45	30-80	15-40	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.43			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensibility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodibility group	Wind erodibility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
2009:														
Alderwood, warm-----	0-1	50-70	20-40	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-10	50-70	20-40	5-15	1.10-1.45	2-6	0.04-0.10	0.0-2.9	7.0-12	.02	.15			
	10-18	50-70	20-40	5-15	1.10-1.45	2-6	0.04-0.08	0.0-2.9	1.0-4.0	.02	.10			
	18-36	50-70	20-35	5-15	1.60-1.80	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	36-60	10-30	45-70	18-35	1.70-1.90	0.00-0.06	0.12-0.21	3.0-5.9	0.2-1.0	.24	.49			
Sholander-----------	0-8	30-55	30-50	8-18	1.10-1.45	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.15	.24	4	5	56
	8-16	60-85	5-35	2-12	1.50-1.80	2-6	0.07-0.13	0.0-2.9	0.2-1.0	.05	.17			
	16-28	60-90	5-30	0-8	1.50-1.70	6-20	0.03-0.08	0.0-2.9	0.2-1.0	.02	.05			
	28-51	65-95	0-30	0-5	1.50-1.70	20-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.05			
	51-60	35-70	30-50	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.28	.37			
2010:														
Whidbey-------------	0-2	30-80	10-45	6-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	2-6	30-80	10-45	6-15	0.80-1.20	2-6	0.09-0.32	0.0-2.9	7.0-12	.15	.28			
	6-20	35-75	10-45	4-15	1.10-1.45	2-20	0.03-0.16	0.0-2.9	1.0-4.0	.05	.24			
	20-37	55-80	5-40	5-18	1.60-1.80	2-20	0.02-0.11	0.0-2.9	0.2-1.0	.05	.24			
	37-60	50-75	5-30	9-24	1.70-1.90	0.00-0.06	0.05-0.14	0.0-2.9	0.2-1.0	.10	.24			
Hoypus--------------	0-1	55-75	0-30	0-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-5	55-75	0-30	0-15	1.10-1.45	2-6	0.05-0.13	0.0-2.9	7.0-12	.05	.10			
	5-20	60-90	0-25	0-5	1.25-1.50	6-20	0.05-0.14	0.0-2.9	1.0-4.0	.02	.02			
	20-36	70-100	0-20	0-5	1.25-1.50	6-20	0.01-0.05	0.0-2.9	0.8-3.5	.02	.05			
	36-60	70-100	0-15	0-5	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
2011:														
Roche---------------	0-1	35-75	10-50	0-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-5	35-75	10-50	5-18	0.80-1.20	2-6	0.14-0.18	0.0-2.9	7.0-12	.20	.24			
	5-15	35-85	5-50	2-18	0.80-1.40	2-6	0.12-0.22	0.0-2.9	1.0-4.0	.10	.15			
	15-23	35-85	5-50	2-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.5-2.0	.32	.37			
	23-39	35-75	10-50	5-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.2-1.0	.37	.43			
	39-60	15-70	30-75	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.55	.64			
Killebrew-----------	0-1	55-75	15-35	5-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	3	86
	1-5	55-75	15-35	5-18	1.10-1.45	2-6	0.10-0.12	0.0-2.9	7.0-12	.10	.15			
	5-9	45-75	15-35	5-18	1.10-1.45	2-6	0.12-0.32	0.0-2.9	1.0-4.0	.15	.20			
	9-17	45-70	15-35	5-18	1.70-1.90	0.6-2	0.07-0.18	0.0-2.9	0.2-1.0	.10	.24			
	17-27	20-45	40-70	18-35	1.70-1.90	0.06-0.6	0.10-0.21	3.0-5.9	0.2-1.0	.49	.55			
	27-60	20-45	30-50	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.32	.43			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
3000:														
Pilepoint-----------	0-4	40-70	20-50	5-12	0.80-1.20	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.24	.32	4	5	56
	4-13	40-70	20-50	5-12	0.80-1.45	0.6-6	0.10-0.18	0.0-2.9	6.0-10	.24	.32			
	13-22	50-80	10-50	2-12	1.10-1.50	2-6	0.04-0.11	0.0-2.9	1.0-4.0	.02	.10			
	22-29	50-80	5-50	2-15	0.80-1.50	2-20	0.07-0.13	0.0-2.9	0.2-1.0	.10	.20			
	29-36	20-50	35-60	18-35	0.80-1.35	0.06-0.6	0.12-0.21	3.0-5.9	0.2-1.0	.37	.43			
	36-46	20-50	35-60	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.49	.55			
	46-60	20-50	35-60	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.49	.55			
3001:														
Hoypus--------------	0-1	55-75	0-30	0-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-5	55-75	0-30	0-15	1.10-1.45	2-6	0.05-0.13	0.0-2.9	7.0-12	.05	.10			
	5-20	60-90	0-25	0-5	1.25-1.50	6-20	0.05-0.14	0.0-2.9	1.0-4.0	.02	.02			
	20-36	70-100	0-20	0-5	1.25-1.50	6-20	0.01-0.05	0.0-2.9	0.8-3.5	.02	.05			
	36-60	70-100	0-15	0-5	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
3002:														
Keystone------------	0-1	55-85	10-45	0-8	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-3	55-85	10-45	0-8	1.15-1.45	2-20	0.07-0.13	0.0-2.9	5.0-10	.15	.15			
	3-8	55-100	10-45	0-8	1.15-1.60	2-20	0.07-0.12	0.0-2.9	1.0-5.0	.15	.15			
	8-19	75-100	0-25	0-8	1.35-1.60	6-101	0.04-0.11	0.0-2.9	0.5-1.0	.05	.05			
	19-34	75-100	0-25	0-5	1.35-1.60	6-101	0.04-0.08	0.0-2.9	0.5-1.0	.02	.10			
	34-60	75-100	0-25	0-5	1.35-1.60	6-101	0.04-0.08	0.0-2.9	0.5-1.0	.05	.10			
3005:														
San Juan------------	0-4	45-75	15-50	2-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.15	.15	5	3	86
	4-13	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	6.0-12	.15	.15			
	13-19	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	3.0-6.0	.15	.15			
	19-27	65-85	5-35	0-8	1.10-1.50	2-20	0.01-0.06	0.0-2.9	1.0-4.0	.02	.02			
	27-41	75-95	5-25	0-5	1.50-1.70	6-20	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	41-62	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	62-70	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
3006:														
San Juan------------	0-4	45-75	15-50	2-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.15	.15	5	3	86
	4-13	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	6.0-12	.15	.15			
	13-19	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	3.0-6.0	.15	.15			
	19-27	65-85	5-35	0-8	1.10-1.50	2-20	0.01-0.06	0.0-2.9	1.0-4.0	.02	.02			
	27-41	75-95	5-25	0-5	1.50-1.70	6-20	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	41-62	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	62-70	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
3007:														
San Juan------------	0-4	45-75	15-50	2-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.15	.15	5	3	86
	4-13	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	6.0-12	.15	.15			
	13-19	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	3.0-6.0	.15	.15			
	19-27	65-85	5-35	0-8	1.10-1.50	2-20	0.01-0.06	0.0-2.9	1.0-4.0	.02	.02			
	27-41	75-95	5-25	0-5	1.50-1.70	6-20	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	41-62	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	62-70	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
3008:														
Xerorthents---------	0-1	75-95	0-10	0-3	1.25-1.50	20-101	0.01-0.04	0.0-2.9	3.0-6.0	.02	.02	5	1	220
	1-20	80-100	0-5	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.05			
	20-60	80-100	0-5	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.05			
Endoaquents, tidal--	0-29	70-100	0-25	0-3	1.50-1.70	20-101	0.01-0.06	0.0-2.9	0.5-1.2	.02	.05	5	1	220
	29-48	85-100	0-15	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.05			
	48-60	85-100	0-15	0-3	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-0.8	.02	.05			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
3010:														
San Juan------------	0-4	45-75	15-50	2-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.15	.15	5	3	86
	4-13	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	6.0-12	.15	.15			
	13-19	45-75	15-50	2-12	0.80-1.50	2-20	0.07-0.13	0.0-2.9	3.0-6.0	.15	.15			
	19-27	65-85	5-35	0-8	1.10-1.50	2-20	0.01-0.06	0.0-2.9	1.0-4.0	.02	.02			
	27-41	75-95	5-25	0-5	1.50-1.70	6-20	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	41-62	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
	62-70	75-100	0-25	0-5	1.50-1.70	6-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
Dune land-----------	0-60	---	---	0-1	1.40-1.60	6-20	0.03-0.05	0.0-2.9	0.0-0.1	.17	.17	5	1	250
3012:														
Hoypus--------------	0-1	55-75	0-30	0-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-5	55-75	0-30	0-15	1.10-1.45	2-6	0.05-0.13	0.0-2.9	7.0-12	.05	.10			
	5-20	60-90	0-25	0-5	1.25-1.50	6-20	0.05-0.14	0.0-2.9	1.0-4.0	.02	.02			
	20-36	70-100	0-20	0-5	1.25-1.50	6-20	0.01-0.05	0.0-2.9	0.8-3.5	.02	.05			
	36-60	70-100	0-15	0-5	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
3013:														
Everett, warm-------	0-2	50-75	10-45	0-25	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	2-9	50-75	10-35	5-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.10	.15			
	9-13	50-85	5-35	2-12	1.10-1.45	2-6	0.12-0.23	0.0-2.9	1.0-4.0	.10	.17			
	13-30	70-95	5-25	0-5	1.10-1.50	6-20	0.01-0.05	0.0-2.9	0.5-3.0	.02	.05			
	30-60	70-95	5-25	0-4	1.50-1.60	6-101	0.01-0.03	0.0-2.9	0.2-1.0	.02	.02			
3014:														
Everett, warm-------	0-2	50-75	10-45	0-25	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	2-9	50-75	10-35	5-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.10	.15			
	9-13	50-85	5-35	2-12	1.10-1.45	2-6	0.12-0.23	0.0-2.9	1.0-4.0	.10	.17			
	13-30	70-95	5-25	0-5	1.10-1.50	6-20	0.01-0.05	0.0-2.9	0.5-3.0	.02	.05			
	30-60	70-95	5-25	0-4	1.50-1.60	6-101	0.01-0.03	0.0-2.9	0.2-1.0	.02	.02			
3015:														
Indianola, warm-----	0-1	75-95	5-20	0-8	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	1	220
	1-6	75-95	5-20	0-8	1.25-1.50	6-101	0.06-0.08	0.0-2.9	7.0-12	.05	.05			
	6-17	75-95	5-20	0-8	1.25-1.50	6-101	0.06-0.11	0.0-2.9	1.0-4.0	.10	.10			
	17-27	75-95	5-20	0-8	1.25-1.50	6-101	0.03-0.11	0.0-2.9	0.5-2.0	.05	.05			
	27-37	75-95	5-20	0-8	1.50-1.70	6-101	0.03-0.08	0.0-2.9	0.2-1.0	.05	.05			
	37-60	75-95	5-20	0-8	1.35-1.60	6-101	0.03-0.08	0.0-2.9	0.2-1.0	.05	.05			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi- bility group	Wind erodi- bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
3016:														
Sucia----------------	0-8	72-88	5-23	2-8	1.25-1.50	6-20	0.05-0.08	0.0-2.9	7.0-12	.05	.05	4	2	134
	8-17	72-95	5-23	0-5	1.25-1.50	6-101	0.04-0.14	0.0-2.9	1.0-4.0	.10	.10			
	17-31	72-95	5-23	0-5	1.50-1.70	6-101	0.03-0.08	0.0-2.9	0.2-1.0	.05	.10			
	31-38	25-70	10-45	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.37	.37			
	38-60	10-60	10-65	18-35	1.70-1.90	0.2-0.6	0.00-0.00	3.0-5.9	0.2-1.0	.55	.55			
Sholander-----------	0-8	30-55	30-50	8-18	1.10-1.45	0.6-2	0.10-0.18	0.0-2.9	7.0-12	.15	.24	4	5	56
	8-16	60-85	5-35	2-12	1.50-1.80	2-6	0.07-0.13	0.0-2.9	0.2-1.0	.05	.17			
	16-28	60-90	5-30	0-8	1.50-1.70	6-20	0.03-0.08	0.0-2.9	0.2-1.0	.02	.05			
	28-51	65-95	0-30	0-5	1.50-1.70	20-101	0.03-0.06	0.0-2.9	0.2-1.0	.02	.05			
	51-60	35-70	30-50	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.28	.37			
4000:														
Roche----------------	0-1	35-75	10-50	0-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-5	35-75	10-50	5-18	0.80-1.20	2-6	0.14-0.18	0.0-2.9	7.0-12	.20	.24			
	5-15	35-85	5-50	2-18	0.80-1.40	2-6	0.12-0.22	0.0-2.9	1.0-4.0	.10	.15			
	15-23	35-85	5-50	2-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.5-2.0	.32	.37			
	23-39	35-75	10-50	5-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.2-1.0	.37	.43			
	39-60	15-70	30-75	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.55	.64			
Killebrew-----------	0-1	55-75	15-35	5-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	3	86
	1-5	55-75	15-35	5-18	1.10-1.45	2-6	0.10-0.12	0.0-2.9	7.0-12	.10	.15			
	5-9	45-75	15-35	5-18	1.10-1.45	2-6	0.12-0.32	0.0-2.9	1.0-4.0	.15	.20			
	9-17	45-70	15-35	5-18	1.70-1.90	0.6-2	0.07-0.18	0.0-2.9	0.2-1.0	.10	.24			
	17-27	20-45	40-70	18-35	1.70-1.90	0.06-0.6	0.10-0.21	3.0-5.9	0.2-1.0	.49	.55			
	27-60	20-45	30-50	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.32	.43			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
4002:														
Laconner, warm------	0-1	45-75	20-40	2-12	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-3	45-75	20-40	2-12	1.10-1.45	2-6	0.07-0.15	0.0-2.9	7.0-12	.05	.10			
	3-10	55-85	10-40	0-8	1.10-1.45	6-20	0.02-0.09	0.0-2.9	1.0-4.0	.05	.10			
	10-20	55-85	10-40	0-8	1.10-1.45	6-20	0.01-0.11	0.0-2.9	0.5-2.0	.02	.10			
	20-33	75-95	5-23	0-8	1.35-1.60	20-101	0.01-0.07	0.0-2.9	0.2-1.0	.02	.02			
	33-39	75-95	5-23	0-8	1.35-1.60	20-101	0.01-0.05	0.0-2.9	0.2-1.0	.02	.02			
	39-60	55-85	10-40	0-8	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.15	.24			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
4003:														
Hoypus--------------	0-1	55-75	0-30	0-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-5	55-75	0-30	0-15	1.10-1.45	2-6	0.05-0.13	0.0-2.9	7.0-12	.05	.10			
	5-20	60-90	0-25	0-5	1.25-1.50	6-20	0.05-0.14	0.0-2.9	1.0-4.0	.02	.02			
	20-36	70-100	0-20	0-5	1.25-1.50	6-20	0.01-0.05	0.0-2.9	0.8-3.5	.02	.05			
	36-60	70-100	0-15	0-5	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			
Whidbey-------------	0-2	30-80	10-45	6-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	2-6	30-80	10-45	6-15	0.80-1.20	2-6	0.09-0.32	0.0-2.9	7.0-12	.15	.28			
	6-20	35-75	10-45	4-15	1.10-1.45	2-20	0.03-0.16	0.0-2.9	1.0-4.0	.05	.24			
	20-37	55-80	5-40	5-18	1.60-1.80	2-20	0.02-0.11	0.0-2.9	0.2-1.0	.05	.24			
	37-60	50-75	5-30	9-24	1.70-1.90	0.00-0.06	0.05-0.14	0.0-2.9	0.2-1.0	.10	.24			
4005:														
Roche---------------	0-1	35-75	10-50	0-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-5	35-75	10-50	5-18	0.80-1.20	2-6	0.14-0.18	0.0-2.9	7.0-12	.20	.24			
	5-15	35-85	5-50	2-18	0.80-1.40	2-6	0.12-0.22	0.0-2.9	1.0-4.0	.10	.15			
	15-23	35-85	5-50	2-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.5-2.0	.32	.37			
	23-39	35-75	10-50	5-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.2-1.0	.37	.43			
	39-60	15-70	30-75	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.55	.64			
Haro----------------	0-1	35-55	30-45	8-15	0.80-1.45	0.6-20	0.14-0.18	0.0-2.9	7.0-12	.17	.24	1	5	56
	1-5	40-65	20-45	5-15	0.80-1.45	2-20	0.07-0.18	0.0-2.9	4.0-8.0	.15	.24			
	5-11	50-70	20-40	5-15	1.10-1.45	2-20	0.07-0.13	0.0-2.9	1.0-4.0	.10	.17			
	11-21	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
4006:														
Alderwood, warm-----	0-1	50-70	20-40	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-10	50-70	20-40	5-15	1.10-1.45	2-6	0.04-0.10	0.0-2.9	7.0-12	.02	.15			
	10-18	50-70	20-40	5-15	1.10-1.45	2-6	0.04-0.08	0.0-2.9	1.0-4.0	.02	.10			
	18-36	50-70	20-35	5-15	1.60-1.80	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	36-60	10-30	45-70	18-35	1.70-1.90	0.00-0.06	0.12-0.21	3.0-5.9	0.2-1.0	.24	.49			
Hoypus--------------	0-1	55-75	0-30	0-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-5	55-75	0-30	0-15	1.10-1.45	2-6	0.05-0.13	0.0-2.9	7.0-12	.05	.10			
	5-20	60-90	0-25	0-5	1.25-1.50	6-20	0.05-0.14	0.0-2.9	1.0-4.0	.02	.02			
	20-36	70-100	0-20	0-5	1.25-1.50	6-20	0.01-0.05	0.0-2.9	0.8-3.5	.02	.05			
	36-60	70-100	0-15	0-5	1.50-1.70	20-101	0.01-0.04	0.0-2.9	0.2-1.0	.02	.02			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Erosion factors Kf	Erosion factors T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
4007:														
Roche---------------	0-1	35-75	10-50	0-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	5	56
	1-5	35-75	10-50	5-18	0.80-1.20	2-6	0.14-0.18	0.0-2.9	7.0-12	.20	.24			
	5-15	35-85	5-50	2-18	0.80-1.40	2-6	0.12-0.22	0.0-2.9	1.0-4.0	.10	.15			
	15-23	35-85	5-50	2-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.5-2.0	.32	.37			
	23-39	35-75	10-50	5-18	1.50-1.75	0.2-0.6	0.10-0.18	0.0-2.9	0.2-1.0	.37	.43			
	39-60	15-70	30-75	8-18	1.70-1.90	0.00-0.06	0.00-0.00	0.0-2.9	0.2-1.0	.55	.64			
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			
4008:														
Mitchellbay---------	0-1	55-65	10-35	8-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	4	3	86
	1-6	55-65	10-35	8-18	1.10-1.45	0.6-6	0.07-0.13	0.0-2.9	7.0-12	.10	.15			
	6-15	30-70	20-45	8-18	1.10-1.45	0.6-6	0.12-0.20	0.0-2.9	1.0-4.0	.10	.17			
	15-20	30-70	20-45	4-12	1.60-1.80	0.6-6	0.05-0.18	0.0-2.9	0.2-1.0	.20	.24			
	20-26	15-50	30-65	18-35	1.50-1.75	0.2-2	0.14-0.21	3.0-5.9	0.2-1.0	.32	.37			
	26-38	15-50	35-65	18-35	1.50-1.75	0.2-2	0.09-0.21	3.0-5.9	0.2-1.0	.32	.37			
	38-60	15-50	35-65	12-27	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.37	.37			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
Killebrew-----------	0-1	55-75	15-35	5-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	3	86
	1-5	55-75	15-35	5-18	1.10-1.45	2-6	0.10-0.12	0.0-2.9	7.0-12	.10	.15			
	5-9	45-75	15-35	5-18	1.10-1.45	2-6	0.12-0.32	0.0-2.9	1.0-4.0	.15	.20			
	9-17	45-70	15-35	5-18	1.70-1.90	0.6-2	0.07-0.18	0.0-2.9	0.2-1.0	.10	.24			
	17-27	20-45	40-70	18-35	1.70-1.90	0.06-0.6	0.10-0.21	3.0-5.9	0.2-1.0	.49	.55			
	27-60	20-45	30-50	18-35	1.70-1.90	0.00-0.06	0.00-0.00	3.0-5.9	0.2-1.0	.32	.43			
5000:														
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
5001:														
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
Haro----------------	0-1	35-55	30-45	8-15	0.80-1.45	0.6-20	0.14-0.18	0.0-2.9	7.0-12	.17	.24	1	5	56
	1-5	40-65	20-45	5-15	0.80-1.45	2-20	0.07-0.18	0.0-2.9	4.0-8.0	.15	.24			
	5-11	50-70	20-40	5-15	1.10-1.45	2-20	0.07-0.13	0.0-2.9	1.0-4.0	.10	.17			
	11-21	---	---	---	---	---	---	---	---	---	---			
5002:														
Doebay, moist-------	0-1	45-70	20-40	5-16	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	5	56
	1-6	45-70	20-40	5-16	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.28	.37			
	6-16	50-75	20-40	5-16	1.10-1.45	0.6-6	0.14-0.25	0.0-2.9	1.0-4.0	.17	.24			
	16-21	50-75	20-40	5-16	0.80-1.30	0.6-6	0.05-0.14	0.0-2.9	0.5-2.0	.10	.37			
	21-35	60-80	15-30	2-12	1.10-1.45	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	35-45	---	---	---	---	---	---	---	---	---	---			
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			
Doebay--------------	0-1	45-70	20-40	5-16	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	5	56
	1-6	45-70	20-40	5-16	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.28	.37			
	6-16	50-75	20-40	5-16	1.10-1.45	0.6-6	0.14-0.25	0.0-2.9	1.0-4.0	.17	.24			
	16-21	50-75	20-40	5-16	0.80-1.30	0.6-6	0.05-0.14	0.0-2.9	0.5-2.0	.10	.37			
	21-35	60-80	15-30	2-12	1.10-1.45	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	35-45	---	---	---	---	---	---	---	---	---	---			
5003:														
Doebay--------------	0-1	45-70	20-40	5-16	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	5	56
	1-6	45-70	20-40	5-16	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.28	.37			
	6-16	50-75	20-40	5-16	1.10-1.45	0.6-6	0.14-0.25	0.0-2.9	1.0-4.0	.17	.24			
	16-21	50-75	20-40	5-16	0.80-1.30	0.6-6	0.05-0.14	0.0-2.9	0.5-2.0	.10	.37			
	21-35	60-80	15-30	2-12	1.10-1.45	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	35-45	---	---	---	---	---	---	---	---	---	---			
Morancreek----------	0-1	50-80	5-45	4-12	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	1-3	50-80	5-45	4-12	1.10-1.45	2-6	0.09-0.13	0.0-2.9	7.0-12	.24	.24			
	3-10	20-80	10-60	4-14	1.10-1.45	2-6	0.12-0.37	0.0-2.9	1.0-4.0	.24	.24			
	10-21	20-80	10-60	4-14	1.10-1.45	2-6	0.12-0.37	0.0-2.9	0.5-2.0	.24	.24			
	21-28	50-85	5-45	5-14	1.60-1.80	2-6	0.05-0.13	0.0-2.9	0.2-1.0	.20	.24			
	28-60	50-85	5-45	4-12	1.60-1.80	2-6	0.05-0.13	0.0-2.9	0.2-1.0	.24	.24			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi-bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi-bility group	Wind erodi-bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
5004:														
Pickett-------------	0-1	35-75	15-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	3	86
	1-3	35-75	15-50	5-15	0.80-1.00	2-6	0.08-0.23	0.0-2.9	7.0-12	.05	.24			
	3-27	35-75	15-50	5-15	0.80-1.00	2-6	0.06-0.15	0.0-2.9	1.0-4.0	.05	.17			
	27-36	50-75	15-35	5-15	1.10-1.45	2-6	0.03-0.07	0.0-2.9	0.5-2.0	.02	.15			
	36-46	---	---	---	---	---	---	---	---	---	---			
Kahboo--------------	0-1	35-70	25-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	3	86
	1-2	35-70	25-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---			
	2-9	35-70	25-50	5-15	0.80-1.00	2-6	0.12-0.23	0.0-2.9	2.5-4.0	.15	.24			
	9-14	35-70	25-50	5-15	0.80-1.00	0.6-6	0.12-0.27	0.0-2.9	2.0-3.0	.10	.28			
	14-24	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
5005:														
Constitution--------	0-1	35-75	15-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	3	86
	1-6	35-75	15-50	5-15	0.80-1.00	2-6	0.11-0.20	0.0-2.9	7.0-12	.10	.15			
	6-16	35-75	15-50	5-15	0.80-1.00	2-6	0.11-0.23	0.0-2.9	1.0-4.0	.17	.17			
	16-26	50-75	15-35	5-15	1.10-1.45	2-6	0.05-0.15	0.0-2.9	0.5-2.0	.15	.15			
	26-36	---	---	---	---	---	---	---	---	---	---			
Skipjack------------	0-3	35-75	15-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	5	3	86
	3-32	35-75	15-50	5-15	0.80-1.00	0.6-2	0.12-0.23	0.0-2.9	2.0-5.0	.10	.17			
	32-43	35-75	15-50	5-15	0.80-1.00	2-6	0.11-0.27	0.0-2.9	0.8-3.0	.15	.20			
	43-60	50-75	15-35	3-15	1.35-1.60	2-6	0.05-0.13	0.0-29.0	0.2-1.0	.10	.17			
Kahboo--------------	0-1	35-70	25-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	3	86
	1-2	35-70	25-50	5-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---			
	2-9	35-70	25-50	5-15	0.80-1.00	2-6	0.12-0.23	0.0-2.9	2.5-4.0	.15	.24			
	9-14	35-70	25-50	5-15	0.80-1.00	0.6-6	0.12-0.27	0.0-2.9	2.0-3.0	.10	.28			
	14-24	---	---	---	---	---	---	---	---	---	---			
5006:														
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			
Doebay--------------	0-1	45-70	20-40	5-16	0.10-0.30	6-100	0.30-0.60	---	60-90	---	---	2	5	56
	1-6	45-70	20-40	5-16	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.28	.37			
	6-16	50-75	20-40	5-16	1.10-1.45	0.6-6	0.14-0.25	0.0-2.9	1.0-4.0	.17	.24			
	16-21	50-75	20-40	5-16	0.80-1.30	0.6-6	0.05-0.14	0.0-2.9	0.5-2.0	.10	.37			
	21-35	60-80	15-30	2-12	1.10-1.45	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	35-45	---	---	---	---	---	---	---	---	---	---			

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*In/hr*	*In/in*	*Pct*	*Pct*					
5006:														
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
5007:														
Haro----------------	0-1	35-55	30-45	8-15	0.80-1.45	0.6-20	0.14-0.18	0.0-2.9	7.0-12	.17	.24	1	5	56
	1-5	40-65	20-45	5-15	0.80-1.45	2-20	0.07-0.18	0.0-2.9	4.0-8.0	.15	.24			
	5-11	50-70	20-40	5-15	1.10-1.45	2-20	0.07-0.13	0.0-2.9	1.0-4.0	.10	.17			
	11-21	---	---	---	---	---	---	---	---	---	---			
Hiddenridge---------	0-1	50-75	10-45	5-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	4	86
	1-3	50-75	10-45	5-18	1.10-1.45	2-6	0.06-0.09	0.0-2.9	7.0-12	.02	.02			
	3-24	45-75	10-45	5-18	1.10-1.45	2-20	0.03-0.08	0.0-2.9	4.0-9.0	.02	.02			
	24-57	55-80	5-40	0-18	1.30-1.50	2-20	0.02-0.07	0.0-2.9	0.2-1.0	.02	.15			
	57-60	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
5008:														
Doebay--------------	0-1	45-70	20-40	5-16	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	5	56
	1-6	45-70	20-40	5-16	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.28	.37			
	6-16	50-75	20-40	5-16	1.10-1.45	0.6-6	0.14-0.25	0.0-2.9	1.0-4.0	.17	.24			
	16-21	50-75	20-40	5-16	0.80-1.30	0.6-6	0.05-0.14	0.0-2.9	0.5-2.0	.10	.37			
	21-35	60-80	15-30	2-12	1.10-1.45	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	35-45	---	---	---	---	---	---	---	---	---	---			
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
5009:														
Haro----------------	0-1	35-55	30-45	8-15	0.80-1.45	0.6-20	0.14-0.18	0.0-2.9	7.0-12	.17	.24	1	5	56
	1-5	40-65	20-45	5-15	0.80-1.45	2-20	0.07-0.18	0.0-2.9	4.0-8.0	.15	.24			
	5-11	50-70	20-40	5-15	1.10-1.45	2-20	0.07-0.13	0.0-2.9	1.0-4.0	.10	.17			
	11-21	---	---	---	---	---	---	---	---	---	---			
Hiddenridge---------	0-1	50-75	10-45	5-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	4	86
	1-3	50-75	10-45	5-18	1.10-1.45	2-6	0.06-0.09	0.0-2.9	7.0-12	.02	.02			
	3-24	45-75	10-45	5-18	1.10-1.45	2-20	0.03-0.08	0.0-2.9	4.0-9.0	.02	.02			
	24-57	55-80	5-40	0-18	1.30-1.50	2-20	0.02-0.07	0.0-2.9	0.2-1.0	.02	.15			
	57-60	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---

Physical Soil Properties--Continued

Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity (Ksat)	Available water capacity	Linear extensi- bility	Organic matter	Erosion factors Kw	Kf	T	Wind erodi- bility group	Wind erodi- bility index
	In	Pct	Pct	Pct	g/cc	In/hr	In/in	Pct	Pct					
5010:														
Turtleback----------	0-3	55-70	10-40	5-18	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	3	2	134
	3-13	55-70	10-40	5-18	0.80-1.00	2-6	0.07-0.19	0.0-2.9	1.0-4.0	.10	.28			
	13-40	55-80	5-40	5-18	1.10-1.45	6-20	0.03-0.12	0.0-2.9	0.5-2.0	.05	.24			
	40-48	60-85	5-40	1-12	1.35-1.60	6-20	0.01-0.07	0.0-2.9	0.2-1.0	.02	.15			
	48-58	---	---	---	---	---	---	---	---	---	---			
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---
5015:														
Doebay, moist-------	0-1	45-70	20-40	5-16	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	2	5	56
	1-6	45-70	20-40	5-16	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.28	.37			
	6-16	50-75	20-40	5-16	1.10-1.45	0.6-6	0.14-0.25	0.0-2.9	1.0-4.0	.17	.24			
	16-21	50-75	20-40	5-16	0.80-1.30	0.6-6	0.05-0.14	0.0-2.9	0.5-2.0	.10	.37			
	21-35	60-80	15-30	2-12	1.10-1.45	2-6	0.02-0.07	0.0-2.9	0.2-1.0	.05	.28			
	35-45	---	---	---	---	---	---	---	---	---	---			
Cady----------------	0-1	35-50	30-50	8-15	0.10-0.30	6-101	0.30-0.60	---	60-90	---	---	1	2	86
	1-4	35-50	30-50	8-15	0.80-1.20	0.6-2	0.14-0.18	0.0-2.9	7.0-12	.24	.28			
	4-16	40-75	20-50	5-15	0.80-1.20	2-6	0.08-0.27	0.0-2.9	1.0-4.0	.17	.24			
	16-26	---	---	---	---	---	---	---	---	---	---			
Rock outcrop--------	0-60	---	---	---	---	---	---	---	---	---	---	---	---	---

Chemical Properties

The table described in this section shows estimates of some chemical characteristics and features that affect soil behavior. These estimates are given for the 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.

Cation-exchange capacity (CEC) is the total amount of exchangeable cations that can be held by the soil, expressed in terms of centimoles per kilogram. It commonly is measured at neutral pH of 7.0 (CEC-7), but it may be measured at some other stated pH value. Soils that have a low CEC hold fewer cations and may require more frequent applications of fertilizer than those that have a high CEC. The ability to retain cations minimizes the risk of ground-water pollution.

Effective cation-exchange capacity (ECEC) refers to the sum of exchangeable cations plus aluminum, expressed in terms of centimoles per kilogram. It is determined for soils that have natural pH of less than or equal to 5.5 and is a measure of the CEC at the natural pH. In soils with low pH, the ECEC more accurately reflects the actual CEC of the soils. Although CEC-7 is not actually present in these soils under natural conditions, the ECEC reflects the potential CEC if the soils are limed and the pH increased to neutral.

Soil reaction is a measure of acidity or alkalinity. The pH of each soil 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.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be

Chemical Soil Properties

(Absence of an entry indicates that data were not estimated.)

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
997:								
Pits, gravel	0-60	---	---	---	---	---	---	---
998:								
Water, saline	---	---	---	---	---	---	---	---
999:								
Water, fresh	---	---	---	---	---	---	---	---
1000:								
Sholander	0-8	19-40	---	5.6-6.0	0	0	0	0
	8-16	2.0-11	---	5.6-6.0	0	0	0	0
	16-28	0.0-7.0	---	5.6-6.0	0	0	0	0
	28-51	0.0-4.0	---	5.6-6.0	0	0	0	0
	51-60	7.0-16	---	6.1-6.5	0	0	0	0
Spieden	0-4	23-66	---	6.1-6.5	0	0	0	0
	4-11	17-40	---	6.1-6.5	0	0	0	0
	11-24	0.0-4.0	---	6.6-7.3	0	0	0	0
	24-36	0.0-4.0	---	6.6-7.3	0	0	0	0
	36-48	0.0-4.0	---	6.6-7.3	0	0	0	0
	48-60	0.0-4.0	---	6.6-7.3	0	0	0	0
1001:								
Coveland	0-4	16-37	---	6.1-6.5	0	0	0	0
	4-9	9.0-29	---	6.1-6.5	0	0	0	0
	9-20	3.0-17	---	6.6-7.3	0	0	0	0
	20-36	13-24	---	6.1-8.0	0	0	0	0
	36-44	13-24	---	6.1-8.0	0	0	0	0
	44-60	13-24	---	6.6-8.0	0	0	0	0
1002:								
Sholander	0-8	19-40	---	5.6-6.0	0	0	0	0
	8-16	2.0-11	---	5.6-6.0	0	0	0	0
	16-28	0.0-7.0	---	5.6-6.0	0	0	0	0
	28-51	0.0-4.0	---	5.6-6.0	0	0	0	0
	51-60	7.0-16	---	6.1-6.5	0	0	0	0
1003:								
Coupeville	0-7	15-40	---	5.6-6.0	0	0	0	0
	7-12	10-35	---	6.1-6.5	0	0	0	0
	12-20	20-30	---	6.6-7.3	0	0	0	0
	20-34	20-30	---	6.6-7.3	0	0	0	0
	34-50	20-30	---	6.6-7.3	0	0	0	0
	50-60	15-25	---	6.6-7.3	0	0	0	0
1004:								
Limepoint	0-6	13-34	---	5.6-6.0	0	0	0	0
	6-14	13-34	---	5.6-6.0	0	0	0	0
	14-31	0.0-16	---	6.1-6.5	0	0	0	0
	31-49	0.0-16	---	6.6-7.3	0	0	0	0
	49-58	0.0-16	---	6.6-7.3	0	0	0	0
	58-60	13-36	---	7.4-7.8	0	0	0	0

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
1004:								
Sholander------------	0-8	19-40	---	5.6-6.0	0	0	0	0
	8-16	2.0-11	---	5.6-6.0	0	0	0	0
	16-28	0.0-7.0	---	5.6-6.0	0	0	0	0
	28-51	0.0-4.0	---	5.6-6.0	0	0	0	0
	51-60	7.0-16	---	6.1-6.5	0	0	0	0
1005:								
Shalcar--------------	0-3	30-100	15-45	5.1-5.5	0	0	0	0
	3-11	30-100	---	6.1-6.5	0	0	0	0
	11-22	30-100	---	6.1-6.5	0	0	0	0
	22-27	2.0-16	---	6.6-7.3	0	0	0	0
	27-44	2.0-16	---	7.4-7.8	0	0	0	0
	44-60	2.0-16	---	7.9-8.4	0	0	0	0
1006:								
Semiahmoo------------	0-9	50-100	---	5.6-6.0	0	0	0	0
	9-10	10-30	---	5.6-6.0	0	0	0	0
	10-30	50-100	---	5.6-6.0	0	0	0	0
	30-48	---	35-60	5.1-5.5	0	0	0	0
	48-60	50-100	---	6.6-7.3	0	0	0	0
	60-72	50-100	---	6.6-7.3	0	0	0	0
	72-84	50-100	---	7.4-7.8	0	0	0	0
1009:								
Coveland-------------	0-4	16-37	---	6.1-6.5	0	0	0	0
	4-9	9.0-29	---	6.1-6.5	0	0	0	0
	9-20	3.0-17	---	6.6-7.3	0	0	0	0
	20-36	13-24	---	6.1-8.0	0	0	0	0
	36-44	13-24	---	6.1-8.0	0	0	0	0
	44-60	13-24	---	6.6-8.0	0	0	0	0
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
1010:								
Deadmanbay-----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	20-40	---	4.5-5.0	0	0	0	0
	5-16	5.0-30	---	5.6-6.0	0	0	0	0
	16-29	0.0-15	---	5.6-6.0	0	0	0	0
	29-57	15-30	---	6.4-6.5	0	0	0	0
	57-60	15-30	---	6.6-7.3	0	0	0	0
Morancreek-----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-3	15-35	---	5.6-6.0	0	0	0	0
	3-10	5.0-20	---	5.6-6.0	0	0	0	0
	10-21	5.0-15	---	5.6-6.0	0	0	0	0
	21-28	5.0-15	---	5.6-6.0	0	0	0	0
	28-60	5.0-10	---	6.1-6.5	0	0	0	0

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
1013:								
Bazal----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	27-68	---	5.6-6.0	0	0	0	0
	4-10	21-42	---	6.6-7.3	0	0	0	0
	10-17	2.0-22	---	6.6-7.3	0	0	0	0
	17-24	2.0-16	---	6.6-7.3	0	0	0	0
	24-39	16-29	---	6.6-7.3	0	0	0	0
	39-60	13-21	---	7.4-7.8	0	0	0	0
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
1014:								
Beaches--------------	0-60	---	---	---	---	---	---	---
Endoaquents, tidal---	0-29	0.0-2.0	---	5.1-5.5	0	0	0.3-3.0	0-2
	29-48	0.0-2.0	---	6.6-7.3	0	0	0.3-3.0	0-2
	48-60	0.0-2.0	---	6.6-7.3	0	0	0.3-3.0	0-2
Xerorthents----------	0-1	4.0-12	---	5.6-6.0	0	0	0	0
	1-20	0.0-2.0	---	6.1-6.5	0	0	0	0
	20-60	0.0-2.0	---	6.6-7.3	0	0	0	0
1015:								
Deadmanbay-----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	20-40	---	4.5-5.0	0	0	0	0
	5-16	5.0-30	---	5.6-6.0	0	0	0	0
	16-29	0.0-15	---	5.6-6.0	0	0	0	0
	29-57	15-30	---	6.4-6.5	0	0	0	0
	57-60	15-30	---	6.6-7.3	0	0	0	0
Bazal----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	27-68	---	5.6-6.0	0	0	0	0
	4-10	21-42	---	6.6-7.3	0	0	0	0
	10-17	2.0-22	---	6.6-7.3	0	0	0	0
	17-24	2.0-16	---	6.6-7.3	0	0	0	0
	24-39	16-29	---	6.6-7.3	0	0	0	0
	39-60	13-21	---	7.4-7.8	0	0	0	0
Cady-----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
1016:								
Orcas----------------	0-3	---	25-50	4.0-4.5	0	0	0	0
	3-12	---	25-50	4.0-4.5	0	0	0	0
	12-60	---	25-50	4.0-4.5	0	0	0	0
1053:								
Dugualla-------------	0-11	50-150	---	6.1-6.5	0	0	40.0-60.0	0-5
	11-20	50-150	---	6.1-6.5	0	0	40.0-60.0	0-5
	20-26	50-150	---	6.6-7.3	0	0	40.0-60.0	0-5
	26-60	50-150	---	6.6-7.3	0	0	40.0-60.0	0-5

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
2000:								
Whidbey--------------	0-2	50-100	---	5.0-6.0	0	0	0	0
	2-6	15-30	---	5.4-6.1	0	0	0	0
	6-20	5.0-15	---	5.4-6.1	0	0	0	0
	20-37	3.0-10	---	6.0-6.6	0	0	0	0
	37-60	5.0-15	---	6.5-7.3	0	0	0	0
2001:								
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
2002:								
Sucia----------------	0-8	15-30	---	5.1-5.5	0	0	0	0
	8-17	0.0-10	---	5.6-6.0	0	0	0	0
	17-31	0.0-5.0	---	5.6-6.0	0	0	0	0
	31-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	15-30	---	6.6-7.3	0	0	0	0
2004:								
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
2007:								
Alderwood, warm------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-10	15-40	---	6.1-6.5	0	0	0	0
	10-18	5.0-20	---	6.1-6.5	0	0	0	0
	18-36	5.0-15	---	6.1-6.5	0	0	0	0
	36-60	15-30	---	5.6-6.0	0	0	0	0
Everett, warm--------	0-2	50-100	---	5.0-6.0	0	0	0	0
	2-9	16-35	---	4.5-5.6	0	0	0	0
	9-13	2.0-17	---	4.5-5.6	0	0	0	0
	13-30	0.0-8.0	---	4.5-5.7	0	0	0	0
	30-60	0.0-2.0	---	5.6-6.5	0	0	0	0
2008:								
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
Sholander------------	0-8	19-40	---	5.6-6.0	0	0	0	0
	8-16	2.0-11	---	5.6-6.0	0	0	0	0
	16-28	0.0-7.0	---	5.6-6.0	0	0	0	0
	28-51	0.0-4.0	---	5.6-6.0	0	0	0	0
	51-60	7.0-16	---	6.1-6.5	0	0	0	0

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
2008:								
Bazal----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	27-68	---	5.6-6.0	0	0	0	0
	4-10	21-42	---	6.6-7.3	0	0	0	0
	10-17	2.0-22	---	6.6-7.3	0	0	0	0
	17-24	2.0-16	---	6.6-7.3	0	0	0	0
	24-39	16-29	---	6.6-7.3	0	0	0	0
	39-60	13-21	---	7.4-7.8	0	0	0	0
2009:								
Limepoint------------	0-6	13-34	---	5.6-6.0	0	0	0	0
	6-14	13-34	---	5.6-6.0	0	0	0	0
	14-31	0.0-16	---	6.1-6.5	0	0	0	0
	31-49	0.0-16	---	6.6-7.3	0	0	0	0
	49-58	0.0-16	---	6.6-7.3	0	0	0	0
	58-60	13-36	---	7.4-7.8	0	0	0	0
Alderwood, warm------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-10	15-40	---	6.1-6.5	0	0	0	0
	10-18	5.0-20	---	6.1-6.5	0	0	0	0
	18-36	5.0-15	---	6.1-6.5	0	0	0	0
	36-60	15-30	---	5.6-6.0	0	0	0	0
Sholander------------	0-8	19-40	---	5.6-6.0	0	0	0	0
	8-16	2.0-11	---	5.6-6.0	0	0	0	0
	16-28	0.0-7.0	---	5.6-6.0	0	0	0	0
	28-51	0.0-4.0	---	5.6-6.0	0	0	0	0
	51-60	7.0-16	---	6.1-6.5	0	0	0	0
2010:								
Whidbey--------------	0-2	50-100	---	5.0-6.0	0	0	0	0
	2-6	15-30	---	5.4-6.1	0	0	0	0
	6-20	5.0-15	---	5.4-6.1	0	0	0	0
	20-37	3.0-10	---	6.0-6.6	0	0	0	0
	37-60	5.0-15	---	6.5-7.3	0	0	0	0
Hoypus---------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	12-31	---	5.1-5.6	0	0	0	0
	5-20	0.0-10	---	5.1-5.6	0	0	0	0
	20-36	0.0-8.0	---	5.2-5.7	0	0	0	0
	36-60	0.0-4.0	---	5.5-6.1	0	0	0	0
2011:								
Roche----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	16-40	---	5.6-6.0	0	0	0	0
	5-15	2.0-22	---	5.6-6.2	0	0	0	0
	15-23	2.0-18	---	5.6-6.2	0	0	0	0
	23-39	4.0-16	---	6.6-7.3	0	0	0	0
	39-60	7.0-16	---	6.6-7.3	0	0	0	0
Killebrew------------	0-1	50-100	---	3.5-5.5	0	0	0	0
	1-5	15-40	---	4.5-5.5	0	0	0	0
	5-9	5.0-20	---	5.6-6.0	0	0	0	0
	9-17	5.0-15	---	5.6-6.0	0	0	0	0
	17-27	15-30	---	6.6-7.3	0	0	0	0
	27-60	15-30	---	6.6-7.3	0	0	0	0

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbonate	Gypsum	Salinity	Sodium adsorption ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
3000:								
Pilepoint------------	0-4	15-35	---	6.1-6.5	0	0	0	0
	4-13	14-29	---	6.1-6.5	0	0	0	0
	13-22	2.0-17	---	6.6-7.3	0	0	0	0
	22-29	2.0-13	---	6.6-7.3	0	0	0	0
	29-36	9.0-31	---	6.6-7.3	0	0	0	0
	36-46	9.0-31	---	6.6-7.3	0	0	0	0
	46-60	9.0-31	---	7.4-7.8	0	0	0	0
3001:								
Hoypus---------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	12-31	---	5.1-5.6	0	0	0	0
	5-20	0.0-10	---	5.1-5.6	0	0	0	0
	20-36	0.0-8.0	---	5.2-5.7	0	0	0	0
	36-60	0.0-4.0	---	5.5-6.1	0	0	0	0
3002:								
Keystone-------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-3	8.0-25	---	5.5-6.2	0	0	0	0
	3-8	0.0-15	---	5.5-6.2	0	0	0	0
	8-19	0.0-7.0	---	5.4-6.3	0	0	0	0
	19-34	0.0-4.0	---	5.6-6.3	0	0	0	0
	34-60	0.0-4.0	---	6.0-6.6	0	0	0	0
3005:								
San Juan-------------	0-4	12-35	---	5.1-5.5	0	0	0	0
	4-13	12-35	---	5.6-6.0	0	0	0	0
	13-19	6.0-21	---	6.1-6.5	0	0	0	0
	19-27	0.0-13	---	6.1-6.5	0	0	0	0
	27-41	0.0-4.0	---	6.6-7.3	0	0	0	0
	41-62	0.0-4.0	---	6.6-7.3	0	0	0	0
	62-70	0.0-4.0	---	6.6-7.3	0	0	0	0
3006:								
San Juan-------------	0-4	12-35	---	5.1-5.5	0	0	0	0
	4-13	12-35	---	5.6-6.0	0	0	0	0
	13-19	6.0-21	---	6.1-6.5	0	0	0	0
	19-27	0.0-13	---	6.1-6.5	0	0	0	0
	27-41	0.0-4.0	---	6.6-7.3	0	0	0	0
	41-62	0.0-4.0	---	6.6-7.3	0	0	0	0
	62-70	0.0-4.0	---	6.6-7.3	0	0	0	0
3007:								
San Juan-------------	0-4	12-35	---	5.1-5.5	0	0	0	0
	4-13	12-35	---	5.6-6.0	0	0	0	0
	13-19	6.0-21	---	6.1-6.5	0	0	0	0
	19-27	0.0-13	---	6.1-6.5	0	0	0	0
	27-41	0.0-4.0	---	6.6-7.3	0	0	0	0
	41-62	0.0-4.0	---	6.6-7.3	0	0	0	0
	62-70	0.0-4.0	---	6.6-7.3	0	0	0	0
3008:								
Xerorthents----------	0-1	4.0-12	---	5.6-6.0	0	0	0	0
	1-20	0.0-2.0	---	6.1-6.5	0	0	0	0
	20-60	0.0-2.0	---	6.6-7.3	0	0	0	0
Endoaquents, tidal---	0-29	0.0-2.0	---	5.1-5.5	0	0	0.3-3.0	0-2
	29-48	0.0-2.0	---	6.6-7.3	0	0	0.3-3.0	0-2
	48-60	0.0-2.0	---	6.6-7.3	0	0	0.3-3.0	0-2

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
3010:								
San Juan-------------	0-4	12-35	---	5.1-5.5	0	0	0	0
	4-13	12-35	---	5.6-6.0	0	0	0	0
	13-19	6.0-21	---	6.1-6.5	0	0	0	0
	19-27	0.0-13	---	6.1-6.5	0	0	0	0
	27-41	0.0-4.0	---	6.6-7.3	0	0	0	0
	41-62	0.0-4.0	---	6.6-7.3	0	0	0	0
	62-70	0.0-4.0	---	6.6-7.3	0	0	0	0
Dune land------------	0-60	---	---	6.6-7.3	0	0	0	0
3012:								
Hoypus---------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	12-31	---	5.1-5.6	0	0	0	0
	5-20	0.0-10	---	5.1-5.6	0	0	0	0
	20-36	0.0-8.0	---	5.2-5.7	0	0	0	0
	36-60	0.0-4.0	---	5.5-6.1	0	0	0	0
3013:								
Everett, warm--------	0-2	50-100	---	5.0-6.0	0	0	0	0
	2-9	16-35	---	4.5-5.6	0	0	0	0
	9-13	2.0-17	---	4.5-5.6	0	0	0	0
	13-30	0.0-8.0	---	4.5-5.7	0	0	0	0
	30-60	0.0-2.0	---	5.6-6.5	0	0	0	0
3014:								
Everett, warm--------	0-2	50-100	---	5.0-6.0	0	0	0	0
	2-9	16-35	---	4.5-5.6	0	0	0	0
	9-13	2.0-17	---	4.5-5.6	0	0	0	0
	13-30	0.0-8.0	---	4.5-5.7	0	0	0	0
	30-60	0.0-2.0	---	5.6-6.5	0	0	0	0
3015:								
Indianola, warm------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	10-30	---	6.6-7.3	0	0	0	0
	6-17	0.0-10	---	6.6-7.3	0	0	0	0
	17-27	0.0-10	---	6.6-7.3	0	0	0	0
	27-37	0.0-5.0	---	6.6-7.3	0	0	0	0
	37-60	0.0-5.0	---	6.6-7.3	0	0	0	0
3016:								
Sucia----------------	0-8	15-30	---	5.1-5.5	0	0	0	0
	8-17	0.0-10	---	5.6-6.0	0	0	0	0
	17-31	0.0-5.0	---	5.6-6.0	0	0	0	0
	31-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	15-30	---	6.6-7.3	0	0	0	0
Sholander------------	0-8	19-40	---	5.6-6.0	0	0	0	0
	8-16	2.0-11	---	5.6-6.0	0	0	0	0
	16-28	0.0-7.0	---	5.6-6.0	0	0	0	0
	28-51	0.0-4.0	---	5.6-6.0	0	0	0	0
	51-60	7.0-16	---	6.1-6.5	0	0	0	0
4000:								
Roche----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	16-40	---	5.6-6.0	0	0	0	0
	5-15	2.0-22	---	5.6-6.2	0	0	0	0
	15-23	2.0-18	---	5.6-6.2	0	0	0	0
	23-39	4.0-16	---	6.6-7.3	0	0	0	0
	39-60	7.0-16	---	6.6-7.3	0	0	0	0

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
4000:								
Killebrew------------	0-1	50-100	---	3.5-5.5	0	0	0	0
	1-5	15-40	---	4.5-5.5	0	0	0	0
	5-9	5.0-20	---	5.6-6.0	0	0	0	0
	9-17	5.0-15	---	5.6-6.0	0	0	0	0
	17-27	15-30	---	6.6-7.3	0	0	0	0
	27-60	15-30	---	6.6-7.3	0	0	0	0
Rock outcrop---------	0-60	---	---	---	---	---	---	---
4002:								
Laconner, warm-------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-3	15-35	---	6.1-6.5	0	0	0	0
	3-10	0.0-15	---	5.6-6.0	0	0	0	0
	10-20	0.0-10	---	5.6-6.0	0	0	0	0
	20-33	0.0-5.0	---	6.6-7.3	0	0	0	0
	33-39	0.0-5.0	---	6.6-7.3	0	0	0	0
	39-60	0.0-5.0	---	6.6-7.3	0	0	0	0
4003:								
Hoypus---------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	12-31	---	5.1-5.6	0	0	0	0
	5-20	0.0-10	---	5.1-5.6	0	0	0	0
	20-36	0.0-8.0	---	5.2-5.7	0	0	0	0
	36-60	0.0-4.0	---	5.5-6.1	0	0	0	0
Whidbey--------------	0-2	50-100	---	5.0-6.0	0	0	0	0
	2-6	15-30	---	5.4-6.1	0	0	0	0
	6-20	5.0-15	---	5.4-6.1	0	0	0	0
	20-37	3.0-10	---	6.0-6.6	0	0	0	0
	37-60	5.0-15	---	6.5-7.3	0	0	0	0
4005:								
Roche----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	16-40	---	5.6-6.0	0	0	0	0
	5-15	2.0-22	---	5.6-6.2	0	0	0	0
	15-23	2.0-18	---	5.6-6.2	0	0	0	0
	23-39	4.0-16	---	6.6-7.3	0	0	0	0
	39-60	7.0-16	---	6.6-7.3	0	0	0	0
Haro-----------------	0-1	19-38	---	5.1-5.5	0	0	0	0
	1-5	10-27	---	5.1-5.5	0	0	0	0
	5-11	4.0-19	---	5.6-6.0	0	0	0	0
	11-21	---	---	---	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
4006:								
Alderwood, warm------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-10	15-40	---	6.1-6.5	0	0	0	0
	10-18	5.0-20	---	6.1-6.5	0	0	0	0
	18-36	5.0-15	---	6.1-6.5	0	0	0	0
	36-60	15-30	---	5.6-6.0	0	0	0	0
Hoypus---------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	12-31	---	5.1-5.6	0	0	0	0
	5-20	0.0-10	---	5.1-5.6	0	0	0	0
	20-36	0.0-8.0	---	5.2-5.7	0	0	0	0
	36-60	0.0-4.0	---	5.5-6.1	0	0	0	0

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
4007:								
Roche----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-5	16-40	---	5.6-6.0	0	0	0	0
	5-15	2.0-22	---	5.6-6.2	0	0	0	0
	15-23	2.0-18	---	5.6-6.2	0	0	0	0
	23-39	4.0-16	---	6.6-7.3	0	0	0	0
	39-60	7.0-16	---	6.6-7.3	0	0	0	0
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
4008:								
Mitchellbay----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	20-40	---	4.5-5.5	0	0	0	0
	6-15	5.0-20	---	5.6-6.0	0	0	0	0
	15-20	5.0-10	---	5.6-6.0	0	0	0	0
	20-26	15-30	---	6.1-6.5	0	0	0	0
	26-38	15-30	---	6.1-6.5	0	0	0	0
	38-60	10-25	---	6.6-7.3	0	0	0	0
Rock outcrop---------	0-60	---	---	---	---	---	---	---
Killebrew------------	0-1	50-100	---	3.5-5.5	0	0	0	0
	1-5	15-40	---	4.5-5.5	0	0	0	0
	5-9	5.0-20	---	5.6-6.0	0	0	0	0
	9-17	5.0-15	---	5.6-6.0	0	0	0	0
	17-27	15-30	---	6.6-7.3	0	0	0	0
	27-60	15-30	---	6.6-7.3	0	0	0	0
5000:								
Cady-----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
5001:								
Rock outcrop---------	0-60	---	---	---	---	---	---	---
Haro-----------------	0-1	19-38	---	5.1-5.5	0	0	0	0
	1-5	10-27	---	5.1-5.5	0	0	0	0
	5-11	4.0-19	---	5.6-6.0	0	0	0	0
	11-21	---	---	---	---	---	---	---
5002:								
Doebay, moist--------	0-1	50-100	---	5.6-6.0	0	0	0	0
	1-6	12-32	---	5.1-6.0	0	0	0	0
	6-16	4.0-22	---	5.1-6.0	0	0	0	0
	16-21	4.0-16	---	5.1-6.0	0	0	0	0
	21-35	2.0-11	---	5.1-6.0	0	0	0	0
	35-45	---	---	---	---	---	---	---

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
5002:								
Cady----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
Doebay--------------	0-1	50-100	---	5.6-6.0	0	0	0	0
	1-6	12-32	---	5.1-6.0	0	0	0	0
	6-16	4.0-22	---	5.1-6.0	0	0	0	0
	16-21	4.0-16	---	5.1-6.0	0	0	0	0
	21-35	2.0-11	---	5.1-6.0	0	0	0	0
	35-45	---	---	---	---	---	---	---
5003:								
Doebay--------------	0-1	50-100	---	5.6-6.0	0	0	0	0
	1-6	12-32	---	5.1-6.0	0	0	0	0
	6-16	4.0-22	---	5.1-6.0	0	0	0	0
	16-21	4.0-16	---	5.1-6.0	0	0	0	0
	21-35	2.0-11	---	5.1-6.0	0	0	0	0
	35-45	---	---	---	---	---	---	---
Morancreek----------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-3	15-35	---	5.6-6.0	0	0	0	0
	3-10	5.0-20	---	5.6-6.0	0	0	0	0
	10-21	5.0-15	---	5.6-6.0	0	0	0	0
	21-28	5.0-15	---	5.6-6.0	0	0	0	0
	28-60	5.0-10	---	6.1-6.5	0	0	0	0
5004:								
Pickett-------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-3	17-34	---	5.1-5.5	0	0	0	0
	3-27	4.0-19	---	5.6-6.0	0	0	0	0
	27-36	4.0-15	---	5.6-6.0	0	0	0	0
	36-46	---	---	---	---	---	---	---
Kahboo--------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-2	50-100	---	5.0-6.0	0	0	0	0
	2-9	4.0-19	---	5.1-5.5	0	0	0	0
	9-14	4.0-17	---	5.6-6.0	0	0	0	0
	14-24	---	---	---	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
5005:								
Constitution---------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-6	15-40	---	5.1-5.5	0	0	0	0
	6-16	5.0-20	---	5.1-5.5	0	0	0	0
	16-26	5.0-15	---	5.6-6.0	0	0	0	0
	26-36	---	---	---	---	---	---	---
Skipjack------------	0-3	50-100	---	5.0-6.0	0	0	0	0
	3-32	5.0-20	---	5.1-5.5	0	0	0	0
	32-43	5.0-15	---	5.6-6.0	0	0	0	0
	43-60	0.0-15	---	5.6-6.0	0	0	0	0
Kahboo--------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-2	50-100	---	5.0-6.0	0	0	0	0
	2-9	4.0-19	---	5.1-5.5	0	0	0	0
	9-14	4.0-17	---	5.6-6.0	0	0	0	0
	14-24	---	---	---	---	---	---	---

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
5006:								
Cady-----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
Doebay---------------	0-1	50-100	---	5.6-6.0	0	0	0	0
	1-6	12-32	---	5.1-6.0	0	0	0	0
	6-16	4.0-22	---	5.1-6.0	0	0	0	0
	16-21	4.0-16	---	5.1-6.0	0	0	0	0
	21-35	2.0-11	---	5.1-6.0	0	0	0	0
	35-45	---		---	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
5007:								
Haro-----------------	0-1	19-38	---	5.1-5.5	0	0	0	0
	1-5	10-27	---	5.1-5.5	0	0	0	0
	5-11	4.0-19	---	5.6-6.0	0	0	0	0
	11-21	---	---	---	---	---	---	---
Hiddenridge----------	0-1	50-100	30-40	3.5-5.5	0	0	0	0
	1-3	16-40	---	5.1-5.5	0	0	0	0
	3-24	10-32	---	5.1-5.5	0	0	0	0
	24-57	0.0-16	---	5.1-5.5	0	0	0	0
	57-60	---	---	---	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
5008:								
Doebay---------------	0-1	50-100	---	5.6-6.0	0	0	0	0
	1-6	12-32	---	5.1-6.0	0	0	0	0
	6-16	4.0-22	---	5.1-6.0	0	0	0	0
	16-21	4.0-16	---	5.1-6.0	0	0	0	0
	21-35	2.0-11	---	5.1-6.0	0	0	0	0
	35-45	---	---	---	---	---	---	---
Cady-----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
5009:								
Haro-----------------	0-1	19-38	---	5.1-5.5	0	0	0	0
	1-5	10-27	---	5.1-5.5	0	0	0	0
	5-11	4.0-19	---	5.6-6.0	0	0	0	0
	11-21	---	---	---	---	---	---	---
Hiddenridge----------	0-1	50-100	30-40	3.5-5.5	0	0	0	0
	1-3	16-40	---	5.1-5.5	0	0	0	0
	3-24	10-32	---	5.1-5.5	0	0	0	0
	24-57	0.0-16	---	5.1-5.5	0	0	0	0
	57-60	---	---	---	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---

Chemical Soil Properties--Continued

Map symbol and soil name	Depth	Cation-exchange capacity	Effective cation-exchange capacity	Soil reaction	Calcium carbon-ate	Gypsum	Salinity	Sodium adsorp-tion ratio
	In	*meq/100 g*	*meq/100 g*	*pH*	*Pct*	*Pct*	*mmhos/cm*	
5010:								
Turtleback-----------	0-3	50-100	---	3.5-5.5	0	0	0	0
	3-13	5.0-20	---	5.1-5.5	0	0	0	0
	13-40	5.0-20	---	5.6-6.0	0	0	0	0
	40-48	0.0-10	---	5.6-6.0	0	0	0	0
	48-58	---	---	---	---	---	---	---
Cady-----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---
5015:								
Doebay, moist--------	0-1	50-100	---	5.6-6.0	0	0	0	0
	1-6	12-32	---	5.1-6.0	0	0	0	0
	6-16	4.0-22	---	5.1-6.0	0	0	0	0
	16-21	4.0-16	---	5.1-6.0	0	0	0	0
	21-35	2.0-11	---	5.1-6.0	0	0	0	0
	35-45	---	---	---	---	---	---	---
Cady-----------------	0-1	50-100	---	5.0-6.0	0	0	0	0
	1-4	12-31	---	5.6-6.0	0	0	0	0
	4-16	4.0-21	---	5.6-6.0	0	0	0	0
	16-26	---	---	7.4-7.8	---	---	---	---
Rock outcrop---------	0-60	---	---	---	---	---	---	---

characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

The table described in this section gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, 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 sands or gravelly sands. 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 potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a 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.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redoximorphic features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on the average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on the average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if

0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

The information 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 little or no horizon development.

Also considered are local information about the extent and levels of flooding and the relation of each soil on the landscape to historic floods. Information on the extent

Water Features

(Depths of layers are in inches. See text for definitions of terms used in this table. Estimates of the frequency of ponding and flooding apply to the whole year rather than to individual months. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Hydrologic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	*In*	*In*				
997:									
Pits, gravel	A								
		Jan-Dec	---	---	---	---	None	---	None
998:									
Water, saline	---								
		Jan-Dec	---	---	---	---	None	---	None
999:									
Water, fresh	---								
		Jan-Dec	---	---	---	---	None	---	None
1000:									
Sholander	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
Spieden	D								
		January	0-8	>72	2-8	Very long	Frequent	---	None
		February	0-8	>72	2-8	Very long	Frequent	---	None
		March	0-8	>72	2-8	Very long	Frequent	---	None
		April	0-12	>72	---	---	None	---	None
		May	16-28	>72	---	---	None	---	None
		June	16-60	>72	---	---	None	---	None
		November	16-52	>72	---	---	None	---	None
		December	0-8	>72	2-8	Very long	Frequent	---	None
1001:									
Coveland	D								
		January	0-8	40-60	1-3	Brief	Frequent	---	None
		February	0-8	40-60	1-3	Brief	Frequent	---	None
		March	0-12	40-60	---	---	None	---	None
		April	4-12	40-60	---	---	None	---	None
		May	16-28	40-60	---	---	None	---	None
		November	24-48	40-60	---	---	None	---	None
		December	0-8	40-60	1-3	Brief	Frequent	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
1002:									
Sholander	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
1003:									
Coupeville	D								
		January	0-8	40-60	2-8	Very long	Frequent	---	None
		February	0-8	40-60	2-8	Very long	Frequent	---	None
		March	0-12	40-60	2-8	Very long	Frequent	---	None
		April	0-12	40-60	---	---	None	---	None
		May	16-24	40-60	---	---	None	---	None
		June	16-56	40-60	---	---	None	---	None
		November	16-48	40-60	---	---	None	---	None
		December	0-8	40-60	2-8	Very long	Frequent	---	None
1004:									
Limepoint	D								
		January	0-8	40-60	2-8	Very long	Frequent	---	None
		February	0-8	40-60	2-8	Very long	Frequent	---	None
		March	0-12	40-60	2-8	Very long	Frequent	---	None
		April	0-12	40-60	---	---	None	---	None
		May	16-24	40-60	---	---	None	---	None
		June	16-56	40-60	---	---	None	---	None
		November	16-48	40-60	---	---	None	---	None
		December	0-8	40-60	2-8	Very long	Frequent	---	None
Sholander	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	*In*	*In*				
1005:									
Shalcar	D								
		January	0-8	>72	6-20	Very long	Frequent	---	None
		February	0-8	>72	6-20	Very long	Frequent	---	None
		March	0-12	>72	6-20	Very long	Frequent	---	None
		April	0-12	>72	6-20	Very long	Frequent	---	None
		May	0-12	>72	4-10	Very long	Frequent	---	None
		June	16-36	>72	---	---	None	---	None
		July	24-48	>72	---	---	None	---	None
		August	24-52	>72	---	---	None	---	None
		September	24-52	>72	---	---	None	---	None
		October	20-44	>72	---	---	None	---	None
		November	8-20	>72	---	---	None	---	None
		December	0-8	>72	6-20	Very long	Frequent	---	None
1006:									
Semiahmoo	D								
		January	0-8	>72	6-20	Very long	Frequent	---	None
		February	0-8	>72	6-20	Very long	Frequent	---	None
		March	0-12	>72	6-20	Very long	Frequent	---	None
		April	0-12	>72	6-20	Very long	Frequent	---	None
		May	0-12	>72	4-10	Very long	Frequent	---	None
		June	16-36	>72	---	---	None	---	None
		July	24-48	>72	---	---	None	---	None
		August	24-52	>72	---	---	None	---	None
		September	24-52	>72	---	---	None	---	None
		October	20-44	>72	---	---	None	---	None
		November	8-20	>72	---	---	None	---	None
		December	0-8	>72	6-20	Very long	Frequent	---	None
1009:									
Coveland	D								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
Mitchellbay	C								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
1010:									
Deadmanbay	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
Morancreek	C								
		January	16-28	>72	---	---	None	---	None
		February	16-32	>72	---	---	None	---	None
		March	20-52	>72	---	---	None	---	None
		April	24-60	>72	---	---	None	---	None
		December	24-40	>72	---	---	None	---	None
1013:									
Bazal	D								
		January	0-8	20-40	2-8	Very long	Frequent	---	None
		February	0-8	20-40	2-8	Very long	Frequent	---	None
		March	0-12	20-40	2-8	Very long	Frequent	---	None
		April	0-12	20-40	---	---	None	---	None
		May	16-24	20-40	---	---	None	---	None
		June	16-36	20-40	---	---	None	---	None
		November	16-24	20-40	---	---	None	---	None
		December	0-8	20-40	2-8	Very long	Frequent	---	None
Mitchellbay	C								
		January	0-8	20-40	1-3	Brief	Occasional	---	None
		February	0-8	20-40	1-3	Brief	Occasional	---	None
		March	4-12	20-40	---	---	None	---	None
		April	4-12	20-40	---	---	None	---	None
		May	16-28	20-40	---	---	None	---	None
		December	0-8	20-40	1-3	Brief	Occasional	---	None

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
1014:									
Beaches	D								
		January	0	>72	---	---	None	Very brief	Very frequent
		February	0	>72	---	---	None	Very brief	Very frequent
		March	0	>72	---	---	None	Very brief	Very frequent
		April	0	>72	---	---	None	Very brief	Very frequent
		May	0	>72	---	---	None	Very brief	Very frequent
		June	0	>72	---	---	None	Very brief	Very frequent
		July	0	>72	---	---	None	Very brief	Very frequent
		August	0	>72	---	---	None	Very brief	Very frequent
		September	0	>72	---	---	None	Very brief	Very frequent
		October	0	>72	---	---	None	Very brief	Very frequent
		November	0	>72	---	---	None	Very brief	Very frequent
		December	0	>72	---	---	None	Very brief	Very frequent
Endoaquents, tidal	D								
		January	0	>72	---	---	None	Very brief	Very frequent
		February	0	>72	---	---	None	Very brief	Very frequent
		March	0	>72	---	---	None	Very brief	Very frequent
		April	0	>72	---	---	None	Very brief	Very frequent
		May	0	>72	---	---	None	Very brief	Very frequent
		June	0	>72	---	---	None	Very brief	Very frequent
		July	0	>72	---	---	None	Very brief	Very frequent
		August	0	>72	---	---	None	Very brief	Very frequent
		September	0	>72	---	---	None	Very brief	Very frequent
		October	0	>72	---	---	None	Very brief	Very frequent
		November	0	>72	---	---	None	Very brief	Very frequent
		December	0	>72	---	---	None	Very brief	Very frequent
Xerorthents	A								
		Jan-Dec	---	---	---	---	None	---	None
1015:									
Deadmanbay	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	*In*	*In*				
1015:									
Bazal	D								
		January	0-8	20-40	1-3	Brief	Frequent	---	None
		February	0-8	20-40	1-3	Brief	Frequent	---	None
		March	0-12	20-40	1-3	Brief	Frequent	---	None
		April	0-12	20-40	---	---	None	---	None
		May	16-24	20-40	---	---	None	---	None
		June	16-36	20-40	---	---	None	---	None
		November	16-24	20-40	---	---	None	---	None
		December	0-8	20-40	1-3	Brief	Frequent	---	None
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
1016:									
Orcas	D								
		January	0	>72	6-20	Very long	Frequent	---	None
		February	0-4	>72	6-20	Very long	Frequent	---	None
		March	0-4	>72	6-20	Very long	Frequent	---	None
		April	0-4	>72	6-20	Very long	Frequent	---	None
		May	0-4	>72	1-6	Very long	Frequent	---	None
		June	0-4	>72	1-6	Very long	Frequent	---	None
		July	0-8	>72	1-3	Very long	Frequent	---	None
		August	0-8	>72	1-3	Very long	Frequent	---	None
		September	0-8	>72	1-3	Very long	Frequent	---	None
		October	0-4	>72	1-6	Very long	Frequent	---	None
		November	0-4	>72	6-20	Very long	Frequent	---	None
		December	0-4	>72	6-20	Very long	Frequent	---	None
1053:									
Dugualla	D								
		January	0	>72	---	---	None	Very brief	Very frequent
		February	0	>72	---	---	None	Very brief	Very frequent
		March	0	>72	---	---	None	Very brief	Very frequent
		April	0	>72	---	---	None	Very brief	Very frequent
		May	0	>72	---	---	None	Very brief	Very frequent
		June	0	>72	---	---	None	Very brief	Very frequent
		July	0	>72	---	---	None	Very brief	Very frequent
		August	0	>72	---	---	None	Very brief	Very frequent
		September	0	>72	---	---	None	Very brief	Very frequent
		October	0	>72	---	---	None	Very brief	Very frequent
		November	0	>72	---	---	None	Very brief	Very frequent
		December	0	>72	---	---	None	Very brief	Very frequent

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	*In*	*In*				
2000:									
Whidbey	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
2001:									
Mitchellbay	C								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None
2002:									
Sucia	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-28	20-40	---	---	None	---	None
		December	16-28	20-40	---	---	None	---	None
2004:									
Mitchellbay	C								
		January	0-8	20-40	1-3	Brief	Occasional	---	None
		February	0-8	20-40	1-3	Brief	Occasional	---	None
		March	4-12	20-40	---	---	None	---	None
		April	4-12	20-40	---	---	None	---	None
		May	16-28	20-40	---	---	None	---	None
		December	0-8	20-40	1-3	Brief	Occasional	---	None
2007:									
Alderwood, warm	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
Everett, warm	A								
		Jan-Dec	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	*In*	*In*				
2008:									
Mitchellbay------------------------------	C								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None
Sholander--------------------------------	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
Bazal------------------------------------	D								
		January	0-8	20-40	1-3	Brief	Frequent	---	None
		February	0-8	20-40	1-3	Brief	Frequent	---	None
		March	0-12	20-40	1-3	Brief	Frequent	---	None
		April	0-12	20-40	---	---	None	---	None
		May	16-24	20-40	---	---	None	---	None
		June	16-36	20-40	---	---	None	---	None
		November	16-24	20-40	---	---	None	---	None
		December	0-8	20-40	1-3	Brief	Frequent	---	None
2009:									
Limepoint--------------------------------	D								
		January	0-8	40-60	1-3	Brief	Frequent	---	None
		February	0-8	40-60	1-3	Brief	Frequent	---	None
		March	0-12	40-60	1-3	Brief	Frequent	---	None
		April	0-12	40-60	---	---	None	---	None
		May	16-24	40-60	---	---	None	---	None
		June	16-56	40-60	---	---	None	---	None
		November	16-48	40-60	---	---	None	---	None
		December	0-8	40-60	1-3	Brief	Frequent	---	None
Alderwood, warm--------------------------	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
2009:									
Sholander	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
2010:									
Whidbey	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
Hoypus	A								
		Jan-Dec	---	---	---	---	None	---	None
2011:									
Roche	C								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
Killebrew	D								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None
3000:									
Pilepoint	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-28	20-40	---	---	None	---	None
		December	16-28	20-40	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydrologic group	Month	Water table		Ponding			Flooding	
			Upper limit	Lower limit	Surface water depth	Duration	Frequency	Duration	Frequency
			In	*In*	*In*				
3001:									
Hoypus	A								
		Jan-Dec	---	---	---	---	None	---	None
3002:									
Keystone	A								
		Jan-Dec	---	---	---	---	None	---	None
3005:									
San Juan	A								
		Jan-Dec	---	---	---	---	None	---	None
3006:									
San Juan	A								
		Jan-Dec	---	---	---	---	None	---	None
3007:									
San Juan	A								
		Jan-Dec	---	---	---	---	None	---	None
3008:									
Xerorthents	A								
		Jan-Dec	---	---	---	---	None	---	None
Endoaquents, tidal	D								
		January	0	>72	---	---	None	Very brief	Very frequent
		February	0	>72	---	---	None	Very brief	Very frequent
		March	0	>72	---	---	None	Very brief	Very frequent
		April	0	>72	---	---	None	Very brief	Very frequent
		May	0	>72	---	---	None	Very brief	Very frequent
		June	0	>72	---	---	None	Very brief	Very frequent
		July	0	>72	---	---	None	Very brief	Very frequent
		August	0	>72	---	---	None	Very brief	Very frequent
		September	0	>72	---	---	None	Very brief	Very frequent
		October	0	>72	---	---	None	Very brief	Very frequent
		November	0	>72	---	---	None	Very brief	Very frequent
		December	0	>72	---	---	None	Very brief	Very frequent
3010:									
San Juan	A								
		Jan-Dec	---	---	---	---	None	---	None
Dune land	A								
		Jan-Dec	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
3012:									
Hoypus	A								
		Jan-Dec	---	---	---	---	None	---	None
3013:									
Everett, warm	A								
		Jan-Dec	---	---	---	---	None	---	None
3014:									
Everett, warm	A								
		Jan-Dec	---	---	---	---	None	---	None
3015:									
Indianola, warm	A								
		Jan-Dec	---	---	---	---	None	---	None
3016:									
Sucia	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-28	20-40	---	---	None	---	None
		December	16-28	20-40	---	---	None	---	None
Sholander	C								
		January	4-12	40-60	---	---	None	---	None
		February	4-12	40-60	---	---	None	---	None
		March	4-16	40-60	---	---	None	---	None
		April	8-16	40-60	---	---	None	---	None
		May	16-48	40-60	---	---	None	---	None
		December	8-16	40-60	---	---	None	---	None
4000:									
Roche	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
4000:									
Killebrew	D								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
4002:									
Laconner, warm	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
4003:									
Hoypus	A								
		Jan-Dec	---	---	---	---	None	---	None
Whidbey	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
4005:									
Roche	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
Haro	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
4006:									
Alderwood, warm	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
Hoypus	A								
		Jan-Dec	---	---	---	---	None	---	None
4007:									
Roche	B								
		January	12-20	20-40	---	---	None	---	None
		February	12-20	20-40	---	---	None	---	None
		March	16-24	20-40	---	---	None	---	None
		April	16-32	20-40	---	---	None	---	None
		December	16-32	20-40	---	---	None	---	None
Mitchellbay	C								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None
4008:									
Mitchellbay	C								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
Killebrew	D								
		January	4-12	20-40	---	---	None	---	None
		February	4-12	20-40	---	---	None	---	None
		March	8-16	20-40	---	---	None	---	None
		April	12-20	20-40	---	---	None	---	None
		December	8-16	20-40	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro- logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
5000:									
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
5001:									
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
Haro	D								
		Jan-Dec	---	---	---	---	None	---	None
5002:									
Doebay, moist	C								
		Jan-Dec	---	---	---	---	None	---	None
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
Doebay	C								
		Jan-Dec	---	---	---	---	None	---	None
5003:									
Doebay	C								
		Jan-Dec	---	---	---	---	None	---	None
Morancreek	C								
		January	16-28	>72	---	---	None	---	None
		February	16-32	>72	---	---	None	---	None
		March	20-52	>72	---	---	None	---	None
		April	24-60	>72	---	---	None	---	None
		December	24-40	>72	---	---	None	---	None
5004:									
Pickett	C								
		Jan-Dec	---	---	---	---	None	---	None
Kahboo	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
5005:									
Constitution	C								
		Jan-Dec	---	---	---	---	None	---	None
Skipjack	B								
		January	36-48	>72	---	---	None	---	None
		February	36-48	>72	---	---	None	---	None
		March	40-52	>72	---	---	None	---	None
		December	40-68	>72	---	---	None	---	None
Kahboo	D								
		Jan-Dec	---	---	---	---	None	---	None
5006:									
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
Doebay	C								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
5007:									
Haro	D								
		Jan-Dec	---	---	---	---	None	---	None
Hiddenridge	B								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
5008:									
Doebay	C								
		Jan-Dec	---	---	---	---	None	---	None
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None

Water Features--Continued

Map symbol and soil name	Hydro-logic group	Month	Water table: Upper limit	Water table: Lower limit	Ponding: Surface water depth	Ponding: Duration	Ponding: Frequency	Flooding: Duration	Flooding: Frequency
			In	In	In				
5009:									
Haro	D								
		Jan-Dec	---	---	---	---	None	---	None
Hiddenridge	B								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
5010:									
Turtleback	B								
		Jan-Dec	---	---	---	---	None	---	None
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None
5015:									
Doebay, moist	C								
		Jan-Dec	---	---	---	---	None	---	None
Cady	D								
		Jan-Dec	---	---	---	---	None	---	None
Rock outcrop	D								
		Jan-Dec	---	---	---	---	None	---	None

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.

Soil Features

The table described in this section gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, saturated hydraulic conductivity (Ksat), content of organic matter, and depth to the water table are the most important factors considered in evaluating the potential for frost action. It is assumed that the soil is not insulated by vegetation or snow and is not artificially drained. Silty and highly structured, clayey soils that have a high water table in winter are the most susceptible to frost action. Well drained, very gravelly, or very sandy soils are the least susceptible. Frost heave and low soil strength during thawing cause damage to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes 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 results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete 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 also is expressed as *low, moderate,* or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

Soil Features

(See text for definitions of terms used in this table. Absence of an entry indicates that the feature is not a concern or that data were not estimated.)

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
997:									
Pits, gravel	---	---	---	---	0	---	---	---	---
998:									
Water, saline	---	---	---	---	---	---	---	---	---
999:									
Water, fresh	---	---	---	---	0	---	---	---	---
1000:									
Sholander	Dense material	40-60	---	Noncemented	0	---	None	Low	Moderate
Spieden	---	---	---	---	0	---	None	Moderate	Moderate
1001:									
Coveland	Dense material	40-60	---	Noncemented	0	---	None	Moderate	Low
1002:									
Sholander	Dense material	40-60	---	Noncemented	0	---	None	Low	Moderate
1003:									
Coupeville	Dense material	40-60	---	Noncemented	0	---	None	High	Moderate
1004:									
Limepoint	Dense material	40-60	---	Noncemented	0	---	None	High	Moderate
Sholander	Dense material	40-60	---	Noncemented	0	---	None	Low	Moderate
1005:									
Shalcar	---	---	---	---	1-3	3-10	None	High	High
1006:									
Semiahmoo	---	---	---	---	1-3	3-10	None	Moderate	Moderate
1009:									
Coveland	Dense material	40-60	---	Noncemented	0	---	None	Moderate	Low
Mitchellbay	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
1010:									
Deadmanbay-------------	Dense material	40-60	---	Noncemented	0	---	None	High	Moderate
Morancreek-------------	---	---	---	---	0	---	None	Low	Moderate
1013:									
Bazal------------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
Mitchellbay------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
1014:									
Beaches----------------	---	---	---	---	0	---	---	---	---
Endoaquents, tidal-----	---	---	---	---	0	---	None	High	Low
Xerorthents------------	---	---	---	---	0	---	None	Moderate	Moderate
1015:									
Deadmanbay-------------	Dense material	40-60	---	Noncemented	0	---	None	High	Moderate
Bazal------------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
Cady-------------------	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
1016:									
Orcas------------------	---	---	---	---	1-3	3-10	None	High	High
1053:									
Dugualla---------------	---	---	---	---	1-3	3-9	None	High	High
2000:									
Whidbey----------------	Dense material	20-40	---	Noncemented	0	---	None	Low	Moderate
2001:									
Mitchellbay------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
2002:									
Sucia------------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
2004:									
Mitchellbay------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
2007:									
Alderwood, warm--------	Dense material	20-40	---	Noncemented	0	---	None	Low	Moderate
Everett, warm----------	---	---	---	---	0	---	None	Low	Moderate
2008:									
Mitchellbay------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
Sholander--------------	Dense material	40-60	---	Noncemented	0	---	None	Low	Moderate
Bazal------------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
2009:									
Limepoint--------------	Dense material	40-60	---	Noncemented	0	---	None	High	Moderate
Alderwood, warm--------	Dense material	20-40	---	Noncemented	0	---	None	Low	Moderate
Sholander--------------	Dense material	40-60	---	Noncemented	0	---	None	Low	Moderate
2010:									
Whidbey----------------	Dense material	20-40	---	Noncemented	0	---	None	Low	Moderate
Hoypus-----------------	---	---	---	---	0	---	None	Low	High
2011:									
Roche------------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
Killebrew--------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
3000:									
Pilepoint--------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Low
3001:									
Hoypus-----------------	---	---	---	---	0	---	None	Low	High
3002:									
Keystone---------------	---	---	---	---	0	---	None	Low	Moderate
3005:									
San Juan---------------	---	---	---	---	0	---	None	Low	Moderate
3006:									
San Juan---------------	---	---	---	---	0	---	None	Low	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
3007:									
San Juan----------------	---	---	---	---	0	---	None	Low	Moderate
3008:									
Xerorthents------------	---	---	---	---	0	---	None	Moderate	Moderate
Endoaquents, tidal-----	---	---	---	---	0	---	None	High	Low
3010:									
San Juan----------------	---	---	---	---	0	---	None	Low	Moderate
Dune land--------------	---	---	---	---	0	---	None	---	---
3012:									
Hoypus------------------	---	---	---	---	0	---	None	Low	High
3013:									
Everett, warm----------	---	---	---	---	0	---	None	Low	Moderate
3014:									
Everett, warm----------	---	---	---	---	0	---	None	Low	Moderate
3015:									
Indianola, warm--------	---	---	---	---	0	---	None	Low	Low
3016:									
Sucia------------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
Sholander--------------	Dense material	40-60	---	Noncemented	0	---	None	Low	Moderate
4000:									
Roche------------------	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
Killebrew--------------	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
Rock outcrop-----------	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
4002:									
Laconner, warm---------	Dense material	20-40	---	Indurated	0	---	None	Low	Moderate
4003:									
Hoypus------------------	---	---	---	---	0	---	None	Low	High
Whidbey----------------	Dense material	20-40	---	Noncemented	0	---	None	Low	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
4005:									
Roche	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
Haro	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
4006:									
Alderwood, warm	Dense material	20-40	---	Noncemented	0	---	None	Low	Moderate
Hoypus	---	---	---	---	0	---	None	Low	High
4007:									
Roche	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
Mitchellbay	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
4008:									
Mitchellbay	Dense material	20-40	---	Noncemented	0	---	None	Moderate	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
Killebrew	Dense material	20-40	---	Noncemented	0	---	None	High	Moderate
5000:									
Cady	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
5001:									
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
Haro	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
5002:									
Doebay, moist	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Cady	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Doebay	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
5003:									
Doebay	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Morancreek	---	---	---	---	0	---	None	Low	Moderate

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
5004:									
Pickett	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Kahboo	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
5005:									
Constitution	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Skipjack	---	---	---	---	0	---	None	Low	Moderate
Kahboo	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
5006:									
Cady	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Doebay	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
5007:									
Haro	Lithic bedrock	10-20	---	Indurated	0	---	None	Moderate	Moderate
Hiddenridge	Lithic bedrock	40-60	---	Indurated	0	---	None	Moderate	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
5008:									
Doebay	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Cady	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
5009:									
Haro	Lithic bedrock	10-20	---	Indurated	0	---	None	Moderate	Moderate
Hiddenridge	Lithic bedrock	40-60	---	Indurated	0	---	None	Moderate	Moderate
Rock outcrop	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---

Soil Features--Continued

Map symbol and soil name	Restrictive layer				Subsidence		Potential for frost action	Risk of corrosion	
	Kind	Depth to top	Thickness	Hardness	Initial	Total		Uncoated steel	Concrete
		In	*In*		*In*	*In*			
5010:									
Turtleback-------------	Lithic bedrock	40-60	---	Indurated	0	---	None	Low	Moderate
Cady-------------------	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Rock outcrop-----------	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---
5015:									
Doebay, moist----------	Lithic bedrock	20-40	---	Indurated	0	---	None	Low	Moderate
Cady-------------------	Lithic bedrock	10-20	---	Indurated	0	---	None	Low	Moderate
Rock outcrop-----------	Lithic bedrock	0-0	---	Indurated	0	---	---	---	---

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1999 and 2003). 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. The categories are defined in the following paragraphs.

ORDER.##Twelve 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 Histosol.

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 Saprist (*Sapr*, meaning well decomposed, plus *ist*, from Histosol).

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; type of saturation; 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 Haplosaprists (*Hapl*, meaning minimal horizonation, plus *saprist*, the suborder of the Histosols that are well decomposed).

SUBGROUP.##Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup 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 taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Haplosaprists.

FAMILY.##Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, 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, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is euic, mesic Typic Haplosaprists.

SERIES.##The series consists of soils within a family that have horizons similar in color, texture, structure, reaction, consistence, mineral and chemical composition, and arrangement in the profile. An example is the Semiahmoo series.

The table “Taxonomic Classification of the Soils” indicates the order, suborder, great group, subgroup, and family of the soil series in the survey area.

Taxonomic Classification of the Soils

(An asterisk in the first column indicates a taxadjunct to the series.)

Soil name	Family or higher taxonomic class
*Alderwood	Loamy-skeletal, isotic, mesic Aquic Dystroxerepts
Aquic Dystroxerepts	Aquic Dystroxerepts
Bazal	Fine-loamy, mixed, superactive, mesic Typic Argialbolls
Cady	Loamy, isotic, mesic Lithic Dystroxerepts
Constitution	Coarse-loamy, isotic, mesic Andic Dystroxerepts
Coupeville	Fine-loamy, mixed, superactive, mesic Argiaquic Argialbolls
Coveland	Fine-loamy, mixed, superactive, mesic Aquic Haploxeralfs
Deadmanbay	Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs
Doebay	Loamy-skeletal, isotic, mesic Typic Dystroxerepts
Dugualla	Euic, mesic Halic Haplosaprists
Endoaquents	Endoaquents
*Everett	Sandy-skeletal, isotic, mesic Typic Dystroxerepts
Haro	Loamy, isotic, mesic Lithic Ultic Haploxerolls
Hiddenridge	Loamy-skeletal, isotic, mesic Humic Dystroxerepts
Hoypus	Sandy-skeletal, isotic, mesic Typic Xerorthents
Indianola	Isotic, mesic Dystric Xeropsamments
Kahboo	Loamy, isotic, mesic Lithic Dystroxerepts
Keystone	Isotic, mesic Dystric Xeropsamments
Killebrew	Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs
Laconner	Sandy-skeletal, isotic, mesic Aquic Haploxerepts
Limepoint	Coarse-loamy, isotic, mesic Typic Epiaquolls
Mitchellbay	Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs
Morancreek	Coarse-loamy, isotic, mesic Aquic Dystroxerepts
Orcas	Dysic, mesic Typic Sphagnofibrists
Pickett	Loamy-skeletal, isotic, mesic Andic Dystroxerepts
Pilepoint	Fine-loamy, mixed, superactive, mesic Xeric Argialbolls
Roche	Coarse-loamy, isotic, mesic Aquic Dystroxerepts
San Juan	Sandy, isotic, mesic Pachic Ultic Haploxerolls
Semiahmoo	Euic, mesic Typic Haplosaprists
Shalcar	Loamy, mixed, euic, mesic Terric Haplosaprists
Sholander	Sandy, isotic, mesic Aquic Dystroxerepts
Skipjack	Coarse-loamy, isotic, mesic Andic Dystroxerepts
Spieden	Sandy, isotic, mesic Typic Endoaquolls
Sucia	Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs
Turtleback	Loamy-skeletal, isotic, mesic Typic Dystroxerepts
Whidbey	Loamy-skeletal, isotic, mesic Aquic Dystroxerepts
Xerorthents	Xerorthents

Taxonomic Units and Their Morphology

In this section, each taxonomic unit recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each unit. A pedon, a small three-dimensional area of soil, that is typical of the taxonomic unit in the survey area is described. The detailed description of each soil horizon follows standards in the “Soil Survey Manual” (Soil Survey Division Staff, 1993) and in the “Field Book for Describing and Sampling Soils” (Schoeneberger and others, 2002). Many of the technical terms used in the descriptions are defined in “Soil Taxonomy” (Soil Survey Staff, 1999) and in “Keys to Soil Taxonomy” (Soil Survey Staff, 2003). Following the pedon description is the range of important characteristics of the soils in the taxonomic units.

Alderwood Taxadjunct

Depth class: Moderately deep to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 3 to 20 percent
Elevation: 0 to 450 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy-skeletal, isotic, mesic Aquic Dystroxerepts

Typical Pedon

Alderwood taxadjunct extremely gravelly sandy loam in an area of Alderwood-Everett complex, warm, 5 to 15 percent slopes; 600 feet west and 1,650 feet south of the northeast corner of sec. 2, T. 36 N., R. 1 W.; Willamette Baseline Meridian; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 38 minutes, 25 seconds north and longitude 122 degrees, 47 minutes, 23 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt wavy boundary.

A—1 to 10 inches; brown (10YR 4/3) extremely gravelly sandy loam, very dark brown (10YR 2/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium and few coarse roots; common fine tubular and very fine irregular pores; 60 percent gravel; slightly acid (pH 6.2); clear wavy boundary.

Bw—10 to 18 inches; yellowish brown (10YR 5/4) extremely gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, loose, nonsticky and nonplastic; many very fine, fine, and medium and few coarse roots; common fine tubular and very fine irregular pores; 50 percent gravel and 10 percent cobbles; slightly acid (pH 6.2); clear wavy boundary.

Bg—18 to 36 inches; brown (10YR 5/3) extremely gravelly coarse sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; moderately hard, friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common very fine irregular pores; 10 percent iron-manganese masses that are brownish yellow (10YR 6/6), dark yellowish brown (10YR 4/6) moist, and 20 percent iron depletions that are light gray (2.5Y 7/1), dark grayish brown (2.5Y 4/2) moist; 50 percent gravel and 20 percent cobbles; moderately acid (pH 6.0); abrupt wavy boundary.

Cd—36 to 60 inches; pale red (2.5YR 7/2) gravelly silty clay loam, light olive brown (2.5Y 5/4) moist; massive; very hard, very firm, moderately sticky and very plastic; few fine roots in cracks; few very fine irregular pores; 5 percent iron depletions that are light gray (2.5Y 7/1), dark grayish brown (2.5Y 4/2) moist, and 10 percent iron-manganese masses that are brownish yellow (10YR 6/6), dark yellowish brown (10YR 4/6) moist; 20 percent gravel and 5 percent cobbles; moderately acid (pH 6.0).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 60 to 75 days following summer solstice
Depth to redoximorphic features: 18 to 36 inches
Reaction: Slightly acid or moderately acid
Particle-size control section:
Content of clay—5 to 15 percent
Content of rock fragments—35 to 85 percent total, including 35 to 60 percent gravel, 0 to 25 percent cobbles, and 0 to 5 percent stones

A horizon:
Hue—10YR or 7.5YR
Value—2 to 4 moist or dry
Chroma—2 or 3 moist or dry
Content of rock fragments—15 to 65 percent total, including 15 to 65 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

Bw horizon:
Hue—10YR or 7.5YR
Value—3 to 5 moist or dry
Chroma—3 or 4 moist or dry
Texture—coarse sandy loam or sandy loam
Content of rock fragments—35 to 65 percent total, including 35 to 65 percent gravel, 0 to 15 percent cobbles, and 0 to 5 percent stones

Bg horizon:
Hue—10YR or 7.5YR
Value—3 to 5 moist or dry
Chroma—2 to 4 moist or dry
Texture—coarse sandy loam or sandy loam
Content of rock fragments—35 to 85 percent total, including 35 to 60 percent gravel, 0 to 25 percent cobbles, and 0 to 5 percent stones

Cd horizon:
Hue—2.5YR or 2.5Y
Value—3 to 5 moist, 4 to 7 dry
Chroma—2 to 4 moist or dry
Texture—sandy loam, loam, or silt loam
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 5 percent cobbles

The Alderwood soils in this survey area are a taxadjunct to the Alderwood series because they are in the Aquic subgroup rather than the Vitrandic subgroup.

Aquic Dystroxerepts

Depth class: Deep to lithic bedrock
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Moderately high to very high
Landscape: Hills, mountains
Landform: Drainageways
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 1 to 15 percent
Elevation: 0 to 2,300 feet
Mean annual precipitation: 25 to 40 inches

Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Aquic Dystroxerepts

Reference Pedon

Aquic Dystroxerepts gravelly loam in an area of Doebay-Cady-Rock outcrop complex, 10 to 30 percent slopes; 1,650 feet west and 1,750 feet south of the northeast corner of sec. 32, T. 37 N., R. 2 W.; Eastsound, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 39 minutes, 19 seconds north and longitude 122 degrees, 58 minutes, 23 seconds west. (Colors are for moist soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.

A—1 to 10 inches; very dark brown (10YR 2/2) gravelly loam, very dark grayish brown (10YR 3/2) dry; moderate coarse granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many very fine and fine irregular pores; 20 percent gravel; slightly acid (pH 6.2); clear wavy boundary.

Bg—10 to 24 inches; dark brown (7.5YR 3/3) gravelly sandy loam, brown (7.5YR 4/4) dry; weak medium subangular blocky structure; soft, friable, nonsticky and nonplastic; common fine roots; many very fine and fine irregular pores; 10 percent fine prominent irregular iron depletions that are grayish brown (10YR 5/2), light brownish gray (10YR 6/2) dry, and are throughout; and 20 percent fine prominent irregular iron-manganese masses that are yellowish brown (10YR 5/6), yellowish brown (10YR 5/8) dry, and are throughout; 25 percent gravel and 5 percent cobbles; moderately acid (pH 6.0); gradual wavy boundary.

C—24 to 48 inches; gravelly coarse sandy loam; single grain; loose, nonsticky and nonplastic; few fine interstitial pores; 25 percent gravel and 5 percent cobbles; moderately acid (pH 6.0); abrupt wavy boundary.

R—48 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 60 to 75 days following summer solstice
Depth to lithic contact: 40 to 60 inches
Depth to redoximorphic features: 10 to 24 inches
Reaction: Slightly acid or moderately acid
Particle-size control section:
Content of clay—2 to 10 percent
Content of rock fragments—5 to 50 percent total, including 5 to 40 percent gravel and 0 to 20 percent cobbles

A horizon:
Hue—10YR
Value—2 to 4 moist or dry
Chroma—2 or 3 moist or dry
Texture—loam, sandy loam, or silt loam
Content of rock fragments—5 to 35 percent total, including 5 to 35 percent gravel and 0 to 5 percent cobbles

Bg horizon:
Hue—10YR or 7.5YR
Value—3 to 5 moist or dry
Chroma—3 or 4 moist or dry

Texture—sandy loam, loam, or silt loam
Content of rock fragments—5 to 50 percent total, including 5 to 40 percent gravel and 0 to 20 percent cobbles

C horizon:
Color—variegated colors of parent material
Texture—coarse sandy loam, sandy loam, or loamy sand
Content of rock fragments—5 to 50 percent total, including 5 to 40 percent gravel and 0 to 20 percent cobbles

Bazal Series

Depth class: Moderately deep to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Very low to very high
Landscape: Hills, mountains, drift plains
Landform: Drainageways, valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Elevation: 0 to 650 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Typic Argialbolls

Typical Pedon

Bazal mucky loam in an area of Bazal-Mitchellbay complex, 0 to 5 percent slopes, in an area of forestland; 2,600 feet north and 300 feet east of southwest corner of sec. 19, T. 36 N., R. 3 W.; Roche Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 36 minutes, 4 seconds north and longitude 123 degrees, 7 minutes, 31 seconds west. (Colors are for moist soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; moderately acid (pH 6.0); abrupt smooth boundary.

A1—1 to 4 inches; black (10YR 2/1) mucky loam, dark gray (10YR 4/1) dry; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine irregular pores; moderately acid (pH 5.8); abrupt smooth boundary.

A2—4 to 10 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate medium granular structure; soft, friable, slightly sticky and slightly plastic; many very fine and fine and common medium and coarse roots; many very fine irregular pores; 2 percent gravel; neutral (pH 6.6); clear wavy boundary.

Bw—10 to 17 inches; dark brown (10YR 3/3) loam, brown (10YR 5/3) dry; moderate coarse subangular blocky structure; soft, very friable, moderately sticky and moderately plastic; common very fine and fine roots; many very fine irregular pores; 5 percent gravel; neutral (pH 6.7); clear wavy boundary.

E—17 to 24 inches; dark grayish brown (10YR 4/2) loamy coarse sand, light brownish gray (10YR 6/2) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine irregular pores; 10 percent faint iron-manganese masses that are very dark grayish brown (10YR 3/2) moist, dark yellowish brown (10YR 4/6) dry, and are on faces of peds; 5 percent gravel; neutral (pH 6.7); gradual wavy boundary.

2Btg—24 to 39 inches; brown (10YR 4/3) loam, pale brown (10YR 6/3) dry; moderate medium subangular blocky structure; moderately hard, friable, slightly sticky and slightly plastic; few very fine roots between peds; common very fine irregular pores; 30 percent prominent iron-manganese masses that are brownish yellow (10YR 6/8) dry, yellowish brown (10YR 5/8) moist, and are on faces of peds; 3 percent gravel; neutral (pH 7.0); clear wavy boundary.

2Cd—39 to 43 inches; olive brown (2.5Y 4/3) loam, light yellowish brown (2.5Y 6/3) dry; massive; hard, firm, moderately sticky and moderately plastic; few very fine irregular pores; 10 percent faint iron-manganese masses that are brownish yellow (10YR 6/6) dry, yellowish brown (10YR 5/8) moist, and are in cracks; 3 percent gravel; slightly alkaline (pH 7.4).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Thickness of mollic epipedon: 10 to 17 inches
Reaction: Moderately acid to mildly alkaline
Depth to redoximorphic features: 3 to 9 inches
Particle-size control section:
Content of rock fragments—0 to 15 percent gravel
Content of clay—18 to 35 percent

A1 horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 dry
Chroma—1 or 2 moist or dry
Content of clay—10 to 20 percent

A2 horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 dry
Chroma—1 or 2 moist or dry
Texture—loam or silt loam
Content of clay—10 to 20 percent
Content of rock fragments—0 to 5 percent

Bw horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3 moist or dry
Texture—loam, fine sandy loam, or silt loam
Content of clay—3 to 18 percent
Content of rock fragments—0 to 15 percent

E horizon:
Value—4 or 5 moist, 6 dry
Chroma—1 or 2 moist or dry
Texture—loamy coarse sand, loamy sand, sandy loam, or loam
Content of clay—3 to 18 percent
Content of rock fragments—0 to 15 percent

Btg horizon:
Hue—10YR or 7.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—2 to 4 moist or dry
Texture—loam, silt loam, or silty clay loam
Content of clay—18 to 35 percent

Cd horizon:
Hue—7.5YR to 2.5Y
Value—5 or 6 moist, 4 to 7 dry
Chroma—2 or 3 moist or dry
Texture—loam, silt loam, or silty clay loam
Content of clay—15 to 35 percent

Cady Series

Depth class: Shallow to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Hills, mountains
Landform: Drainageways, hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 75 percent
Elevation: 0 to 2,400 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy, isotic, mesic Lithic Dystroxerepts

Typical Pedon

Cady loam in an area of Cady-Rock outcrop complex, 5 to 30 percent slopes, in an area of forestland; 1,100 feet north and 1,500 feet east of the southwest corner of sec. 30, T. 36 N., R. 3 W.; Friday Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 34 minutes, 57 seconds north and longitude 123 degrees, 7 minutes, 13 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt wavy boundary.
A—1 to 4 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine and medium roots; many very fine and fine irregular pores; 5 percent gravel; moderately acid (pH 5.7); clear wavy boundary.
Bw—4 to 16 inches; brownish yellow (10YR 6/6) fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium, coarse, and very coarse roots; many very fine and fine irregular and common very fine and fine tubular pores; 10 percent gravel; moderately acid (pH 5.6); abrupt wavy boundary.
R—16 inches, metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Average annual soil temperature: 49 to 54 degrees F
Soil moisture control section: Dry 60 to 90 days following summer solstice
Reaction: Moderately acid or slightly acid
Content of volcanic glass: Less than 5 percent throughout
Particle-size control section:
Texture—coarse sandy loam, fine sandy loam, sandy loam, or loam
Content of clay—5 to 15 percent
Content of rock fragments—0 to 35 percent gravel

A horizon:
Value—2 to 4 moist, 2 to 5 dry
Chroma—1 or 2 moist, 1 to 3 dry

Bw horizon:
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 or 4 moist, 3 to 6 dry

Constitution Series

Depth class: Moderately deep to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 5 to 25 percent
Elevation: 0 to 2,300 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 160 to 220 days

Taxonomic class: Coarse-loamy, isotic, mesic Andic Dystroxerepts

Typical Pedon

Constitution sandy loam in an area of Constitution-Skipjack-Kahboo complex, 5 to 25 percent slopes, in an area of forestland; 1,000 feet north and 1,250 feet west of sec. 32, T. 37 N., R 1 W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 38 minutes, 53 seconds north and longitude 122 degrees, 50 minutes, 28 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; clear wavy boundary.
A—1 to 6 inches; dark yellowish brown (10YR 3/4) sandy loam, very dark brown (10YR 2/2) moist; strong medium granular structure; soft, very friable, nonsticky and nonplastic; many fine and medium and common coarse and very coarse roots; many very fine and fine irregular pores; 10 percent gravel; strongly acid (pH 5.4); clear smooth boundary.
Bw1—6 to 16 inches; strong brown (7.5YR 4/6) gravelly sandy loam, dark brown (7.5YR 3/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and medium and common coarse and very coarse roots; few fine tubular and common very fine irregular pores; 30 percent gravel; strongly acid (pH 5.4); gradual wavy boundary.
Bw2—16 to 26 inches; light olive brown (2.5Y 5/6) gravelly coarse sandy loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few coarse roots; few very fine irregular pores; 30 percent gravel; moderately acid (pH 5.6); abrupt wavy boundary.
R—26 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Average annual soil temperature: 48 to 50 degrees F
Soil moisture control section: Dry 45 to 60 days following summer solstice
Reaction: Strongly acid or moderately acid

Particle-size control section:
Content of clay—5 to 15 percent
Content of rock fragments—0 to 35 percent

A horizon:
Value—2 or 3 moist
Chroma—1 to 3 moist, 3 or 4 dry
Ammonium oxalate extractable aluminum plus one-half iron—1.5 to 2.5 percent
Bulk density—0.8 to 1.0 gram per cubic centimeter
Phosphorous retention—50 to 80 percent
Content of volcanic glass—0 to 4 percent
Content of rock fragments—0 to 15 percent gravel

Bw1 horizon:
Hue—10YR to 7.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 to 6 moist or dry
Texture—loam, sandy loam, or fine sandy loam
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones
Ammonium oxalate extractable aluminum plus one-half iron—1.5 to 2.5 percent
Bulk density—0.8 to 1.0 gram per cubic centimeter
Phosphorous retention—50 to 80 percent
Content of volcanic glass—0 to 4 percent

Bw2 horizon:
Hue—2.5Y to 10YR
Value—3 or 4 moist, 4 to 6 dry
Chroma—3 to 6 moist or dry
Texture—sandy loam or coarse sandy loam
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Coupeville Series

Depth class: Deep to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Elevation: 0 to 300 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Argiaquic Argialbolls

Typical Pedon

Coupeville loam, 0 to 5 percent slopes (fig. 16); 1,100 feet north and 600 feet west of the southeast corner of sec. 4, T. 31 N., R. 1 E.; Coupeville, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 11 minutes, 55 seconds north and longitude 122 degrees, 40 minutes, 59 seconds west. (Colors are for moist soil unless otherwise noted.)

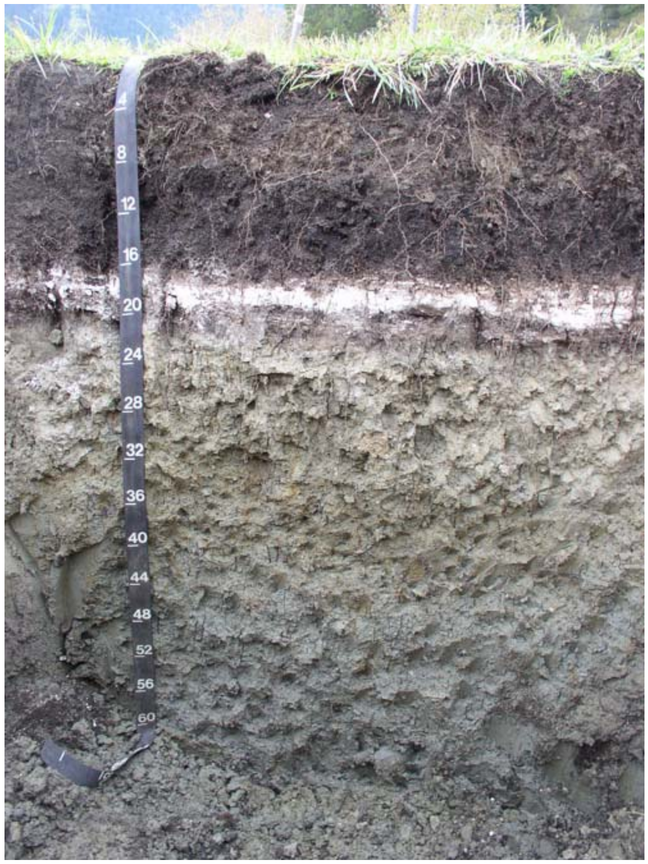

Figure 16.—Typical profile of a Coupeville loam.

Ap—0 to 7 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; moderate coarse granular structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores; moderately acid (pH 5.6); clear wavy boundary.

A—7 to 12 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores; 5 percent fine distinct iron-manganese masses that are yellowish brown (10YR 5/6), yellow (10YR 7/6) dry, and are throughout and 5 percent fine faint iron depletions that are grayish brown (2.5Y 5/2), light gray (2.5Y 7/2) dry, and are throughout; slightly acid (pH 6.5); abrupt wavy boundary.

2E—12 to 20 inches; grayish brown (2.5Y 5/2) clay loam, light gray (2.5Y 7/2) dry; strong medium angular blocky structure; moderately hard, friable, very sticky and very plastic; few very fine and fine roots; few fine interstitial pores; 30 percent fine distinct iron-manganese masses that are yellowish brown (10YR 5/6), yellow (10YR 7/6) dry, and are throughout and 60 percent fine faint iron depletions that are grayish brown (2.5Y 5/2), light gray (2.5Y 7/2) dry, and are throughout; neutral (pH 6.7); gradual wavy boundary.

2Btg1—20 to 34 inches; dark gray (2.5Y 4/1) clay loam, gray (2.5Y 6/1) dry; strong coarse angular blocky structure; hard, firm, very sticky and very plastic; few very fine and fine roots between peds; many fine tubular and common fine irregular pores; 40 percent fine faint iron depletions that are grayish brown (2.5Y 5/2), light gray (2.5Y 7/2) dry, and are throughout and 40 percent fine distinct iron-manganese masses that are dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/6) dry, and are on faces of peds; neutral (pH 6.8); gradual wavy boundary.

2Btg2—34 to 50 inches; dark grayish brown (2.5Y 4/2) clay loam, light brownish gray (2.5Y 6/2) dry; strong coarse angular blocky structure; very hard, very firm, very sticky and very plastic; few very fine and fine roots between peds; common fine irregular and tubular pores; 10 percent fine faint iron depletions that are grayish brown (2.5Y 5/2), light brownish gray (2.5Y 6/2) dry, and are throughout and 30 percent fine distinct iron-manganese masses that are yellowish brown (10YR 5/6), yellow (10YR 7/6) dry, and are on faces of peds; neutral (pH 6.8); gradual irregular boundary.

2Cd—50 to 60 inches; dark grayish brown (2.5Y 4/2) silty clay loam, light brownish gray (2.5Y 6/2) dry; massive; very hard, very firm, moderately sticky and very plastic; few fine irregular pores; 5 percent fine prominent iron-manganese masses that are yellowish brown (10YR 5/6), yellow (10YR 7/6) dry, and are in cracks; neutral (pH 7.3).

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to dense material
Average annual soil temperature: 52 to 54 degrees F
Thickness of mollic epipedon: 10 to 14 inches
Depth to redoximorphic features: 5 to 8 inches
Reaction: Moderately acid or slightly alkaline
Particle-size control section:
Content of rock fragments—0 to 15 percent gravel
Content of clay—18 to 35 percent

Ap horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Content of clay—10 to 20 percent
Content of rock fragments—0 to 5 percent gravel

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Texture—loam or silt loam
Content of clay—10 to 20 percent
Content of rock fragments—0 to 5 percent gravel

2E horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 5 or 6 dry
Chroma—1 or 2 moist or dry
Texture—loam or clay loam
Content of clay—18 to 30 percent
Content of rock fragments—0 to 15 percent gravel

2Btg horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 5 or 6 dry
Chroma—1 or 2 moist or dry
Texture—loam or clay loam

Content of clay—18 to 32 percent
Content of rock fragments—0 to 15 percent gravel

Cd horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 5 or 6 dry
Chroma—1 or 2 moist or dry
Texture—silt loam or silty clay loam
Content of clay—15 to 30 percent
Content of rock fragments—0 to 15 percent gravel

Coveland Series

Depth class: Deep to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Hillslopes, valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 10 percent
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Aquic Haploxeralfs

Typical Pedon

Coveland loam, 0 to 5 percent slopes (fig. 17); 1,400 feet south and 1,300 feet west of the northeast corner of sec. 3, T. 34 N., R. 3 W.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 28 minutes, 26 seconds north and longitude 123 degrees, 2 minutes, 41 seconds west. (Colors are for dry soil unless otherwise noted.)

A1—0 to 4 inches; dark grayish brown (10YR 4/2) loam, black (10YR 2/1) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine and fine interstitial pores; 5 percent gravel; slightly acid (pH 6.4); abrupt smooth boundary.

A2—4 to 9 inches; dark grayish brown (10YR 4/2) loam, black (10YR 2/1) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; many very fine and fine interstitial pores; 5 percent gravel; slightly acid (pH 6.5); abrupt smooth boundary.

E—9 to 20 inches; gray (10YR 6/1) sandy loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few fine interstitial pores; 10 percent medium prominent irregular iron-manganese masses that are yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/6) moist, have a clear boundary, and are throughout; 5 percent gravel; neutral (pH 7.1); clear wavy boundary.

2Btg1—20 to 36 inches; light brownish gray (10YR 6/2) silty clay loam, dark grayish brown (2.5Y 4/2) moist; strong coarse prismatic structure and strong medium prismatic; moderately hard, friable, moderately sticky and moderately plastic; many very fine roots in cracks and few very fine roots throughout; common fine irregular and many fine tubular pores; 5 percent discontinuous faint clay films on surfaces along pores and 60 percent discontinuous prominent organic stains on

Figure 17.—Typical profile of a Coveland loam.

vertical faces of peds; 40 percent medium prominent irregular iron-manganese masses that are yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/6) moist, have a clear boundary, and are throughout; slightly alkaline (pH 7.4); gradual wavy boundary.

2Btg2—36 to 44 inches; light brownish gray (2.5Y 6/2) silt loam, olive brown (2.5Y 4/3) moist; strong coarse angular blocky structure; moderately hard, friable, moderately sticky and moderately plastic; many very fine roots in cracks and few very fine roots throughout; common fine tubular and irregular pores; 5 percent discontinuous faint clay films on surfaces along pores and 15 percent discontinuous prominent organic stains on vertical faces of peds; 20 percent medium prominent irregular iron-manganese masses that are yellowish brown (10YR 5/6), dark yellowish brown (10YR 3/6) moist, have a clear boundary, and are throughout; moderately alkaline (pH 8.0); gradual wavy boundary.

2Cd—44 to 60 inches; light brownish gray (2.5Y 6/2) silt loam, olive brown (2.5Y 4/3) moist; massive; hard, firm, slightly sticky and slightly plastic; few fine irregular pores; 10 percent medium prominent irregular iron-manganese masses that are yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/6) moist, have a clear boundary, and are throughout; moderately alkaline (pH 7.9).

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to dense material

Average annual soil temperature: 50 to 52 degrees F
Depth to redoximorphic features: 9 to 18 inches
Reaction: Slightly acid to moderately alkaline
Particle-size control section:
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

A1 horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Content of clay—7 to 18 percent

A2 horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Texture—loam, silt loam, or sandy loam
Content of clay—10 to 25 percent
Content of rock fragments—0 to 15 percent gravel

E horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 6 or 7 dry
Chroma—1 or 2 moist or dry
Texture—sandy loam, loamy sand, or loam
Content of clay—2 to 19 percent
Content of rock fragments—0 to 15 percent gravel

2Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 5 moist, 5 to 7 dry
Chroma—2 or 3 moist or dry
Texture—silt loam, silty clay loam, or loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

Cd horizon:
Hue—2.5Y or 5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 or 3 moist or dry
Texture—silty clay loam, loam, or silt loam
Content of clay—17 to 32 percent
Content of rock fragments—0 to 15 percent gravel

Deadmanbay Series

Depth class: Deep to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to very high
Landscape: Drift plains, hills, mountains
Landform: Drainageways, valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 15 percent
Elevation: 0 to 650 feet

Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs

Typical Pedon

Deadmanbay silt loam in an area of Deadmanbay-Morancreek complex, 2 to 15 percent slopes; 2,100 feet south and 1,000 feet east of the northwest corner of sec. 19, T. 37 N., R. 1 W.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 40 minutes, 58 seconds north and longitude 122 degrees, 52 minutes, 30 seconds west. (Colors are for moist soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt wavy boundary.

A—1 to 5 inches; black (10YR 2/1) silt loam, very dark grayish brown (10YR 3/2) dry; strong coarse granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine and fine, common medium, and few coarse roots; few fine and medium tubular pores and common medium irregular pores; 10 percent gravel; very strongly acid (pH 5.0); clear wavy boundary.

Bw—5 to 16 inches; dark brown (10YR 3/3) silt loam, dark yellowish brown (10YR 4/4) dry; moderate coarse subangular blocky structure; moderately hard, friable, moderately sticky and moderately plastic; many very fine and fine, common medium, and few coarse roots; few fine and many medium tubular pores and common medium irregular pores; 10 percent gravel; moderately acid (pH 5.6); abrupt wavy boundary.

Bg—16 to 29 inches; dark yellowish brown (10YR 4/6) loamy coarse sand, yellowish brown (10YR 5/6) dry; massive; moderately hard, friable, nonsticky and nonplastic; few very fine, fine, and medium roots; many very fine interstitial pores; 30 percent fine prominent irregular iron depletions that are reddish gray (2.5YR 5/1), reddish gray (2.5YR 6/1) dry, and are in matrix; moderately acid (pH 6.0); clear wavy boundary.

2Btg—29 to 57 inches; dark yellowish brown (10YR 4/6) gravelly silty clay loam, yellowish brown (10YR 5/6) dry; strong medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; few fine and medium roots; few very fine interstitial pores; many fine prominent irregular iron depletions that are reddish gray (2.5YR 5/1), reddish gray (2.5YR 6/1) dry, and are in matrix; 30 percent gravel; slightly acid (pH 6.4); gradual wavy boundary.

2Cd—57 to 60 inches; dark reddish gray (2.5YR 4/1) silty clay loam, reddish gray (2.5YR 5/1) dry; massive; very hard, firm, moderately sticky and moderately plastic; 10 percent gravel; neutral (pH 7.3).

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 60 to 75 days following summer solstice
Depth to redoximorphic features: 9 to 18 inches
Particle-size control section:
Content of clay—18 to 35 percent

A horizon:
Value—2 or 3 moist, 3 to 5 dry
Chroma—2 or 3 moist, 1 or 2 dry

Bw horizon:
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 or 3 moist, 3 or 4 dry
Texture—silt loam or loam
Content of clay—12 to 27 percent
Content of rock fragments—0 to 15 percent gravel

Bg horizon:
Value—4 or 5 moist, 5 to 7 dry
Chroma—4 to 6 moist or dry
Texture—loamy coarse sand, loamy sand, or sandy loam
Content of clay—1 to 12 percent
Content of rock fragments—0 to 35 percent gravel

2Btg horizon:
Value—4 or 5 moist, 5 to 7 dry
Chroma—4 to 6 moist or dry
Texture—silty clay loam, silt loam, or loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 30 percent gravel

2Cd horizon:
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 or 3 moist or dry
Texture—silty clay loam, silt loam, or loam
Content of clay—12 to 35 percent
Content of rock fragments—0 to 15 percent gravel

Doebay Series

Depth class: Moderately deep to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 75 percent
Elevation: 0 to 1,700 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy-skeletal, isotic, mesic Typic Dystroxerepts

Typical Pedon

Doebay loam (fig. 18) in an area of Doebay-Cady-Rock outcrop complex, 10 to 30 percent slopes, in an area of forestland; 1,900 feet north and 2,100 feet east of the southeast corner of sec. 33; T. 37 N., R. 1 W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 39 minutes, 1 seconds north and longitude 122 degrees, 50 minutes, 40 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt wavy boundary.
A—1 to 6 inches; brown (10YR 4/3) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; moderately hard, friable, slightly sticky and slightly plastic; common fine and medium and few coarse roots; common very fine

Figure 18.—Typical profile of a Doebay loam.

and fine irregular and tubular pores; 10 percent gravel; moderately acid (pH 5.7); abrupt smooth boundary.

Bw1—6 to 16 inches; dark yellowish brown (10YR 4/6) fine sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine and medium and few coarse roots; common very fine and fine irregular and tubular pores; 10 percent gravel; moderately acid (pH 5.6); clear smooth boundary.

Bw2—16 to 21 inches; yellowish brown (10YR 5/6) very gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium and few coarse roots; common very fine and fine tubular and irregular pores; 35 percent gravel and 5 percent cobbles; moderately acid (pH 5.6); clear wavy boundary.

C—21 to 35 inches; light olive brown (2.5Y 5/4) extremely gravelly loam, olive brown (2.5Y 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine interstitial and irregular pores; 65 percent gravel; moderately acid (pH 5.6); abrupt wavy boundary.

R—35 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Average annual soil temperature: 50 to 52 degrees F
Soil moisture control section: Dry 60 to 90 days following summer solstice

Reaction: Strongly acid or moderately acid
Content of volcanic glass: 0 to less than 5 percent in A and Bw horizons
Particle-size control section:
Content of clay—5 to 18 percent
Content of rock fragments—35 to 75 percent total, including 35 to 75 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

A horizon:
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3 moist, 3 or 4 dry
Texture—loam, fine sandy loam, or sandy loam
Content of clay—5 to 18 percent
Content of rock fragments—10 to 35 percent gravel

Bw1 horizon:
Hue—7.5YR or 10YR
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 to 4 moist, 3 to 6 dry
Texture—loam, sandy loam, or fine sandy loam
Content of clay—5 to 18 percent
Content of rock fragments—10 to 35 percent total, including 10 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Bw2 horizon:
Hue—7.5YR to 2.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 or 4 moist, 3 to 6 dry
Texture—loam, sandy loam, or fine sandy loam
Content of clay—5 to 18 percent
Content of rock fragments—35 to 60 percent total, including 35 to 60 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

C horizon:
Hue—10YR to 2.5Y
Value—4 or 5 moist, 4 to 7 dry
Chroma—2 to 4 moist, 2 to 6 dry
Texture—loam, fine sandy loam, sandy loam, or coarse sandy loam
Content of clay—2 to 12 percent
Content of rock fragments—50 to 70 percent total, including 50 to 75 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Dugualla Series

Depth class: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Shore complexes
Landform: Depressions, lagoons
Parent material: Herbaceous organic deposits
Slope range: 0 to 2 percent
Elevation: 0 to 10 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Euic, mesic Halic Haplosaprists

Typical Pedon

Dugualla muck, 0 to 2 percent slopes (fig. 19); 1,500 feet east and 1,850 feet north of the southwest corner of sec. 11, T. 34 N., R. 2 W.; Richardson, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 27 minutes, 15 seconds north and longitude 122 degrees, 54 minutes, 13 seconds west. (Colors are for moist soil unless otherwise noted.)

Oa1—0 to 11 inches; black (10YR 2/1) muck, very dark gray (10YR 3/1) dry; about 20 percent fiber, 5 percent rubbed; massive; slightly hard, very friable, nonsticky and nonplastic; few fine roots; many very fine tubular pores; 15 percent fine prominent iron depletions that are very pale brown (10YR 7/4), very pale brown (10YR 8/2) dry, and are in matrix; slightly acid (pH 6.5); clear wavy boundary.

Oa2—11 to 20 inches; very dark brown (7.5YR 2.5/2) muck, brown (7.5YR 4/2) dry; about 10 percent fiber, 3 percent rubbed; strong thin platy structure; hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; 10 percent fine distinct irregular iron depletions that are very pale brown (10YR 7/4), very pale brown (10YR 8/2) dry, and are in matrix and 15 percent fine distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/6) dry, and are on surfaces along root channels; slightly acid (pH 6.3); gradual wavy boundary.

Figure 19.—Typical profile of a Dugualla muck.

Oa3—20 to 26 inches; very dark brown (10YR 2/2) muck, very dark gray (10YR 3/1) dry; about 20 percent fiber, 5 percent rubbed; moderate medium platy structure; moderately hard, very friable, nonsticky and nonplastic; few fine roots; many very fine irregular pores; 20 percent angular noncemented shell fragments; neutral (pH 7.1); gradual wavy boundary.

Oa4—26 to 60 inches; very dark brown (7.5YR 2.5/2) muck, brown (7.5YR 4/2) dry; about 5 percent fiber, 0 percent rubbed; massive; hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine irregular pores; neutral (pH 7.2).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Depth to mineral soil material: More than 51 inches
Reaction: Slightly acid or neutral
Electrical conductivity: More than 30 deciSiemens per meter for 6 months or more throughout upper 51 inches
Rubbed fiber content—averages less than 16 percent throughout upper 51 inches

Oa1 horizon:
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry

Oa2, Oa3, and Oa4 horizons:
Hue—7.5YR to 10YR
Value—2 to 3 moist, 2 to 4 dry
Chroma—1 to 3 moist or dry

Endoaquents

Depth class: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Very high
Landscape: Shore complexes
Landform: Beaches
Parent material: Beach sand
Slope range: 0 to 5 percent
Elevation: 0 to 10 feet
Mean annual precipitation: 18 to 45 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 365 days

Taxonomic class: Endoaquents

Typical Pedon

Endoaquents gravelly sand (fig. 20) in an area of Endoaquents, tidal-Xerorthents association, 0 to 15 percent slopes; 1,250 feet east and 1,700 feet north of the southwest corner of sec. 9, T. 36 N., R. 1 W.; Blakely Island, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 37 minutes, 18 seconds north and longitude 122 degrees, 49 minutes, 49 seconds west. (Colors are for moist soil unless otherwise noted.)

C1—0 to 29 inches; greenish black (5GY 2.5/1) gravelly sand; 20 percent black (N 2.5/0) mottles; single grain; loose, nonsticky and nonplastic; few tubular pores;

Figure 20.—Typical profile of an Endoaquents gravelly sand.

2 percent dark yellowish brown (10YR 4/4) masses of iron-manganese; 15 percent gravel; strongly acid (pH 5.2) clear wavy boundary.

C2—29 to 48 inches; greenish black (5GY 2.5/1) very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; common interstitial pores; 50 percent gravel; neutral (pH 7.1) gradual wavy boundary.

C3—48 to 60 inches; greenish black (5GY 2.5/1) extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; common interstitial pores; 65 percent gravel; neutral (pH 7.2).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 48 to 54 degrees F
Reaction: Moderately acid to neutral
Content of clay—0 to 2 percent

C1 horizon:
Texture—fine sand, loamy coarse sand, or sand
Content of rock fragments—0 to 35 percent gravel

C2 and C3 horizons:
Texture—sand or coarse sand
Content of rock fragments—35 to 90 percent gravel

Everett Taxadjunct

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial outwash
Slope range: 3 to 40 percent
Elevation: 0 to 400 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Sandy-skeletal, isotic, mesic Typic Dystroxerepts

Typical Pedon

Everett sandy loam (fig. 21) in an area of Alderwood-Everett complex, warm, 5 to 15 percent slopes; 1,700 feet north and 10 feet west of the southeast corner of sec. 9, T. 36 N., R. 1 W.; Willamette Baseline Meridian; Blakely Island, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 37 minutes, 16 seconds north and longitude 122 degrees, 48 minutes, 50 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 2 inches; slightly decomposed plant material; abrupt wavy boundary.
A—2 to 9 inches; brown (10YR 4/3) sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots; common very fine and fine tubular and irregular pores; 10 percent gravel; very strongly acid (pH 4.7); abrupt wavy boundary.
Bw1—9 to 13 inches; yellowish brown (10YR 5/6) gravelly sandy loam, dark yellowish brown (10YR 3/6) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common fine and few medium roots; few very fine and fine irregular and tubular pores; 25 percent gravel; very strongly acid (pH 4.9); clear wavy boundary.
Bw2—13 to 30 inches; yellowish brown (10YR 5/6) very gravelly coarse sand, dark yellowish brown (10YR 3/6) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine and few medium and coarse roots; few very fine and fine irregular and common very fine and fine interstitial pores; 50 percent gravel; strongly acid (pH 5.4); gradual wavy boundary.
C—30 to 60 inches; variegated extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; 65 percent gravel; moderately acid (pH 5.8).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 48 to 54 degrees F
Soil moisture control section: Dry for 60 to 75 consecutive days following summer solstice
Estimated content of volcanic glass: Less than 5 percent
Estimated ammonium oxalate extractable aluminum plus one-half iron: Less than 0.4 percent

Figure 21.—Typical profile of an Everett sandy loam.

Particle-size control section:
Content of rock fragments—35 to 75 percent total, including 35 to 75 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

A horizon:
Hue—10YR to 5YR
Value—2 to 5 moist, 4 to 6 dry
Chroma—1 to 3 moist or dry
Reaction—very strongly acid or strongly acid

Bw horizon:
Hue—10YR or 7.5YR
Value—3 to 6 moist or dry
Chroma—2 to 6 moist or dry
Reaction—very strongly acid to moderately acid
Texture—sandy loam, loamy sand, loamy coarse sand, or coarse sand
Content of clay—0 to 12 percent
Content of rock fragments—35 to 75 percent total, including 35 to 60 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

C horizon:
Color—variegated colors from parent material

Texture—coarse sand, loamy sand, or fine sand
Reaction—slightly acid or moderately acid
Content of clay—0 to 2 percent
Content of rock fragments—50 to 75 percent total, including 50 to 70 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

The Everett soils in this survey area are a taxadjunct to the Everett series because they are in the Typic subgroup rather than the Vitrandic subgroup.

Haro Series

Depth class: Shallow to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high to very high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 75 percent
Elevation: 0 to 2,000 feet
Mean annual precipitation: 18 to 35 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy, isotic, mesic Lithic Ultic Haploxerolls

Typical Pedon

Haro loam in an area of Haro-Hiddenridge-Rock outcrop complex, 5 to 30 percent slopes; 900 feet north and 1,250 feet east of the southwest corner of sec. 25, T. 36 N., R. 4 W.; Roche Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 34 minutes, 55 seconds north and longitude 123 degrees, 8 minutes, 35 seconds west. (Colors are for dry soil unless otherwise noted.)

A1—0 to 1 inch; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 3 percent gravel; strongly acid (pH 5.1); clear smooth boundary.
A2—1 to 5 inches; dark gray (10YR 4/1) gravelly loam, black (10YR 2/1) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 20 percent gravel; strongly acid (pH 5.4); clear wavy boundary.
Bw—5 to 11 inches; very dark grayish brown (10YR 3/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine and few coarse and very coarse roots; many very fine and fine irregular and common very fine and fine tubular pores; 30 percent gravel; moderately acid (pH 5.9); abrupt wavy boundary.
R—11 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Average annual soil temperature: 50 to 54 degrees F
Soil moisture control section: Dry 75 to 90 days following summer solstice
Thickness of mollic epipedon: 10 to 20 inches (A and Bw horizons)
Reaction: Moderately acid or strongly acid

Particle-size control section:
Content of clay—5 to 18 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 5 percent cobbles

A1 horizon:
Hue 10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Content of clay—8 to 18 percent
Content of rock fragments—0 to 15 percent gravel

A2 horizon:
Hue 10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Texture—loam or sandy loam
Content of clay—5 to 18 percent

Bw horizon:
Hue 10YR or 7.5YR
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 or 3 moist or dry
Texture—sandy loam or loam
Content of clay—5 to 18 percent

Hiddenridge Series

Depth class: Deep to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High or very high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 5 to 50 percent
Elevation: 0 to 2,000 feet
Mean annual precipitation: 18 to 35 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy-skeletal, isotic, mesic Humic Dystroxerepts

Typical Pedon

Hiddenridge gravelly coarse sandy loam (fig. 22) in an area of Haro-Hiddenridge-Rock outcrop complex, 25 to 75 percent slopes; 600 feet south and 1,850 feet west of the northeast corner of sec. 32, T. 37 N., R. 1 W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 39 minutes, 29 seconds north and longitude 122 degrees, 50 minutes, 37 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.
A1—1 to 3 inches; very dark grayish brown (10YR 3/2) gravelly coarse sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots;

Figure 22.—Typical profile of a Hiddenridge gravelly coarse sandy loam.

many very fine and fine irregular and interstitial pores; 20 percent gravel; strongly acid (pH 5.5); abrupt smooth boundary.

A2—3 to 24 inches; dark grayish brown (10YR 4/2) very gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine, medium, and coarse roots; many very fine and fine irregular and interstitial pores; 40 percent gravel; strongly acid (pH 5.2); clear wavy boundary.

C—24 to 57 inches; olive brown (2.5Y 4/3) extremely gravelly coarse sandy loam, very dark grayish brown (2.5Y 3/2) moist; single grain; loose, nonsticky and nonplastic; common very fine, fine, and medium and few coarse roots; many very fine and fine irregular pores and many very fine and fine and common coarse interstitial pores; 70 percent gravel and 5 percent cobbles; strongly acid (pH 5.3); clear wavy boundary.

R—57 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Average annual soil temperature: 50 to 54 degrees F
Soil moisture control section: Dry 75 to 90 days following summer solstice

Reaction: Moderately acid or strongly acid
Particle-size control section:
Content of clay—0 to 18 percent
Content of rock fragments—35 to 85 percent total, including 25 to 80 percent gravel and 0 to 10 percent cobbles

A1 horizon:
Hue—10YR to 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Content of clay—5 to 18 percent
Content of rock fragments—15 to 30 percent gravel

A2 horizon:
Hue—10YR to 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Texture—loam, sandy loam, or coarse sandy loam
Content of clay—5 to 18 percent
Content of rock fragments—15 to 60 percent gravel

C horizon:
Hue—2.5Y to 10YR
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 or 3 moist or dry
Texture—sandy loam or coarse sandy loam
Content of clay—0 to 18 percent
Content of rock fragments—35 to 85 percent total, including 35 to 80 percent gravel and 0 to 10 percent cobbles

Hoypus Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial outwash
Slope range: 3 to 40 percent
Elevation: 0 to 450 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Sandy-skeletal, isotic, mesic Typic Xerorthents

Typical Pedon

Hoypus sandy loam, 3 to 25 percent slopes; 1,900 feet north and 900 feet east of the southwest corner of sec. 36, T. 32 N., R. 1 E.; Coupeville, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 12 minutes, 54 seconds north and longitude 122 degrees, 37 minutes, 50 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.
A—1 to 5 inches; very dark grayish brown (10YR 3/2) sandy loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure; soft, very friable,

nonsticky and nonplastic; many very fine, fine, and medium and common coarse roots; many very fine and fine irregular and interstitial pores; 10 percent gravel; strongly acid (pH 5.4); clear wavy boundary.

Bw1—5 to 20 inches; yellowish brown (10YR 5/4) loamy sand, dark yellowish brown (10YR 3/4) moist; single grain; loose, nonsticky and nonplastic; many fine and medium and common coarse roots; many very fine, fine, and medium irregular and interstitial pores; 10 percent gravel; strongly acid (pH 5.3); clear wavy boundary.

Bw2—20 to 36 inches; brown (10YR 5/3) very gravelly loamy sand, dark brown (10YR 3/3) moist; single grain; loose, nonsticky and nonplastic; common fine roots; many very fine, fine, and medium irregular and interstitial pores; 55 percent gravel; strongly acid (pH 5.5); clear wavy boundary.

C—36 to 60 inches; extremely gravelly sand; single grain; loose, nonsticky and nonplastic; few fine roots; many very fine irregular and interstitial pores; 55 percent gravel and 5 percent cobbles; moderately acid (pH 5.9).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 47 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice
Particle-size control section:
Content of rock fragments—35 to 75 percent total, including 35 to 60 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones
Content of clay—0 to 5 percent

A horizon:
Value—2 or 3 moist and 3 or 4 dry
Chroma—1 to 3 moist or dry
Reaction—moderately acid or strongly acid

Bw1 horizon:
Hue—7.5YR or 10YR
Value—3 or 4 moist or dry
Chroma—3 or 4 moist or dry
Reaction—moderately acid or strongly acid
Texture—loamy sand or sandy loam
Content of clay—3 to 5 percent
Content of rock fragments—5 to 50 percent total, including 5 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Bw2 horizon:
Hue—7.5YR or 10YR
Value—3 or 4 moist or dry
Chroma—3 or 4 moist or dry
Reaction—moderately acid or strongly acid
Texture—loamy sand or sand
Content of clay—1 to 5 percent
Content of rock fragments—35 to 80 percent total, including 35 to 65 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

C horizon:
Reaction—slightly acid or moderately acid
Texture—loamy sand or sand
Content of clay—0 to 5 percent
Content of rock fragments—35 to 80 percent total, including 35 to 65 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Indianola Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial outwash
Slope range: 3 to 15 percent
Elevation: 0 to 350 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Isotic, mesic Dystric Xeropsamments

Typical Pedon

Indianola loamy sand, warm, 3 to 15 percent slopes, Thurston County, Washington; about 2 miles southeast of Tumwater, at north end of Munn Lake near Department of Game boat launch; 2,200 feet east and 2,550 feet north of the southwest corner of sec. 1, T. 17 N., R. 2 W.; latitude 46 degrees, 59 minutes, 18 seconds north and longitude 122 degrees, 52 minutes, 40 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.

A—1 to 6 inches; very dark grayish brown (10YR 3/2) loamy sand, black (10YR 2/1) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral (pH 6.8); clear wavy boundary.

Bw1—6 to 17 inches; yellowish brown (10YR 5/4) loamy sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores; neutral (pH 6.8); clear wavy boundary.

Bw2—17 to 27 inches; yellowish brown (10YR 5/4) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common very fine, fine, and medium roots; many very fine and fine interstitial pores; neutral (pH 6.6); clear wavy boundary.

BC—27 to 37 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; common fine roots; many very fine and fine interstitial pores; neutral (pH 6.8); gradual wavy boundary.

C—37 to 60 inches; pale brown (10YR 6/3) sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine interstitial pores; neutral (pH 6.6).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry for 60 to 75 consecutive days following summer solstice
Reaction: Neutral to moderately acid
Particle-size control section:
Content of rock fragments—0 to 15 percent gravel

A horizon:
Hue—10YR, 7.5YR, or 5YR
Value—2 or 3 moist, 3 to 6 dry
Chroma—1 to 4 moist or dry

Bw horizon:
Hue—10YR, 7.5YR, or 5YR
Value—2 to 4 moist, 4 to 6 dry
Chroma—1 to 4 moist or dry
Texture—loamy sand or loamy fine sand

BC horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 6 or 7 dry
Chroma—3 or 4 moist or dry
Texture—loamy sand, sand, or fine sand

C horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6 moist, 5 to 7 dry
Chroma—2 to 4 moist or dry
Texture—loamy sand or sand

Kahboo Series

Depth class: Shallow to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 5 to 75 percent
Elevation: 0 to 2,300 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 160 to 220 days

Taxonomic class: Loamy, isotic, mesic Lithic Dystroxerepts

Typical Pedon

Kahboo gravelly fine sandy loam (fig. 23) in an area of Constitution-Skipjack-Kahboo complex, 5 to 25 percent slopes, in an area of forestland; 500 feet north and 1,600 feet west of the southeast corner of sec. 27, T. 37 N., R. 1 W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 42 minutes, 30 seconds north and longitude 122 degrees, 53 minutes, 41 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; gradual wavy boundary.
Oe—1 to 2 inches; moderately decomposed plant material; abrupt wavy boundary.
A—2 to 9 inches; dark yellowish brown (10YR 4/4) gravelly fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium and coarse roots; common very fine and fine irregular and common fine tubular pores; 20 percent gravel and 10 percent cobbles; strongly acid (pH 5.4); gradual wavy boundary.
Bw—9 to 14 inches; strong brown (7.5YR 4/6) gravelly fine sandy loam, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium roots; few fine tubular

Figure 23.—Typical profile of a Kahboo gravelly fine sandy loam.

and many very fine and fine irregular pores; 20 percent gravel and 10 percent cobbles; moderately acid (pH 5.6); abrupt wavy boundary.

R—14 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 10 to 20 inches to lithic bedrock
Average annual soil temperature: 48 to 50 degrees F
Soil moisture control section: Dry 45 to 60 days following summer solstice
Reaction: Strongly acid or moderately acid
Particle-size control section:
Content of clay—5 to 15 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 10 percent cobbles

A horizon:
Content of clay—5 to 15 percent
Hue—10YR or 7.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 to 6 moist, 3 or 4 dry
Content of rock fragments—0 to 15 percent total, including 0 to 15 percent gravel and 0 to 5 percent cobbles

Bw horizon:
Texture—fine sandy loam, sandy loam, or loam
Content of clay—5 to 15 percent
Hue—10YR or 7.5YR

Value—3 or 4 moist, 5 or 6 dry
Chroma—3 to 6 moist, 3 or 4 dry
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 10 percent cobbles

Keystone Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained
Capacity to transmit water (Ksat): High or very high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial outwash
Slope range: 5 to 15 percent
Elevation: 0 to 250 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Isotic, mesic Dystric Xeropsamments

Typical Pedon

Keystone sandy loam, 5 to 15 percent slopes; 375 feet south and 1,250 feet west of the northeast corner of sec. 22, T. 35 N., R 3 W.; Friday Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 31 minutes, 14 seconds north and longitude 123 degrees, 2 minutes, 40 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; clear smooth boundary.
A1—1 to 3 inches; dark grayish brown (10YR 4/2) sandy loam, black (10YR 2/1) moist; strong coarse granular structure; slightly hard, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; moderately acid (pH 5.7); clear wavy boundary.
A2—3 to 8 inches; brown (10YR 5/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; 5 percent gravel; moderately acid (pH 5.6); clear wavy boundary.
Bw1—8 to 19 inches; light yellowish brown (2.5Y 6/4) loamy sand, olive brown (2.5Y 4/3) moist; single grain; loose, nonsticky and nonplastic; common fine and many medium and coarse roots; 5 percent gravel; strongly acid (pH 5.5); clear wavy boundary.
Bw2—19 to 34 inches; light yellowish brown (2.5Y 6/4) very gravelly loamy sand, light olive brown (2.5Y 5/3) moist; single grain; loose, nonsticky and nonplastic; few fine and medium roots; 25 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid (pH 6.0); clear wavy boundary.
C—34 to 60 inches; light yellowish brown (2.5Y 6/3) loamy sand, light olive brown (2.5Y 5/3) moist; massive; moderately hard, friable, nonsticky and nonplastic; 5 percent gravel; slightly acid (pH 6.3).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice

Reaction: Slightly acid to strongly acid
Particle-size control section:
 Content of clay—0 to 8 percent
 Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

A1 horizon:
 Hue—10YR or 7.5YR
 Value—2 or 3 moist, 4 to 6 dry
 Chroma—1 to 3 moist or dry
 Texture—fine sandy loam, sandy loam, or loamy sand
 Content of clay—0 to 8 percent
 Content of rock fragments—0 to 15 percent gravel

A2 horizon:
 Hue—10YR or 7.5YR
 Value—2 or 3 moist, 4 to 6 dry
 Chroma—1 to 3 moist or dry
 Reaction—slightly acid or moderately acid
 Texture—sandy loam or loamy sand
 Content of clay—0 to 8 percent
 Content of rock fragments—0 to 35 percent gravel

Bw horizon:
 Hue—10YR or 7.5YR
 Value—3 to 5 moist, 5 to 7 dry
 Chroma—2 to 5 moist or dry
 Reaction—slightly acid to strongly acid
 Texture—loamy sand or sand
 Content of clay—0 to 5 percent
 Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 5 percent cobbles, and 0 to 5 percent stones

C horizon:
 Hue—10YR or 2.5Y
 Value—2 to 4 moist, 5 to 7 dry
 Chroma—2 to 4 moist or dry
 Reaction—slightly acid or moderately acid
 Texture—loamy sand or coarse sand
 Content of clay—0 to 5 percent
 Content of rock fragments—0 to 35 percent gravel

Killebrew Series

Depth class: Moderately deep to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Valleysides, valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 15 percent
Elevation: 0 to 520 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs

Typical Pedon

Killebrew sandy loam in an area of Roche-Killebrew complex, 2 to 10 percent slopes; 1,900 feet south and 200 feet west of northeast corner of sec. 34, T. 35 N., R. 2 W.; Richardson, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 29 minutes, 14 seconds north and longitude 122 degrees, 54 minutes, 38 seconds west. (Colors are for moist soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt wavy boundary.

A—1 to 5 inches; very dark brown (10YR 2/2) sandy loam, very dark grayish brown (10YR 3/2) dry; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine and common medium and coarse roots; many very fine and fine irregular pores; 10 percent gravel; very strongly acid (pH 5.0); clear wavy boundary.

Bw—5 to 9 inches; brown (7.5YR 4/3) sandy loam, brown (7.5YR 5/4) dry; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and medium roots; many very fine and fine irregular pores; 10 percent gravel; moderately acid (pH 5.6); clear wavy boundary.

E—9 to 17 inches; grayish brown (2.5Y 5/2) gravelly sandy loam, light brownish gray (2.5Y 6/2) dry; massive; hard, firm, nonsticky and nonplastic; few very fine roots; few very fine and fine irregular pores; 30 percent iron-manganese masses that are yellowish brown (10YR 5/8) dry, dark yellowish brown (10YR 4/6) moist, and are in matrix; 20 percent gravel and 5 percent cobbles; moderately acid (pH 6.0); gradual wavy boundary.

2Btg—17 to 27 inches; olive brown (2.5Y 4/4) silt loam, light olive brown (2.5Y 5/4) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine roots in cracks; few very fine and fine tubular pores; 20 percent iron depletions that are grayish brown (2.5Y 5/2) moist, light brownish gray (2.5Y 6/2) dry, and 40 percent iron-manganese masses that are yellowish brown (10YR 5/8) dry, dark yellowish brown (10YR 4/6) moist; 5 percent gravel; slightly acid (pH 6.4); clear wavy boundary.

2Cd—27 to 60 inches; olive brown (2.5Y 4/3) loam, light olive brown (2.5Y 5/3) dry; massive; hard, firm, slightly sticky and slightly plastic; 10 percent gravel; neutral (pH 7.3).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice
Depth to redoximorphic features: 9 to 18 inches
Particle-size control section:
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent fine gravel

A horizon:
Value—2 or 3 moist, 3 to 5 dry
Chroma—2 or 3 moist or dry

Bw horizon:
Value—3 or 4 moist, 4 or 5 dry
Chroma—3 or 4 moist or dry
Texture—sandy loam or loam
Content of clay—8 to 18 percent

Content of rock fragments—0 to 35 percent total, including 0 to 25 percent gravel and 0 to 10 percent cobbles

E horizon:
Value—4 or 5 moist, 5 to 7 dry
Chroma—1 or 2 moist or dry
Texture—sandy loam or loam
Content of clay—4 to 12 percent
Content of rock fragments—0 to 30 percent total, including 0 to 25 percent gravel and 0 to 5 percent cobbles

2Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 to 4 moist or dry
Texture—loam, silt loam, or silty clay loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent fine gravel

Cd horizon:
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 or 3 moist or dry
Texture—loam, sandy loam, or silt loam
Content of clay—12 to 27 percent
Content of rock fragments—0 to 15 percent fine gravel

Laconner Series

Depth class: Moderately deep to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Moderately low to very high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 5 to 15 percent
Elevation: 0 to 650 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Sandy-skeletal, isotic, mesic Aquic Haploxerepts

Typical Pedon

Laconner gravelly sandy loam, 8 to 15 percent slopes, in Skagit County, Washington; 2,600 feet west and 300 feet north of the southeast corner of sec. 35, T. 35 N., R. 1 E.; latitude 48 degrees, 28 minutes, 13 seconds north and longitude 122 degrees, 38 minutes, 48 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.
A—1 to 3 inches; dark gray (10YR 4/1) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium, and coarse roots; many very fine and fine irregular and interstitial pores; 20 percent gravel; slightly acid (pH 6.2); abrupt smooth boundary.
Bw1—3 to 10 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, brown

(10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium, and coarse roots; common very fine and fine irregular and interstitial pores; 60 percent gravel; moderately acid (pH 6.0); clear wavy boundary.

Bw2—10 to 20 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; single grain; loose; few medium and coarse roots; common very fine and fine irregular and interstitial pores; 65 percent gravel; moderately acid (pH 6.0); clear wavy boundary.

C1—20 to 33 inches; light olive brown (2.5Y 5/4) very gravelly sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose; few medium and coarse roots; common very fine and fine irregular and interstitial pores; many dark yellowish brown (10YR 4/6) iron-manganese masses in matrix; many light brownish gray (10YR 6/2) iron depletions; 40 percent gravel; neutral (pH 6.6); clear wavy boundary.

C2—33 to 39 inches; light brownish gray (2.5Y 6/2) extremely gravelly loamy sand, light olive brown (2.5Y 5/4) moist; single grain; loose; few medium and coarse roots; few very fine interstitial pores; common dark yellowish brown (10YR 4/6) iron-manganese masses in matrix; many light brownish gray (10YR 6/2) iron depletions; 65 percent gravel; neutral (pH 6.8); abrupt smooth boundary.

2Cd—39 to 56 inches; very gravelly fine sandy loam, grayish brown (2.5Y 5/2) moist; massive; hard, firm, nonsticky and nonplastic; common light gray (10YR 7/2) iron depletions in cracks; many dark yellowish brown (10YR 4/6) iron-manganese masses in matrix; neutral (pH 6.8); 35 percent gravel.

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice
Depth to redoximorphic features: 20 to 30 inches
Reaction: Moderately acid to neutral
Particle-size control section:
Content of clay—0 to 8 percent
Content of rock fragments—35 to 65 percent total, including 15 to 65 percent gravel and 0 to 20 percent cobbles

A horizon:
Hue—7.5YR or 10YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 to 3 moist or dry
Content of clay—2 to 12 percent
Content of rock fragments—15 to 35 percent gravel

Bw horizon:
Hue—5YR to 10YR
Value—3 or 4 moist, 4 to 6 dry
Chroma—3 or 4 moist or dry
Texture—sandy loam or coarse sandy loam in the upper part and loamy sand or sand in the lower part
Content of clay—0 to 8 percent
Content of rock fragments—35 to 65 percent total, including 15 to 65 percent gravel and 0 to 20 percent cobbles

C horizon:
Hue—10YR or 2.5Y
Value—3 to 5 dry, 4 to 6 moist
Chroma—2 to 4 moist or dry

Texture—loamy sand or sand
Content of clay—0 to 8 percent
Content of rock fragments—35 to 65 percent total, including 15 to 65 percent gravel and 0 to 20 percent cobbles

Cd horizon:
Hue—10YR or 2.5Y
Value—4 or 5 dry or moist
Chroma—3 or 4 dry or moist
Texture—loamy sand, fine sandy loam, or loamy fine sand
Content of clay—0 to 6 percent
Content of rock fragments—35 to 65 percent total, including 15 to 65 percent gravel and 0 to 20 percent cobbles

Limepoint Series

Depth class: Deep to dense material
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Very low to very high
Landscape: Drift plains
Landform: Drainageways, valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 5 percent
Elevation: 0 to 500 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Coarse-loamy, isotic, mesic Typic Epiaquolls

Typical Pedon

Limepoint mucky silt loam (fig. 24) in an area of Limepoint-Sholander complex, 0 to 8 percent slopes, in an area of forestland; 2,550 feet north and 200 feet east of the southwest corner of sec. 25, T. 36 N., R. 4 W.; Roche Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 35 minutes, 12 seconds north and longitude 123 degrees, 8 minutes, 51 seconds west. (Colors are for moist soil unless otherwise noted.)

A1—0 to 6 inches; black (10YR 2/1) mucky silt loam, very dark grayish brown (10YR 3/2) dry; moderate coarse granular structure; slightly hard, very friable, slightly sticky and slightly plastic; common fine, medium, and coarse roots; common very fine and fine dendritic tubular pores; slightly acid (pH 6.4); abrupt smooth boundary.

A2—6 to 14 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and fine dendritic tubular pores; 10 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/4), dark yellowish brown (10YR 4/6) dry, have a sharp boundary, and are throughout; 5 percent gravel; slightly acid (pH 6.5); abrupt wavy boundary.

Bg—14 to 31 inches; grayish brown (10YR 5/2) loamy coarse sand, light brownish gray (10YR 6/2) dry; massive; soft, very friable, nonsticky and nonplastic; few fine roots; few very fine and fine dendritic tubular pores; 50 percent coarse distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/4), dark

Figure 24.—Typical profile of a Limepoint mucky silt loam.

yellowish brown (10YR 4/6) dry, have a diffuse boundary, and are throughout; neutral (pH 6.7); abrupt wavy boundary.

Cg1—31 to 49 inches; grayish brown (10YR 5/2) loam, light gray (10YR 7/2) dry; massive; soft, very friable, slightly sticky and slightly plastic; few very fine and fine irregular pores; 10 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/4), dark yellowish brown (10YR 4/6) dry, have a clear boundary, and are in cracks; neutral (pH 6.8); clear wavy boundary.

Cg2—49 to 58 inches; gray (10YR 6/1) sandy loam, light gray (10YR 7/1) dry; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine irregular pores; 2 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/4), dark yellowish brown (10YR 4/6) dry, have a clear boundary, and are throughout; neutral (pH 7.0); abrupt wavy boundary.

2Cd—58 to 60 inches; gray (10YR 5/1) silty clay loam, gray (10YR 6/1) dry; massive;

extremely hard, extremely firm, moderately sticky and moderately plastic; 5 percent gravel; neutral (pH 7.0).

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Depth to redoximorphic features: 3 to 9 inches
Thickness of mollic epipedon: 10 to 14 inches
Reaction: Slightly acid or neutral
Particle-size control section:
Content of clay—2 to 18 percent
Content of rock fragments—0 to 35 percent gravel

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist
Content of clay—7 to 18 percent
Content of rock fragments—0 to 15 percent gravel

Bg horizon:
Value—4 or 5 moist, 5 or 6 dry
Chroma—1 or 2 moist or dry
Texture—loamy coarse sand, loam, sand, or sandy loam
Content of clay—2 to 18 percent
Content of rock fragments—0 to 35 percent gravel

Cg horizon:
Value—5 or 6 moist, 6 or 7 dry
Chroma—1 or 2 moist or dry
Texture—loam, sandy loam, or sand
Content of clay—2 to 18 percent
Content of rock fragments—0 to 35 percent gravel

2Cd horizon:
Value—5 or 6 moist, 6 or 7 dry
Chroma—1 or 2 moist, 2 or 3 dry
Texture—silt loam, silty clay loam, or clay loam
Content of clay—15 to 40 percent
Content of rock fragments—0 to 15 percent gravel

Mitchellbay Series

Depth class: Moderately deep to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Valleysides, valleys
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 0 to 15 percent
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs

Typical Pedon

Mitchellbay gravelly sandy loam, 5 to 15 percent slopes; 1,900 feet south and 1,000 feet east of the northwest corner of sec.19, T. 36 N., R. 3 W.; Friday Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 36 minutes, 12 seconds north and longitude 123 degrees, 7 minutes, 20 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.

A—1 to 6 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine and fine interstitial and irregular pores; 15 percent gravel; very strongly acid (pH 5.0); clear wavy boundary.

Bw—6 to 15 inches; yellowish brown (10YR 5/4) sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, fine, medium, and coarse roots; many very fine and fine irregular and interstitial pores; 10 percent gravel; moderately acid (pH 5.6); clear wavy boundary.

E—15 to 20 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium prismatic structure; moderately hard, firm, slightly sticky and slightly plastic; common very fine, fine, and medium roots; common fine tubular and interstitial pores; 5 percent gravel; moderately acid (pH 6.0); gradual wavy boundary.

Btg1—20 to 26 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate very coarse prismatic structure; very hard, extremely firm, moderately sticky and moderately plastic; common very fine, fine, and medium roots; common fine tubular and interstitial pores; 50 percent distinct weakly cemented iron-manganese masses on faces of peds; 5 percent gravel; slightly acid (pH 6.4); gradual wavy boundary.

Btg2—26 to 38 inches; yellowish brown (10YR 5/4) loam, brown (10YR 4/3) moist; moderate very coarse prismatic structure; very hard, extremely firm, moderately sticky and moderately plastic; common very fine and fine and few medium roots; common fine tubular and interstitial pores; 50 percent distinct weakly cemented iron-manganese masses on faces of peds; 5 percent gravel; slightly acid (pH 6.4); gradual wavy boundary.

Cd—38 to 60 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; very hard, extremely firm, slightly sticky and slightly plastic; 20 percent distinct weakly cemented iron-manganese masses in cracks; neutral (pH 7.3).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 48 to 50 degrees F
Moisture control section: Dry 60 to 75 days following summer solstice
Depth to redoximorphic features: 9 to 18 inches
Particle-size control section:
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

A horizon:
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3 moist or dry

Bw horizon:
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 or 3 moist or dry
Texture—sandy loam or loam
Content of clay—8 to 18 percent
Content of rock fragments—0 to 35 percent total, including 0 to 25 percent gravel and 0 to 10 percent cobbles

E horizon:
Value—4 or 5 moist, 5 to 7 dry
Chroma—1 or 2 moist or dry
Texture—sandy loam or loam
Content of clay—4 to 12 percent
Content of rock fragments—0 to 15 percent gravel

Btg horizon:
Hue—10YR or 2.5Y
Value—3 to 5 moist, 5 to 7 dry
Chroma—2 or 3 moist or dry
Texture—loam, silt loam, or silty clay loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

Cd horizon:
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 or 3 moist or dry
Texture—loam, sandy loam, or silt loam
Content of clay—12 to 27 percent
Content of rock fragments—0 to 15 percent gravel

Morancreek Series

Depth class: Very deep (more than 60 inches)
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift
Slope range: 5 to 25 percent
Elevation: 0 to 900 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Coarse-loamy, isotic, mesic Aquic Dystroxerepts

Typical Pedon

Morancreek sandy loam in an area of Deadmanbay-Morancreek complex, 2 to 15 percent slopes; 2,400 feet west and 450 feet south of the northeast corner of sec. 13, T. 35 N., R 4 W.; Roche Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 32 minutes, 6 seconds north and longitude 123 degrees, 8 minutes, 10 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.
A—1 to 3 inches; dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky

and nonplastic; many very fine and fine and common medium roots; many very fine and fine irregular pores; moderately acid (pH 5.6); clear wavy boundary.

Bw1—3 to 10 inches; brown (7.5YR 5/4) sandy loam, dark brown (7.5YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many medium, common coarse, and few fine roots; many very fine and fine irregular pores; moderately acid (pH 5.8); gradual wavy boundary.

Bw2—10 to 21 inches; grayish brown (10YR 5/2) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, friable, nonsticky and nonplastic; few fine and coarse and common medium roots; many very fine and fine irregular pores; moderately acid (pH 5.8); gradual wavy boundary.

Bg—21 to 28 inches; grayish brown (10YR 5/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few medium and coarse roots; few very fine and fine irregular pores; 10 percent medium prominent irregular very weakly cemented iron-manganese masses that are yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/6) moist, have a diffuse boundary, and are throughout and 15 percent medium faint irregular very weakly cemented iron depletions that are gray (10YR 6/1), dark gray (10YR 4/1) moist, have a diffuse boundary, and are throughout; 5 percent gravel; moderately acid (pH 6.0); gradual wavy boundary.

C—28 to 60 inches; light brownish gray (10YR 6/2) sandy loam, dark grayish brown (10YR 4/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine roots; many very fine irregular and few fine tubular pores; 50 percent medium prominent irregular very weakly cemented iron-manganese masses that are yellowish brown (10YR 5/6), dark yellowish brown (10YR 4/6) moist, have a diffuse boundary, and are throughout; slightly acid (pH 6.2).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Depth to redoximorphic features: 15 to 30 inches
Reaction: Moderately acid or slightly acid
Particle-size control section:
Content of clay—4 to 17 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

A horizon:
Value—2 or 3 moist, 3 to 5 dry
Chroma—2 to 4 moist, 2 to 4 dry
Content of clay—4 to 12 percent

Bw horizon:
Hue—10YR or 7.5YR
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 to 6 moist or dry
Texture—sandy loam, loam, or silt loam
Content of clay—4 to 14 percent
Content of rock fragments—0 to 35 percent total, including 0 to 25 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Bg horizon:
Value—3 or 4 moist, 4 to 6 dry
Chroma—2 to 4 moist or dry
Texture—sandy loam, coarse sandy loam, or loamy fine sand

Content of clay—5 to 14 percent
Content of rock fragments—5 to 35 percent total, including 5 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

C horizon:
Value—4 or 5 moist, 6 or 7 dry
Texture—sandy loam, coarse sandy loam, or loamy fine sand
Content of clay—4 to 12 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Orcas Series

Depth class: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Drift plains
Landform: Depressions
Parent material: Slightly decomposed plant material
Slope range: 0 to 2 percent
Elevation: 0 to 200 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Dysic, mesic Typic Sphagnofibrists

Typical Pedon

Orcas peat, 0 to 2 percent slopes; 2,300 feet north and 2,200 feet east of the southwest corner of sec. 18, T. 30 N., R. 7 E.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 5 minutes, 9 seconds north and longitude 121 degrees, 57 minutes, 35 seconds west. (Colors are for moist soil unless otherwise noted.)

Oi1—0 to 3 inches; peat; about 90 percent fiber, 80 percent rubbed; weak thick platy structure; very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; extremely acid (pH 4.4); clear smooth boundary.
Oi2—3 to 12 inches; peat; about 95 percent fiber, 90 percent rubbed; weak thick platy structure; very friable, nonsticky and nonplastic; few fine roots; few very fine and fine tubular pores; extremely acid (pH 4.4); gradual smooth boundary.
Oi3—12 to 60 inches; peat; about 95 percent fiber, 90 percent rubbed; massive; very friable, nonsticky and nonplastic; few very fine and fine tubular pores; extremely acid (pH 4.4).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 47 to 50 degrees F

Oi1 horizon:
Hue—2.5YR to 10YR
Value—2 to 4 moist, 4 or 5 dry
Chroma—2 to 4 moist or dry

Oi2 and Oi3 horizons:
Hue—5YR to 10YR
Value—3 to 7 moist, 4 to 6 dry

Chroma—3 to 8 moist or dry
Content of fiber—70 to 95 unrubbed, 50 to 90 percent rubbed
Reaction—extremely acid or very strongly acid

Pickett Series

Depth class: Moderately deep to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock and volcanic ash
Slope range: 25 to 75 percent
Elevation: 0 to 2,300 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 160 to 220 days

Taxonomic class: Loamy-skeletal, isotic, mesic Andic Dystroxerepts

Typical Pedon

Pickett very gravelly loam in an area of Pickett-Kahboo-Rock outcrop complex, 25 to 75 percent slopes, in an area of forestland; on the east slope of Pickett Ridge, Moran State Park, Orcas Island; 60 feet south and 500 feet west of the northeast corner of sec. 34, T. 37 N., R. 1 W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 40 minutes, 8 seconds north and longitude 122 degrees, 50 minutes, 51 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt wavy boundary.

A—1 to 3 inches; dark yellowish brown (10YR 4/4) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; slightly hard, firm, nonsticky and nonplastic; many very fine, common medium and coarse, and few very coarse roots; common very fine and fine tubular pores and few very fine and fine interstitial and irregular pores; 35 percent gravel and 15 percent cobbles; strongly acid (pH 5.4); gradual wavy boundary.

Bw1—3 to 27 inches; strong brown (7.5YR 5/6) very gravelly fine sandy loam, dark brown (7.5YR 3/4) moist; moderate medium subangular blocky structure; soft, friable, nonsticky and nonplastic; many very fine and fine, common medium and coarse, and few very coarse roots; common very fine tubular pores and few very fine and fine interstitial and irregular pores; 30 percent gravel, 15 percent cobbles, and 5 percent stones; moderately acid (pH 5.6); clear wavy boundary.

Bw2—27 to 36 inches; light olive brown (2.5Y 5/4) very gravelly coarse sandy loam, olive brown (2.5Y 4/4) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; many very fine and few medium and coarse roots; common very fine and fine irregular and few very fine and fine interstitial pores; 40 percent gravel and 10 percent cobbles; moderately acid (pH 5.6); abrupt wavy boundary.

R—36 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to lithic bedrock
Average annual soil temperature: 48 to 50 degrees F
Soil moisture control section: Dry 45 to 60 days following summer solstice

Depth to lithic contact: 20 to 40 inches
Reaction: Strongly acid or moderately acid
Particle-size control section:
Content of clay—5 to 18 percent
Content of rock fragments—35 to 70 percent total, including 15 to 60 percent gravel, 0 to 20 percent cobbles, and 0 to 10 percent stones

A horizon:
Value—2 or 3 moist
Chroma—1 to 3 moist, 3 or 4 dry
Content of rock fragments—35 to 60 percent total, including 35 to 60 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones
Ammonium oxalate extractable aluminum plus one-half iron—1.5 to 2.5 percent
Bulk density—0.8 to 1.0 gram per cubic centimeter
Phosphorous retention—50 to 80 percent
Content of volcanic glass—0 to 4 percent
Content of rock fragments—35 to 60 percent total, including 35 to 60 percent gravel and 0 to 20 percent cobbles

Bw1 horizon:
Hue—10YR or 7.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 to 6 moist or dry
Texture—loam, sandy loam, or fine sandy loam
Content of rock fragments—35 to 70 percent total, including 35 to 60 percent gravel, 0 to 20 percent cobbles, and 0 to 10 percent stones
Ammonium oxalate extractable aluminum plus one-half iron—1.5 to 2.5 percent
Bulk density—0.8 to 1.0 gram per cubic centimeter
Phosphorous retention—50 to 80 percent
Content of volcanic glass—0 to 4 percent

Bw2 horizon:
Hue—2.5Y to 10YR
Value—3 or 4 moist, 4 to 6 dry
Chroma—3 to 6 moist or dry
Texture—sandy loam or coarse sandy loam
Content of rock fragments—35 to 70 percent total, including 35 to 60 percent gravel, 0 to 20 percent cobbles, and 0 to 10 percent stones

Pilepoint Series

Depth class: Moderately deep to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Eolian sand over glacial outwash and dense glaciomarine deposits
Slope range: 2 to 8 percent
Elevation: 0 to 250 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Xeric Argialbolls

Typical Pedon

Pilepoint loam, 2 to 8 percent slopes (fig. 25), in an area of hayland; 2,500 feet north and 1,000 feet west of the southeast corner of sec. 3, T. 34 N., R. 3 W.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 28 minutes, 14 seconds north and longitude 123 degrees, 2 minutes, 37 seconds west. (Colors are for dry soil unless otherwise noted.)

A1—0 to 4 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate medium granular structure and moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine irregular pores; 10 percent gravel; moderately acid (pH 5.7); clear wavy boundary.

A2—4 to 13 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate medium granular structure and moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine and few medium roots; many very fine and fine irregular pores; 10 percent gravel; moderately acid (pH 5.8); clear wavy boundary.

Bw—13 to 22 inches; dark brown (10YR 3/3) very gravelly sandy loam, very dark

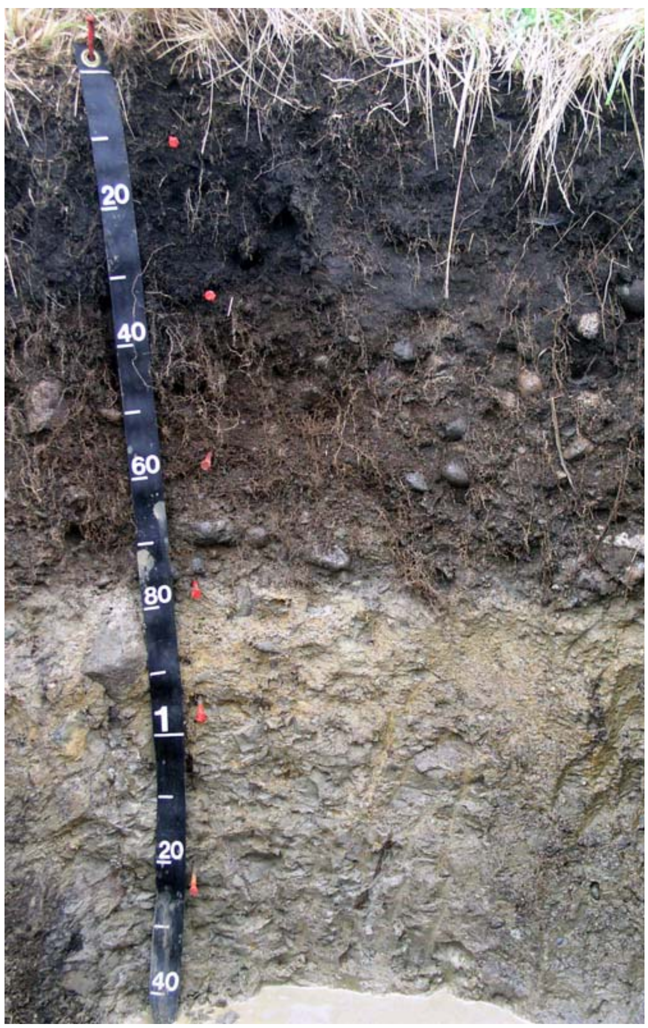

Figure 25.—Typical profile of a Pilepoint loam.

brown (10YR 2/2) moist; single grain; loose, slightly sticky and nonplastic; many very fine and fine roots; many very fine and fine interstitial and irregular pores; 40 percent gravel; moderately acid (pH 5.8); clear wavy boundary.

E—22 to 29 inches; grayish brown (2.5Y 5/2) gravelly loamy sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 15 percent gravel and 5 percent cobbles; moderately acid (pH 5.9); abrupt wavy boundary.

2Btg—29 to 36 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; strong coarse subangular blocky structure; moderately hard, friable, moderately sticky and moderately plastic; few very fine roots throughout and many very fine roots in cracks; common very fine and fine irregular pores; 10 percent discontinuous faint clay films on faces of peds; 60 percent prominent iron-manganese masses that are brownish yellow (10YR 6/6), dark yellowish brown (10YR 4/6) moist, have a diffuse boundary, and are throughout; 5 percent gravel; slightly acid (pH 6.3); gradual irregular boundary.

2Cd1—36 to 46 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; very hard, very firm, moderately sticky and moderately plastic; few very fine roots in cracks; 5 percent prominent iron-manganese masses that are brownish yellow (10YR 6/6), dark yellowish brown (10YR 4/6) moist, have a diffuse boundary, and are in cracks; 5 percent gravel; gradual irregular boundary.

2Cd2—46 to 60 inches; light brownish gray (2.5Y 6/2) silt loam, grayish brown (2.5Y 5/2) moist; massive; very hard, very firm, moderately sticky and moderately plastic; few very fine roots in cracks; 5 percent gravel; slightly acid (pH 6.3).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 54 degrees F
Soil moisture control section: Dry 75 to 90 days after summer solstice
Depth to redoximorphic features: 22 to 30 inches
Reaction: Moderately acid or slightly acid
Particle-size control section:
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

A horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—1 or 2 moist or dry
Content of clay—8 to 18 percent
Content of rock fragments—0 to 15 percent gravel

Bw horizon:
Value—3 or 4 dry, 2 or 3 moist
Chroma—2 or 3 moist or dry
Texture—sandy loam, loamy sand, or loamy coarse sand
Content of clay—3 to 12 percent
Content of rock fragments—15 to 60 percent total, including 15 to 60 percent gravel and 0 to 10 percent cobbles

E horizon:
Value—5 or 6 dry, 4 or 5 moist
Chroma—1 or 2 moist or dry
Texture—loamy sand or sandy loam
Content of clay—2 to 8 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 10 percent cobbles

2Btg horizon:
Hue—10YR or 2.5Y
Value—5 or 6 dry, 4 or 5 moist
Chroma—2 or 3 moist or dry
Texture—silt loam, silty clay loam, or loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

2Cd horizon:
Value—3 to 5 moist, 4 to 6 dry
Chroma—2 or 3 moist or dry
Texture—silt loam, loam, or sandy loam
Content of clay—12 to 27 percent
Content of rock fragments—0 to 15 percent gravel

Roche Series

Depth class: Moderately deep to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to high
Landscape: Drift plains
Landform: Hillslopes
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 15 percent
Elevation: 0 to 520 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Coarse-loamy, isotic, mesic Aquic Dystroxerepts

Typical Pedon

Roche loam in an area of Roche-Killebrew-Rock outcrop complex, 5 to 35 percent slopes, in an area of forestland; 500 feet south and 2,100 feet east of northwest corner of sec. 34, T. 37 N., R. 2 W.; Eastsound, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 39 minutes, 30 seconds north and longitude 122 degrees, 56 minutes, 8 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 1 inch; slightly decomposed plant material; abrupt smooth boundary.
A—1 to 5 inches; very dark grayish brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine, common coarse, and few medium roots; many very fine and fine irregular pores; 5 percent gravel; moderately acid (pH 5.7); clear wavy boundary.
Bw1—5 to 15 inches; dark yellowish brown (10YR 4/4) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine, many medium, and common coarse roots; many very fine and fine irregular pores; 15 percent gravel; moderately acid (pH 5.8); clear wavy boundary.
2Bw2—15 to 23 inches; brown (7.5YR 5/3) loam, brown (7.5YR 5/2) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine, medium, and coarse roots; common very fine and fine irregular pores; 5 percent gravel; moderately acid (pH 6.0); gradual wavy boundary.
2Bg—23 to 39 inches; reddish gray (5YR 5/2) loam, dark reddish gray (5YR 4/2)

moist; massive; hard, firm, nonsticky and nonplastic; few very fine roots; common very fine irregular pores; 20 percent medium prominent iron-manganese masses that are red (2.5YR 4/6) moist, have a diffuse boundary, and are throughout and 20 percent medium distinct iron depletions that are gray (7.5YR 6/1) moist, have a diffuse boundary, and are throughout; 5 percent gravel; neutral (pH 6.7); gradual wavy boundary.

2Cd—39 to 60 inches; brown (7.5YR 4/3) silt loam, brown (7.5YR 4/2) moist; massive; hard, firm, slightly sticky and slightly plastic; 5 percent gravel; neutral (pH 6.9).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice
Depth to redoximorphic features: 18 to 36 inches
Reaction: Moderately acid to neutral
Particle-size control section:
Content of clay—2 to 18 percent
Content of rock fragments—0 to 35 percent gravel

A horizon:
Hue—10YR or 7.5YR
Value—2 to 4 moist, 3 to 5 dry
Chroma—2 or 3 moist or dry
Content of rock fragments—0 to 15 percent gravel

Bw1 horizon:
Hue—10YR or 7.5YR
Value—3 to 5 moist or dry
Chroma—3 or 4 moist or dry
Texture—loam, sandy loam, or loamy sand
Content of rock fragments—0 to 35 percent gravel

2Bw2 horizon:
Hue—10YR or 7.5YR
Value—4 or 5 moist, 5 to 7 dry
Chroma—2 to 4 moist or dry
Texture—loam or sandy loam
Content of rock fragments—0 to 35 percent gravel

2Bg horizon:
Hue—5YR to 2.5Y
Value—4 or 5 moist, 5 or 6 dry
Chroma—2 or 3 moist or dry
Texture—loam or sandy loam
Content of rock fragments—0 to 35 percent gravel

2Cd horizon:
Hue—7.5YR to 2.5Y
Value—3 or 4 moist, 3 to 7 dry
Chroma—2 or 3 moist or dry
Texture—sandy loam, loam, or silt loam
Content of rock fragments—0 to 35 percent gravel

San Juan Series

Depth class: Very deep (more than 60 inches)
Drainage class: Somewhat excessively drained

Capacity to transmit water (Ksat): High or very high
Landscape: Drift plains
Landform: Blowouts, dunes, hillslopes
Parent material: Eolian sand over glacial outwash
Slope range: 0 to 40 percent
Elevation: 0 to 300 feet
Mean annual precipitation: 18 to 25 inches
Mean annual air temperature: 50 to 52 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Sandy, isotic, mesic Pachic Ultic Haploxerolls

Typical Pedon

San Juan sandy loam, 2 to 8 percent slopes (fig. 26); 600 feet south and 2,000 feet west of the northeast corner of sec. 12, T. 34 N., R. 3 W.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 27 minutes, 43 seconds

Figure 26.—Typical profile of a San Juan sandy loam.

north and longitude 123 degrees, 0 minutes, 15 seconds west. (Colors are for dry soil unless otherwise noted.)

A1—0 to 4 inches; dark gray (10YR 4/1) sandy loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; strongly acid (pH 5.1); abrupt smooth boundary.

A2—4 to 13 inches; dark gray (10YR 4/1) sandy loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 5 percent fine gravel; moderately acid (pH 5.8); abrupt smooth boundary.

A3—13 to 19 inches; dark gray (10YR 4/1) sandy loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine irregular pores; 5 percent fine gravel; slightly acid (pH 6.4); clear wavy boundary.

Bw—19 to 27 inches; brown (10YR 4/3) gravelly loamy coarse sand, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 30 percent gravel; slightly acid (pH 6.5); clear wavy boundary.

C1—27 to 41 inches; variegated mineral colored extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine roots; many very fine and fine interstitial pores; 80 percent gravel; neutral (pH 6.8); clear wavy boundary.

C2—41 to 62 inches; variegated mineral colored extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; many very fine and fine interstitial pores; 75 percent gravel; neutral (pH 6.7); clear wavy boundary.

C3—62 to 69 inches; variegated mineral colored extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; many very fine and fine interstitial pores; 75 percent gravel; neutral (pH 6.9).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 54 degrees F
Soil moisture control section: Dry 75 to 90 days following summer solstice
Thickness of mollic epipedon: 20 to 32 inches
Particle-size control section:
Content of clay—0 to 12 percent
Content of rock fragments—15 to 35 percent total, including 0 to 35 percent gravel and 0 to 15 percent cobbles

A1 horizon:
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Content of clay—5 to 12 percent
Content of rock fragments—0 to 15 percent gravel

A2 and A3 horizons:
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Reaction—moderately acid or slightly acid
Texture—sandy loam, loam, or loamy sand
Content of clay—2 to 12 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 5 percent cobbles

Bw horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 to 3 moist or dry
Reaction—slightly acid or moderately acid
Texture—loamy coarse sand, sandy loam, or loamy sand
Content of clay—0 to 8 percent
Content of rock fragments—15 to 60 percent total, including 15 to 60 percent gravel and 0 to 5 percent cobbles

C horizon:
Color—variegated mineral colors
Reaction—slightly acid or neutral
Texture—coarse sand, loamy sand, or loamy coarse sand
Content of clay—0 to 5 percent
Content of rock fragments—35 to 85 percent total, including 35 to 80 percent gravel and 0 to 15 percent cobbles

Semiahmoo Series

Depth class: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Drift plains
Landform: Depressions
Parent material: Highly decomposed plant material with a thin layer of volcanic ash mixed with diatomaceous earth
Slope range: 0 to 2 percent
Elevation: 0 to 450 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Euic, mesic Typic Haplosaprists

Typical Pedon

Semiahmoo muck, 0 to 2 percent slopes; 1,000 feet west and 450 feet north of the southeast corner of sec. 15, T. 35 N., R. 3 W.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 31 minutes, 22 seconds north and longitude 123 degrees, 2 minutes, 37 seconds west. (Colors are for moist soil unless otherwise noted.)

Oa1—0 to 9 inches; black (5YR 2/1) muck, very dark gray (5YR 3/1) dry; about 12 percent fiber, 3 percent rubbed; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine tubular pores; moderately acid (pH 5.6); clear wavy boundary.

C—9 to 10 inches; light gray (N 7/0) silt loam, white (N 8/0) dry; massive; soft, very friable, nonsticky and nonplastic; many very fine and fine roots in cracks; common very fine tubular pores; moderately acid (pH 5.6); abrupt smooth boundary.

Oa2—10 to 30 inches; black (5YR 2/1) muck, very dusky red (2.5YR 2/2) dry; about 60 percent fiber, 12 percent rubbed; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine tubular pores; moderately acid (pH 5.6); gradual wavy boundary.

Oa3—30 to 48 inches; dark reddish brown (5YR 2/2) muck, dark reddish brown (5YR 3/2) dry; about 40 percent fiber, 10 percent rubbed; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; few fine roots; few very fine tubular pores; strongly acid (pH 5.3); gradual wavy boundary.

Oa4—48 to 60 inches; black (5YR 2/1) muck, dark reddish brown (5YR 2/2) dry; about 60 percent fiber, 12 percent rubbed; massive; hard, very friable, nonsticky and nonplastic; few fine roots; few very fine tubular pores; neutral (pH 6.6); gradual wavy boundary.

Oe1—60 to 72 inches; dark reddish brown (5YR 3/3) mucky peat, black (5YR 2/1) dry; about 70 percent fiber, 20 percent rubbed; massive; hard, very friable, nonsticky and nonplastic; neutral (pH 7.0); gradual wavy boundary.

Oe2—72 to 84 inches; dark reddish brown (5YR 3/2) mucky peat, black (5YR 2/1) dry; about 70 percent fiber, 20 percent rubbed; massive; hard, very friable, nonsticky and nonplastic; slightly alkaline (pH 7.6).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Depth to mineral soil: More than 51 inches

Oa horizon:
Hue—2.5YR to 10YR
Value—2 or 3 moist, 2 to 4 dry
Chroma—1 or 2 moist or dry
Fiber content—12 to 60 percent unrubbed, 3 to 13 percent rubbed
Reaction—strongly acid to neutral

C horizon:
Value—7 or 8 moist or dry
Texture—silt loam, very fine sandy loam, or fine sandy loam

Oe horizon:
Hue—5YR to 10YR
Value—2 to 3 moist, 1 or 2 dry
Chroma—2 or 3 moist, 1 or 2 dry
Fiber content—60 to 80 percent unrubbed, 17 to 50 percent rubbed
Reaction—neutral or slightly alkaline

Shalcar Series

Depth class: Very deep (more than 60 inches)
Drainage class: Very poorly drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Drift plains
Landform: Depressions
Parent material: Highly decomposed plant material over glacial outwash or dense glaciomarine deposits
Slope range: 0 to 2 percent
Elevation: 0 to 450 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy, mixed, euic, mesic Terric Haplosaprists

Typical Pedon

Shalcar muck, 0 to 2 percent slopes; 1,650 feet south and 100 feet east of the northwest corner of sec. 3, T. 35 N., R. 3 W.; Friday Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 33 minutes, 39 seconds north and longitude 123 degrees, 3 minutes, 40 seconds west. (Colors are for moist soil unless otherwise noted.)

Oa1—0 to 3 inches; black (10YR 2/1) muck, black (10YR 2/1) dry; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; 15 percent fiber, 3 percent rubbed; many very fine, fine, medium, and coarse roots; many very fine and fine irregular pores; strongly acid (pH 5.2); clear smooth boundary.

Oa2—3 to 11 inches; black (10YR 2/1) muck, black (10YR 2/1) dry; moderate medium granular structure; soft, very friable, nonsticky and nonplastic; 30 percent fiber, 5 percent rubbed; many very fine, fine, and medium roots; many very fine and fine irregular pores; slightly acid (pH 6.2); clear smooth boundary.

Oa3—11 to 22 inches; black (10YR 2/1) muck, black (10YR 2/1) dry; weak medium platy structure; soft, very friable, nonsticky and nonplastic; 20 percent fiber, 5 percent rubbed; many very fine and fine roots; many very fine and fine irregular pores; 5 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/6), yellowish brown (10YR 5/6) dry, have a diffuse boundary, and are throughout and 5 percent medium faint irregular iron depletions that are dark gray (10YR 4/1), light gray (10YR 7/1) dry, have a diffuse boundary, and are throughout; slightly acid (pH 6.3); abrupt smooth boundary.

2Bg1—22 to 27 inches; gray (10YR 5/1) fine sandy loam, gray (10YR 6/1) dry; massive; soft, very friable, nonsticky and nonplastic; many very fine tubular pores; 15 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/5), yellowish brown (10YR 5/6) dry, have a diffuse boundary, and are throughout and 15 percent medium distinct irregular iron depletions that have a diffuse boundary and are throughout; neutral (pH 7.3); gradual wavy boundary.

2Bg2—27 to 44 inches; gray (10YR 5/1) silt loam, gray (10YR 6/1) dry; massive; soft, very friable, slightly sticky and slightly plastic; many very fine tubular pores; 15 percent medium distinct irregular iron depletions that have a diffuse boundary and are throughout and 20 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/5), yellowish brown (10YR 5/6) dry, have a diffuse boundary, and are throughout; slightly alkaline (pH 7.8); gradual wavy boundary.

2Cg—44 to 60 inches; gray (10YR 5/1) sandy loam, gray (10YR 6/1) dry; massive; soft, very friable, slightly sticky and slightly plastic; few very fine irregular pores; moderately alkaline (pH 8.1).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Depth to mineral soil: 16 to 51 inches

Oa horizon:
Hue—10YR to 2.5Y, or neutral
Value—2 or 3 moist or dry
Chroma—1 or 3 moist or dry

Reaction—strongly acid to slightly acid
Fiber content—5 to 40 percent unrubbed, 2 to 15 percent rubbed

2Bg horizon:
Hue—10YR to 5Y or 5GY, or neutral
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 or 2 moist or dry
Reaction—neutral or slightly alkaline
Texture—fine sandy loam, silt loam, loam, sandy loam, or sand
Content of rock fragments—0 to 5 percent gravel

2Cg horizon:
Hue—10YR, 5Y, or 5GY, or neutral
Value—4 or 5 moist, 5 to 7 dry
Chroma—1 or 2 moist or dry
Reaction—neutral to moderately alkaline
Texture—sandy loam, loam, or silt loam
Content of rock fragments—0 to 5 percent gravel

Sholander Series

Depth class: Deep to dense material
Drainage class: Somewhat poorly drained
Capacity to transmit water (Ksat): Very low to very high
Landscape: Drift plains
Landform: Valleys
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 0 to 20 percent
Elevation: 0 to 500 feet
Mean annual precipitation: 25 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Sandy, isotic, mesic Aquic Dystroxerepts

Typical Pedon

Sholander gravelly loam in an area of Sholander-Spieden complex, 0 to 5 percent slopes; 600 feet north and 1,800 feet east of the southwest corner of sec. 9, T. 34 N., R. 1 W.; Lopez Pass, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 27 minutes, 3 seconds north and longitude 122 degrees, 48 minutes, 56 seconds west. (Colors are for dry soil unless otherwise noted.)

A—0 to 8 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine and fine irregular pores; 10 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid (pH 5.9); clear wavy boundary.

E—8 to 16 inches; light brownish gray (10YR 6/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; moderate coarse subangular blocky structure; moderately hard, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine and fine irregular pores; 10 percent iron depletions that are light brownish gray (10YR 6/2) moist and are in matrix and 15 percent prominent iron-manganese masses that are dark yellowish brown (10YR 4/6) moist and are throughout; 20 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid (pH 5.9); abrupt smooth boundary.

Bg1—16 to 28 inches; brown (10YR 5/3) gravelly loamy sand, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine and fine irregular pores; many very fine and fine interstitial pores; 15 percent iron-manganese masses that are dark yellowish brown (10YR 4/6) moist and are throughout and 35 percent iron depletions that are light brownish gray (10YR 6/2) moist and are in matrix; 20 percent gravel, 5 percent cobbles, and 5 percent stones; moderately acid (pH 5.9); gradual wavy boundary.

Bg2—28 to 51 inches; brown (10YR 5/3) gravelly sand, brown (10YR 4/3) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; 15 percent iron-manganese masses that are dark yellowish brown (10YR 4/6) moist and are throughout and 20 percent iron depletions that are light brownish gray (10YR 6/2) moist and are in matrix; 15 percent gravel; moderately acid (pH 5.9); gradual wavy boundary.

2Cd—51 to 60 inches; light gray (10YR 7/1) loam, gray (10YR 5/1) moist; massive; very hard, firm, slightly sticky and slightly plastic; common prominent iron masses that are strong brown (7.5YR 4/6) moist and are throughout; 10 percent gravel; slightly acid (pH 6.4).

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 60 to 75 days following summer solstice
Depth to redoximorphic features: 8 to 18 inches
Reaction: Moderately acid or slightly acid
Particle-size control section:
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

A horizon:
Value—2 or 3 moist, 3 or 4 dry
Chroma—1 or 2 moist or dry
Content of clay—8 to 16 percent

E horizon:
Value—4 or 5 moist, 6 or 7 dry
Chroma—1 or 2 moist or dry
Texture—sandy loam or loamy sand
Content of clay—0 to 8 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Bg horizon:
Value—3 or 4 moist, 5 or 6 dry
Chroma—2 to 4 moist or dry
Texture—sand or loamy sand
Content of clay—0 to 8 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Cd horizon:
Hue—10YR to 2.5Y
Value—5 or 6 moist, 4 to 7 dry
Chroma—2 or 3 moist or dry
Texture—loam or sandy loam

Content of clay—8 to 15 percent
Content of rock fragments—0 to 15 percent gravel

Skipjack Series

Depth class: Very deep (more than 60 inches)
Drainage class: Well drained
Capacity to transmit water (Ksat): Moderately high or high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift and volcanic ash
Slope range: 5 to 15 percent
Elevation: 0 to 2,300 feet
Mean annual precipitation: 35 to 45 inches
Mean annual air temperature: 46 to 48 degrees F
Frost-free period: 160 to 220 days

Taxonomic class: Coarse-loamy, isotic, mesic Andic Dystroxerepts

Typical Pedon

Skipjack fine sandy loam in an area of Constitution-Skipjack-Kahboo complex, 5 to 25 percent slopes, in an area of forestland; 1,000 feet north and 1,000 feet east of the southwest corner of sec. 34, T. 37 N., R. 1. W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 38 minutes, 53 seconds north and longitude 122 degrees, 48 minutes, 35 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 3 inches; slightly decomposed plant material; abrupt wavy boundary.

Bw1—3 to 32 inches; strong brown (7.5YR 5/6) fine sandy loam, dark brown (7.5YR 3/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium roots; many very fine and fine irregular pores; 10 percent gravel; strongly acid (pH 5.4); clear wavy boundary.

Bw2—32 to 43 inches; yellowish brown (10YR 5/6) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; soft, friable, nonsticky and nonplastic; common fine and medium roots; many very fine and fine irregular pores; 15 percent gravel; moderately acid (pH 5.6); clear wavy boundary.

Bg—43 to 60 inches; light olive brown (2.5Y 5/4) gravelly coarse sandy loam, olive brown (2.5Y 4/4) moist; massive; slightly hard, friable, nonsticky and nonplastic; few fine and medium roots; few very fine irregular pores; 25 percent medium distinct irregular iron-manganese masses that are dark yellowish brown (10YR 4/6) moist, have a diffuse boundary, and are in matrix surrounding redoximorphic depletions; 25 percent medium distinct irregular iron depletions that are dark gray (2.5Y 4/1) moist, have a diffuse boundary, and are throughout; 15 percent gravel; moderately acid (pH 5.6).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 48 to 50 degrees F
Soil moisture control section: Dry 45 to 60 days following summer solstice
Reaction: Strongly acid or moderately acid
Particle-size control section:
Content of clay—5 to 15 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Bw1 horizon:
Hue—10YR to 7.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 to 6 moist or dry
Ammonium oxalate extractable aluminum plus one-half iron—1.5 to 2.5 percent
Bulk density—0.8 to 1.0 gram per cubic centimeter
Phosphorous retention—50 to 80 percent
Content of volcanic glass—0 to 4 percent
Content of rock fragments—0 to 15 percent gravel
Content of clay—5 to 15 percent

Bw2 horizon:
Hue—10YR to 7.5YR
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 to 6 moist or dry
Texture—loam, sandy loam, or fine sandy loam
Ammonium oxalate extractable aluminum plus one-half iron—1.5 to 2.5 percent
Bulk density—0.8 to 1.0 gram per cubic centimeter
Phosphorous retention—50 to 80 percent
Content of volcanic glass—0 to 4 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones
Content of clay—5 to 15 percent

Bg horizon:
Value—3 or 4 moist, 4 to 6 dry
Chroma—3 to 6 moist or dry
Texture—sandy loam or coarse sandy loam
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones
Content of clay—3 to 15 percent

Spieden Series

Depth class: Very deep (more than 60 inches)
Drainage class: Poorly drained
Capacity to transmit water (Ksat): Moderately high to very high
Landscape: Drift plains
Landform: Drainageways
Parent material: Glacial outwash
Slope range: 0 to 2 percent
Elevation: 0 to 250 feet
Mean annual precipitation: 18 to 40 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Sandy, isotic, mesic Typic Endoaquolls

Typical Pedon

Spieden mucky silt loam (fig. 27) in an area of Sholander-Spieden complex, 0 to 5 percent slopes; 1,250 feet north and 900 feet west of the southeast corner of sec. 2, T. 34 N., R. 3 W.; False Bay, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 28 minutes, 1 second north and longitude 123 degrees, 1 minute, 16 seconds west. (Colors are for moist soil unless otherwise noted.)

A1—0 to 4 inches; black (10YR 2/1) mucky silt loam, gray (10YR 5/1) dry; weak fine

Figure 27.—Typical profile of a Spieden mucky silt loam.

subangular blocky structure parting to moderate fine granular structure; soft, very friable, slightly sticky and moderately plastic; many very fine and fine roots; many fine interstitial and common very fine and fine irregular pores; 10 percent gravel; moderately acid (pH 5.8); clear wavy boundary.

A2—4 to 11 inches; black (10YR 2/1) silt loam, gray (10YR 5/1) dry; weak fine subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky and moderately plastic; few very fine and fine roots; common very fine interstitial and few very fine irregular pores; 5 percent reddish brown (5YR 4/4) coarse irregular very weakly cemented iron-manganese masses in matrix; 10 percent gravel; slightly acid (pH 6.3); abrupt wavy boundary.

E—11 to 24 inches; dark grayish brown (2.5Y 4/2) gravelly loamy sand, light brownish gray (2.5Y 6/2) dry; single grain; loose, nonsticky and nonplastic; few very fine interstitial pores; 75 percent reddish brown (5YR 4/4) coarse irregular very weakly cemented iron-manganese masses that have a diffuse boundary and are in matrix; 15 percent gravel; neutral (pH 6.7); clear wavy boundary.

Bg—24 to 36 inches; dark olive brown (2.5Y 3/3) gravelly loamy coarse sand, light yellowish brown (2.5Y 6/3) dry; single grain; loose, nonsticky and nonplastic; few very fine interstitial pores; 75 percent reddish brown (5YR 4/4) coarse prominent irregular very weakly cemented iron-manganese masses that have a diffuse boundary and are in matrix; 15 percent gravel; neutral (pH 6.7); clear wavy boundary.

C1—36 to 48 inches; dark olive brown (2.5Y 3/3) coarse sand, light yellowish brown (2.5Y 6/3) dry; single grain; loose, nonsticky and nonplastic; few very fine interstitial pores; 10 percent gravel; neutral (pH 6.9); clear wavy boundary.

C2—48 to 60 inches; very dark grayish brown (2.5Y 3/2) coarse sand, light brownish gray (2.5Y 6/2) dry; single grain; loose, nonsticky and nonplastic; few very fine interstitial pores; 10 percent gravel; neutral (pH 6.9).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Thickness of mollic epipedon: 10 to 14 inches
Depth to redoximorphic features: 0 to 8 inches
Reaction: Moderately acid to neutral
Particle-size control section:
Content of clay—0 to 5 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 5 percent cobbles

A1 horizon:
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2 moist or dry
Content of clay—6 to 18 percent
Content of rock fragments—0 to 15 percent gravel

A2 horizon:
Value—2 or 3 moist, 3 to 5 dry
Chroma—1 or 2 moist or dry
Texture—silt loam or loam
Content of clay—6 to 18 percent
Content of rock fragments—0 to 20 percent total, including 0 to 15 percent gravel and 0 to 5 percent cobbles

E horizon:
Hue—7.5YR to 2.5Y
Value—3 or 4 moist, 5 or 6 dry
Chroma—1 or 2 moist or dry
Texture—loamy sand or sand
Content of clay—0 to 5 percent
Content of rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 5 percent cobbles

Bg horizon:
Hue—7.5YR to 2.5Y
Value—3 or 4 moist, 5 or 6 dry
Chroma—2 to 4 moist or dry
Texture—loamy coarse sand, loamy sand, or sand
Content of clay—0 to 5 percent
Rock fragments—0 to 35 percent total, including 0 to 35 percent gravel and 0 to 5 percent cobbles

C horizon:
- Hue—7.5YR to 2.5Y
- Value—5 or 6 moist, 4 to 7 dry
- Chroma—2 or 3 moist or dry
- Texture—coarse sand, loamy sand, or sand
- Content of clay—0 to 5 percent
- Content of rock fragments—0 to 15 percent total, including 0 to 15 percent gravel and 0 to 5 percent cobbles

Sucia Series

Depth class: Moderately deep to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Moderately high to very high
Landscape: Drift plains
Landform: Valleys
Parent material: Glacial outwash over dense glaciomarine deposits
Slope range: 2 to 20 percent
Elevation: 0 to 500 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Fine-loamy, mixed, superactive, mesic Aquultic Haploxeralfs

Typical Pedon

Sucia loamy sand, 2 to 10 percent slopes; 100 feet north and 1,100 feet west of the southeast corner of sec. 13, T. 36 N., R. 4 W.; Roche Harbor, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 36 minutes, 33 seconds north and longitude 123 degrees, 7 minutes, 53 seconds west. (Colors are for dry soil unless otherwise noted.)

A—0 to 8 inches; dark grayish brown (10YR 4/2) loamy sand, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine and fine irregular and interstitial pores; strongly acid (pH 5.5); abrupt smooth boundary.

Bw—8 to 17 inches; yellowish brown (10YR 5/4) loamy sand, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; few very fine and fine irregular, common fine tubular, and many medium interstitial pores; moderately acid (pH 6.0); clear wavy boundary.

E—17 to 31 inches; gray (10YR 6/1) gravelly loamy sand, dark gray (10YR 4/1) moist; massive; slightly hard, friable, nonsticky and nonplastic; few very fine roots; few very fine interstitial pores; 30 percent prominent iron-manganese masses that are light brown (7.5YR 6/4), brown (7.5YR 5/4) moist; 10 percent gravel and 5 percent cobbles; moderately acid (pH 6.0); gradual wavy boundary.

2Btg—31 to 38 inches; olive brown (2.5Y 4/4) loam, light olive brown (2.5Y 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few fine and common very fine roots in cracks; many very fine and fine tubular pores; 20 percent prominent iron-manganese masses that are strong brown (7.5YR 5/8), strong brown (7.5YR 4/6) moist, and 40 percent prominent iron depletions that are light gray (10YR 7/2), gray (10YR 6/1) moist; slightly acid (pH 6.4); abrupt wavy boundary.

2Cd—38 to 60 inches; weak red (2.5YR 5/2) silt loam, pale red (2.5YR 6/2) moist; massive; hard, firm, slightly sticky and slightly plastic; 10 percent prominent iron depletions that are light gray (10YR 7/2), gray (10YR 6/1) moist, and are in cracks; neutral (pH 7.3).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice
Depth to redoximorphic features: 16 to 27 inches
Reaction: Strongly acid to neutral
Particle-size control section:
Content of clay—18 to 35 percent
Content of rock fragments—0 to 35 percent total, including 0 to 30 percent gravel and 0 to 10 percent cobbles

A horizon:
Value—3 or 4 moist, 4 or 5 dry
Chroma—1 or 2 moist or dry
Content of clay—2 to 8 percent

Bw horizon:
Value—4 or 5 moist, 5 or 6 dry
Chroma—3 or 4 moist or dry
Texture—sand or loamy sand
Content of clay—0 to 5 percent
Content of rock fragments—0 to 35 percent total, including 0 to 25 percent gravel and 0 to 10 percent cobbles

E horizon:
Hue—10YR or 7.5YR
Value—4 or 5 moist, 5 or 6 dry
Chroma—1 or 2 moist or dry
Texture—sand or loamy sand
Content of clay—0 to 5 percent
Content of rock fragments—0 to 15 percent total, including 0 to 15 percent gravel and 0 to 10 percent cobbles

2Btg horizon:
Hue—2.5Y, 10YR, or 7.5YR
Value—4 or 5 moist, 5 or 6 dry
Chroma—3 or 4 moist or dry
Texture—loam, clay loam, or sandy clay loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

2Cd horizon:
Hue—2.5Y, 10YR, or 7.5YR
Value—4 to 6 moist, 5 to 7 dry
Chroma—1 or 2 moist or dry
Texture—silt loam, loam, or sandy loam
Content of clay—18 to 35 percent
Content of rock fragments—0 to 15 percent gravel

Turtleback Series

Depth class: Deep to lithic bedrock
Drainage class: Well drained
Capacity to transmit water (Ksat): High or very high
Landscape: Hills, mountains
Landform: Hillslopes, mountain slopes
Parent material: Glacial drift mixed with colluvium derived from metasedimentary rock
Slope range: 25 to 75 percent
Elevation: 0 to 2,200 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy-skeletal, isotic, mesic Typic Dystroxerepts

Typical Pedon

Turtleback very gravelly fine sandy loam in an area of Turtleback-Cady-Rock outcrop complex, 25 to 75 percent slopes; 500 feet east and 15 feet north of the southwest corner of sec. 27, T. 37 N., R. 1 W.; Mount Constitution, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 39 minutes, 35 seconds north and longitude 122 degrees, 48 minutes, 43 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 3 inches; slightly decomposed plant material; abrupt wavy boundary.

Bw1—3 to 13 inches; dark yellowish brown (10YR 4/6) very gravelly very fine sandy loam, dark yellowish brown (10YR 3/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, and medium and few coarse roots; many fine irregular and few fine interstitial pores; 35 percent gravel and 10 percent cobbles; strongly acid (pH 5.4); clear wavy boundary.

Bw2—13 to 40 inches; light olive brown (2.5Y 5/6) extremely gravelly sandy loam, olive brown (2.5Y 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine and few medium roots; common fine irregular and few fine interstitial pores; 40 percent gravel and 20 percent stones; moderately acid (pH 5.6); gradual wavy boundary.

C—40 to 48 inches; light olive brown (2.5Y 5/3) extremely gravelly loamy sand, dark grayish brown (2.5Y 4/2) moist; single grain; loose, nonsticky and nonplastic; few very fine, fine, and medium roots; common fine interstitial pores; 60 percent gravel and 5 percent cobbles; moderately acid (pH 5.6); abrupt wavy boundary.

R—48 inches; metasedimentary rock.

Range in Characteristics

Depth to restrictive feature: 40 to 60 inches to lithic bedrock
Average annual soil temperature: 50 to 52 degrees F
Soil moisture control section: Dry 75 to 90 days following summer solstice
Reaction: Strongly acid or moderately acid
Particle-size control section:
Content of clay—5 to 18 percent
Content of rock fragments—35 to 75 percent total, including 35 to 75 percent gravel, 0 to 10 percent cobbles, and 0 to 10 percent stones

Bw1 horizon:
Hue—7.5YR or 10YR
Value—3 or 4 moist, 4 or 5 dry
Chroma—2 to 4 moist, 4 to 6 dry

Content of clay—5 to 18 percent
Content of rock fragments—35 to 60 percent total, including 35 to 60 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Bw2 horizon:
Hue—10YR to 2.5Y
Value—3 or 4 moist, 5 or 6 dry
Chroma—3 or 4 moist, 4 to 6 dry
Texture—sandy loam or loamy sand
Content of clay—5 to 18 percent
Content of rock fragments—35 to 70 percent total, including 35 to 70 percent gravel, 0 to 10 percent cobbles, and 0 to 10 percent stones

C horizon:
Hue—10YR to 2.5Y
Value—4 or 5 moist, 4 to 7 dry
Chroma—2 to 4 moist, 2 to 6 dry
Texture—loamy sand, fine sandy loam, sandy loam, or coarse sandy loam
Content of clay—1 to 12 percent
Content of rock fragments—50 to 75 percent total, including 50 to 75 percent gravel, 0 to 10 percent cobbles, and 0 to 10 percent stones

Whidbey Series

Depth class: Moderately deep to dense material
Drainage class: Moderately well drained
Capacity to transmit water (Ksat): Very low to very high
Landscape: Hills, drift plains
Landform: Hillslopes
Parent material: Glacial drift over dense glaciomarine deposits
Slope range: 2 to 20 percent
Elevation: 0 to 300 feet
Mean annual precipitation: 18 to 30 inches
Mean annual air temperature: 48 to 50 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Loamy-skeletal, isotic, mesic Aquic Dystroxerepts

Typical Pedon

Whidbey gravelly loam in an area of Hoypus-Whidbey complex, 10 to 30 percent slopes; 2,400 feet north and 2,000 feet east of the southwest corner of sec. 23, T. 35 N., R. 2 W., Shaw Island, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 30 minutes, 49 seconds north and longitude 122 degrees, 54 minutes, 6 seconds west. (Colors are for dry soil unless otherwise noted.)

Oi—0 to 2 inches; slightly decomposed plant material; abrupt smooth boundary.
A—2 to 6 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many fine, common very fine, and few medium and coarse roots; many very fine and fine irregular pores; 15 percent gravel and 10 percent cobbles; moderately acid (pH 5.7); clear wavy boundary.
Bw—6 to 20 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, and medium roots and few coarse roots; common very fine and fine interstitial and irregular pores; 45 percent gravel and 5 percent cobbles; moderately acid (pH 5.7); clear wavy boundary.

Bg—20 to 37 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; few very fine and fine roots between peds; common very fine and fine interstitial and irregular pores; 15 percent distinct weakly cemented iron depletions that are light brownish gray (10YR 6/2) moist and are in matrix and 25 percent distinct weakly cemented iron-manganese masses that are yellowish brown (10YR 5/6) moist and are in matrix; 45 percent gravel and 5 percent cobbles; slightly acid (pH 6.2); abrupt wavy boundary.

2Cd—37 to 60 inches; light olive brown (2.5Y 5/3) gravelly sandy loam, olive brown (2.5Y 4/3) moist; massive; hard, firm, nonsticky and nonplastic; few very fine irregular pores; 5 percent distinct weakly cemented iron-manganese masses that are yellowish brown (10YR 5/6) moist and are in matrix and 5 percent distinct weakly cemented iron depletions that are light brownish gray (10YR 6/2) moist and are in matrix; 25 percent gravel; neutral (pH 6.9).

Range in Characteristics

Depth to restrictive feature: 20 to 40 inches to dense material
Average annual soil temperature: 50 to 52 degrees F
Depth to redoximorphic features: 18 to 30 inches
Reaction: Moderately acid to neutral
Particle-size control section:
Content of clay—4 to 18 percent
Content of rock fragments—35 to 70 percent total, including 35 to 70 percent gravel, 0 to 20 percent cobbles, and 0 to 5 percent stones

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 or 5 dry
Chroma—2 or 3 moist or dry
Content of rock fragments—15 to 35 percent total, including 15 to 35 percent gravel, 0 to 20 percent cobbles, and 0 to 5 percent stones

Bw horizon:
Hue—10YR, 7.5YR, or 2.5Y
Value—3 to 5 moist, 4 to 6 dry
Chroma—3 or 4 moist or dry
Texture—loam, sandy loam, or coarse sandy loam
Content of clay—4 to 15 percent
Content of rock fragments—35 to 70 percent total, including 25 to 50 percent gravel, 0 to 15 percent cobbles, and 0 to 5 percent stones

Bg horizon:
Hue—10YR or 2.5Y
Value—4 or 5 moist, 5 or 6 dry
Chroma—3 or 4 moist or dry
Texture—sandy loam or loamy sand
Content of clay—5 to 18 percent
Content of rock fragments—35 to 65 percent total, including 25 to 50 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Cd horizon:
Hue—10YR, 2.5Y, or 5Y
Value—4 to 6 moist, 5 to 7 dry
Chroma—2 or 3 moist or dry
Texture—sandy loam, sandy clay loam, or coarse sandy loam
Content of clay—9 to 24 percent

Content of rock fragments—10 to 45 percent total, including 10 to 30 percent gravel, 0 to 10 percent cobbles, and 0 to 5 percent stones

Xerorthents

Depth class: Very deep (more than 60 inches)
Drainage class: Excessively drained
Capacity to transmit water (Ksat): Very high
Landscape: Shore complexes
Landform: Beaches, hillslopes, sea cliffs
Parent material: Beach sand and colluvium derived from glacial outwash
Slope range: 0 to 100 percent
Elevation: 0 to 150 feet
Mean annual precipitation: 18 to 45 inches
Mean annual air temperature: 48 to 52 degrees F
Frost-free period: 200 to 240 days

Taxonomic class: Xerorthents

Typical Pedon

Xerorthents very gravelly sand in an area of Beaches-Endoaquents, tidal-Xerorthents association, 0 to 5 percent slopes, in an area of rangeland; about 5 miles south of the town of Friday Harbor, San Juan Island, Washington; 2,900 feet south and 450 feet east of the northwest corner of sec. 7, T. 34 N., R. 2 W., Richardson, Washington, U.S. Geological Survey quadrangle; latitude 48 degrees, 27 minutes, 20 seconds north and longitude 122 degrees, 59 minutes, 38 seconds west. (Colors are for dry soil unless otherwise noted.)

A—0 to 1 inch; dark grayish brown (10YR 4/2) very gravelly sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and fine and few medium roots; many fine and medium interstitial pores; 50 percent gravel and 10 percent cobbles; moderately acid (pH 5.7); abrupt smooth boundary.

C1—1 to 20 inches; stratified extremely gravelly coarse sand to very gravelly sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many fine and medium interstitial pores; 50 percent gravel and 10 percent cobbles; slightly acid (pH 6.4); clear wavy boundary.

C2—20 to 60 inches; stratified very gravelly sand; single grain; loose, nonsticky and nonplastic; many fine and medium interstitial pores; 50 percent gravel and 10 percent cobbles; neutral (pH 6.8).

Range in Characteristics

Depth to restrictive feature: More than 60 inches
Average annual soil temperature: 50 to 52 degrees F
Moisture control section: Dry 75 to 90 days following summer solstice
Reaction: Moderately acid to neutral
Particle-size control section:
Content of clay—0 to 3 percent
Content of rock fragments—35 to 80 percent total, including 35 to 80 percent gravel and 0 to 15 percent cobbles

A horizon:
Hue—10YR or 7.5YR
Value—2 or 3 moist, 4 to 6 dry
Chroma—1 to 3 moist or dry

Content of clay—0 to 3 percent
Content of rock fragments—35 to 80 percent total, including 35 to 80 percent gravel and 0 to 15 percent cobbles

C horizon:

Color—variegated parent material colors that are 40 percent dark, 40 percent light, and 20 percent intermediate mineral colors
Reaction—slightly acid or neutral
Texture—coarse sand or sand
Content of clay—0 to 3 percent
Content of rock fragments—35 to 80 percent total, including 35 to 80 percent gravel and 0 to 15 percent cobbles

Formation of the Soils

By Michael Regan, soil scientist, Natural Resources Conservation Service.

Thirty-seven soil types are described and delineated within the boundaries of the San Juan County soil survey area. The appearance and properties of these soils are a result of the interaction of five soil-forming factors—parent material, climate, topography, biological factors, and time. Although each of the factors is discussed separately, they are inseparable with respect to soil formation. For example, a change in the climate influences the ecology that is adapted to a soil type.

Parent Material

Four major types of parent material are in the survey area—glacial drift, glacial outwash, dense glaciomarine deposits, and colluvium derived from marine metasedimentary rock. Additions of organic material, eolian sediment, and airfall deposits of volcanic ash are in the surface horizons. Glacial drift and glacial outwash are unconsolidated material that was deposited at the end of the glacial period in a meltwater environment. The degree to which the unconsolidated sediment is sorted differentiates drift from outwash. Glacial outwash is better sorted and coarser textured than drift, suggesting that the depositional environment had a higher water velocity or that the drift was reworked by meltwater streams, stripping away the finer material. Glacial drift and glacial outwash both typically overlie dense glaciomarine deposits. Dense glaciomarine deposits are typically finer textured material containing sparse dropstones, suggesting that the deposition occurred in a deep meltwater environment. Colluvium derived from marine metasedimentary rock typically occurs as rock fragments and sand in soils that are on hillslopes.

Bazal, Mitchellbay, and Roche soils are representative of those that consist of glacial drift or glacial outwash over root- and water-restrictive dense glaciomarine deposits. During the wetter months of the year (October through May), a perched water table develops above the dense glaciomarine deposits. In nearly level to gently sloping areas, the perched water table reaches the surface and water may pond on the soil during periods of frequent precipitation. San Juan, Hoypus, and Everett soils are representative of those that consist of glacial outwash that extends beyond the depth of the soil material. These soils typically have additions of eolian sediment, a small amount of volcanic ash, or a relatively high amount of organic matter in the surface horizon. These additions have a positive influence on the available water capacity for plants. Cady, Doebay, Haro, and Turtleback soils are representative of those that consist of colluvium mixed with glacial drift. These soils are in areas of thin glacial sediment or in areas where the sediment has been eroded, such as on Young Hill on San Juan Island. These soils have a bedrock contact in the root zone. Bedrock in San Juan County is typically marine metasedimentary rock of the Cretaceous-Jurassic period (Logan, 2003). The types of rock included in this metasedimentary group, known as the Constitution Formation, are metamorphosed sandstone, argillite, mudstone, and conglomerate.

Climate

Climate in San Juan County is characterized by warm, dry summers and mild, moist winters. The county is on the leeward side of the Olympic Mountains in Washington and the mountains of Vancouver Island in British Columbia. These mountains produce a topographic rainshadow effect over the county. The southern part of the county receives as little as 18 inches of precipitation annually, and the northern part and areas at the higher elevations can average as much as about 45 inches of precipitation annually. Although the county is in a rainshadow, the proximity to temperature-moderating coastal water results in vegetation patterns that are characteristic of higher precipitation zones. Differences in exposure to wind throughout the county are pronounced. Southwest aspects are exposed to prevailing winds traveling over open water, while northeast aspects are protected from the winds. The San Juan soils, which are generally in the southwest part of the county, reflect the effects of wind exposure. These soils typically have 1 to 2 feet of eolian, or wind-transported, sediment on the surface. Constitution, Kahboo, Pickett, and Skipjack soils, which generally are in the northwest part of the county, are protected from wind exposure. These soils typically have better preserved volcanic ash in the surface horizon.

Topography

The landscapes in the county are the result of a complex geologic history. The steep, rocky hills originated during the Late Cretaceous as a result of a thrust-faulting orogeny (Brandon and others, 1988). Glaciation modified the hills and formed the glacial drift plains and valleys between them. The last glacial episode, the Vashon Stade, produced the modern surface topography of the lowlands (Booth, 1994). Following glaciation, the land surface rebounded as the weight of the glacial ice lessened. As a result of the rebounding surface and changes in sea level, sediment that was deposited in a marine environment is now at elevations of as much as about 300 feet (McLeelean, 1927). Steepness, shape, and aspect of the slope significantly affect the distribution of soil moisture and the plant communities in an area. An excellent example of the topographic factor is the vegetation pattern on Mount Finlayson on San Juan Island. The San Juan soils on the south-facing slopes are exposed to more direct solar radiation and prevailing winds; thus, they support rangeland vegetation. The Everett and Hoypus soils on the north-facing slopes are more protected from solar radiation and prevailing winds; thus, they support forest vegetation. Slope shape affects erosion and deposition, as exhibited by areas of the Haro-Hiddenridge-Rock outcrop complex, 25 to 75 percent slopes. The Rock outcrop and Haro soils, which are shallow to bedrock, typically are in convex areas that are subject to erosion. The deep Hiddenridge soils are in concave positions where soil material tends to accumulate. In nearly level areas underlain by dense sediment, the soils have characteristics attributed to prolonged saturation, such as redoximorphic concentrations and depletions. Bazal, Mitchellbay, and Sholander soils are examples. Semiahmoo and Shalar soils, which are in drainageways and depressions, have a very high content of organic matter. This is due in part to the increased production of biomass in these moister soils and in part to the prolonged anaerobic conditions in the soils, which slow the rate of decomposition.

Biological Factors

Organisms affect soil formation in many ways. Pioneering organisms, such as lichens, facilitate the weathering of rock into soil. Mixing of soil horizons occurs when trees are toppled by wind. At Cattle Point on San Juan Island, European hares have brought gravel to the surface in some areas of the San Juan soils through repeated excavation of warrens. Soil fauna, such as burrowing insects and worms, increase the porosity of soils. Increased porosity increases the ability of a soil to perform functions such as storing water, cycling nutrients, and providing a medium for plant roots. The color and thickness of a surface horizon is significantly influenced by the plant community. Soils that formed under grassland, such as the San Juan soils, have a thick, dark-colored surface horizon as a result of biomass being concentrated in the root zone. In contrast, forested soils, such as the Everett and Hoypus soils, have a lighter colored surface horizon as a result of biomass being concentrated in the forest canopy.

Time

The formation of a soil is a result of the interaction of the soil-forming factors over time. The end of the last glaciation of the Puget Lowlands, including San Juan County, effectively set the time for soil formation to begin, about 16,000 years ago (Porter and Swanson, 1998). Soil formation has progressed since that time as a result of four general soil-forming processes—additions, losses, transformations, and translocations. Soil horizonation is a result of these processes acting over time. The dark-colored surface horizon of soils that formed under grassland vegetation, such as those of the San Juan, Pilepoint, Haro, and Hiddenridge series, forms relatively quickly. Redoximorphic concentrations and depletions in the subsoil of the Spieden, Michellbay, and Sholander soils are evidence of transformation and translocation of iron due to periodic saturation. A subsoil that contains a significant accumulation of clay (argillic horizon), such as that of the Mitchellbay, Coveland, Bazal, and Pilepoint soils, can take thousands of years to form (Birkeland, 1999). Presence of a clay-enriched subsoil suggests that the landscape and soil-forming processes have been stable since the end of the glaciation. In contrast, the Cady, Doebay, and Turtleback soils exhibit little horizon development. The formation of these soils has been affected by the ongoing mixing of soil material through the processes of erosion and mass movement on steep slopes.

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Glossary

Many of the terms relating to landforms, geology, and geomorphology are defined in more detail in the "National Soil Survey Handbook" (available in local offices of the Natural Resources Conservation Service or on the Internet).

ABC soil. A soil having an A, a B, and a C horizon.

Ablation till. Loose, relatively permeable earthy material deposited during the downwasting of nearly static glacial ice, either contained within or accumulated on the surface of the glacier.

Abrupt textural change. A soil horizon boundary or thin transitional zone characterized by a considerable increase in clay that occurs at the contact between a surface layer, subsurface layer, subsoil, or substratum.

AC soil. A soil having only an A and a C horizon. Commonly, such soil formed in recent alluvium or on steep, rocky slopes.

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.

Alluvium. Unconsolidated material, such as gravel, sand, silt, clay, and various mixtures of these, deposited on land by running water.

Alpha, alpha-dipyridyl. A compound that when dissolved in ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction implies reducing conditions and the likely presence of redoximorphic features.

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.

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redoximorphic features.

Argillic horizon. A subsoil horizon characterized by an accumulation of illuvial clay (Soil Survey Staff, 1999).

Aspect. The direction toward which a slope faces. Also called slope aspect.

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:

Very low	0 to 3
Low	3 to 6
Moderate	6 to 9
High	9 to 12
Very high	more than 12

Backslope. The position that forms the steepest and generally linear, middle portion of a hillslope. In profile, backslopes are commonly bounded by a convex shoulder above and a concave footslope below.

Backswamp. A flood-plain landform. Extensive, marshy or swampy, depressed areas of flood plains between natural levees and valley sides or terraces.

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.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, and K), expressed as a percentage of the total cation-exchange capacity.

Base slope (geomorphology). A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).

Bedding plane. A planar or nearly planar bedding surface that visibly separates each successive layer of stratified sediment or rock (of the same or different lithology) from the preceding or following layer; a plane of deposition. It commonly marks a change in the circumstances of deposition and may show a parting, a color difference, a change in particle size, or various combinations of these. The term is commonly applied to any bedding surface, even one that is conspicuously bent or deformed by folding.

Bedding system. A drainage system made by plowing, grading, or otherwise shaping the surface of a flat field. It consists of a series of low ridges separated by shallow, parallel dead furrows.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-controlled topography. A landscape where the configuration and relief of the landforms are determined or strongly influenced by the underlying bedrock.

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 saucer-, cup-, or trough-shaped depression formed by wind erosion on a preexisting dune or other sand deposit, especially in an area of shifting sand or loose soil or where protective vegetation is disturbed or destroyed; the adjoining accumulation of sand derived from the depression, where recognizable, is commonly included. Blowouts are commonly small.

Bottom land. An informal term loosely applied to various portions of a flood plain.

Boulders. Rock fragments larger than 2 feet (60 centimeters) in diameter.

Breaks. A landscape or tract of steep, rough or broken land dissected by ravines and gullies and marking a sudden change in topography.

Breast height. An average height of 4.5 feet above the ground surface; the point on a tree where diameter measurements are ordinarily taken.

Brush management. Use of mechanical, chemical, or biological methods to make conditions favorable for reseeding or to reduce or eliminate competition from woody vegetation and thus allow understory grasses and forbs to recover. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.

Calcareous soil. A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

California bearing ratio (CBR). The load-supporting capacity of a soil as compared to that of 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.)

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 and under similar climatic conditions but that 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. See Terracettes.

Cement rock. Shaly limestone used in the manufacture of cement.

Channery soil material. Soil material that has, by volume, 15 to 35 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches (15 centimeters) along the longest axis. A single piece is called a channer.

Chemical treatment. Control of unwanted vegetation through the use of chemicals.

Chiseling. Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.

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 depletions. See Redoximorphic features.

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.

Claypan. A dense, compact subsoil layer that contains much more clay than the overlying materials, from which it is separated by a sharply defined boundary. The layer restricts the downward movement of water through the soil. A claypan is commonly hard when dry and plastic and sticky when wet.

Climax plant community. The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.

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 has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

COLE (coefficient of linear extensibility). See Linear extensibility.

Colluvium. Unconsolidated, unsorted earth material being transported or deposited on side slopes and/or at the base of slopes by mass movement (for example, direct gravitational action) and by local, unconcentrated runoff.

Complex slope. Irregular or variable slope. Planning or establishing terraces, diversions, and other water-control structures 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.

Concretions. See Redoximorphic features.

Conglomerate. A coarse grained, clastic sedimentary rock composed of rounded or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer textured material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. 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.

Conservation tillage. A tillage system that does not invert the soil and that leaves a protective amount of crop residue on the surface throughout the year.

Consistence, soil. Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the “Soil Survey Manual.”

Contour stripcropping. 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.

Coprogenous earth (sedimentary peat). A type of limnic layer composed predominantly of fecal material derived from aquatic animals.

Cordilleran ice sheet. The glacial ice sheet that covered much of the northern half of North America, from the eastern face of the Rocky Mountains to the Pacific Ocean, during the Pleistocene.

Corrosion (geomorphology). A process of erosion whereby rocks and soil are removed or worn away by natural chemical processes, especially by the solvent action of running water, but also by other reactions, such as hydrolysis, hydration, carbonation, and oxidation.

Corrosion (soil survey interpretations). Soil-induced electrochemical or chemical action that dissolves or weakens concrete or uncoated steel.

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 according to 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.

Cryoturbate. A mass of soil or other unconsolidated earthy material moved or disturbed by frost action. It is typically coarser than the underlying material.

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 resting grazing land for a prescribed period.

Delta. A body of alluvium having a surface that is fan shaped and nearly flat; 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, soil. Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.

Diatomaceous earth. A geologic deposit of fine, grayish siliceous material composed chiefly or entirely of the remains of diatoms.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming to the dip of the underlying bedrock.

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 the hazard of 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 wet periods under conditions similar to those under which the soil formed. Alterations of the water regime by human activities, either through drainage or irrigation, are not a consideration unless they have significantly changed the morphology of the soil. Seven classes of natural soil drainage are recognized—*excessively drained, somewhat excessively drained, well drained, moderately well drained, somewhat poorly drained, poorly drained,* and *very poorly drained*. These classes are defined in the “Soil Survey Manual.”

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. A general term for a course or channel along which water moves in draining an area. A term restricted to relatively small, linear depressions that at some time move concentrated water and either do not have a defined channel or have only a small defined channel.

Draw. A small stream valley that generally is shallower and more open than a ravine or gulch and that has a broader bottom. The present stream channel may appear inadequate to have cut the drainageway that it occupies.

Drift. A general term applied to all mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or transported by running water emanating from a glacier. Drift includes unstratified material (till) that forms moraines and stratified deposits that form outwash plains, eskers, kames, varves, and glaciofluvial sediments. The term is generally applied to Pleistocene glacial deposits in areas that no longer contain glaciers.

Drift plain. A general term applied to a glaciated plain containing mineral material (clay, silt, sand, gravel, and boulders) transported by a glacier and deposited directly by or from the ice or by running water emanating from a glacier. The term is generally applied to Pleistocene glacial deposits on plains that no longer contain glaciers.

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 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.

Dune. A low mound, ridge, bank, or hill of loose, windblown granular material (generally sand), either barren and capable of movement from place to place or covered and stabilized with vegetation but retaining its characteristic shape.

Earthy fill. See Mine spoil.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological 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 ecological sites in kind and/or proportion of species or in total production.

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.

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian deposit. Sand-, silt-, or clay-sized clastic material transported and deposited primarily by wind, commonly in the form of a dune or a sheet of sand or loess.

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.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

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 human or animal activities or of a catastrophe in nature, such as a fire, that exposes the surface.

Erosion pavement. A surficial lag concentration or layer of gravel and other rock fragments that remains on the soil surface after sheet or rill erosion or wind has removed the finer soil particles and that tends to protect the underlying soil from further erosion.

Erosion surface. A land surface shaped by the action of erosion, especially by running water.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. Most commonly applied to cliffs produced by differential erosion. Synonym: scarp.

Esker. A long, narrow, sinuous, steep-sided ridge of stratified sand and gravel deposited as the bed of a stream flowing in an ice tunnel within or below the ice (subglacial) or between ice walls on top of the ice of a wasting glacier and left behind as high ground when the ice melted. Eskers range in length from less than a kilometer to more than 160 kilometers and in height from 3 to 30 meters.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) deposited and cooled 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 remnant. A general term for landforms that are the remaining parts of older fan landforms, such as alluvial fans, that have been either dissected or partially buried.

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, or clay.

Firebreak. An 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 firefighters and equipment. Designated roads also serve as firebreaks.

First bottom. An obsolete, informal term loosely applied to the lowest flood-plain steps that are subject to regular flooding.

Flaggy soil material. Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has 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. The nearly level plain that borders a stream and is subject to flooding unless protected artificially.

Flood-plain landforms. A variety of constructional and erosional features produced by stream channel migration and flooding. Examples include backswamps, flood-plain splays, meanders, meander belts, meander scrolls, oxbow lakes, and natural levees.

Flood-plain splay. A fan-shaped deposit or other outspread deposit formed where an overloaded stream breaks through a levee (natural or artificial) and deposits its material (commonly coarse grained) on the flood plain.

Flood-plain step. An essentially flat, terrace-like alluvial surface within a valley that is frequently covered by floodwater from the present stream; any approximately horizontal surface still actively modified by fluvial scour and/or deposition. May occur individually or as a series of steps.

Fluvial. Of or pertaining to rivers or streams; produced by stream or river action.

Foothills. A region of steeply sloping hills that fringes a mountain range or high-plateau escarpment. The hills have relief of as much as 1,000 feet (300 meters).

Footslope. The concave surface at the base of a hillslope. A footslope is a transition zone between upslope sites of erosion and transport (shoulders and backslopes) and downslope sites of deposition (toeslopes).

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.

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.

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.

Geomorphic surface. A mappable area of the earth’s surface that has a common history; the area is of similar age and is formed by a set of processes during an episode of landscape evolution.

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 clayey soils that shrink and swell considerably with changes in moisture content.

Glaciofluvial deposits. Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur in the form of outwash plains, valley trains, deltas, kames, eskers, and kame terraces.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are bedded or laminated.

Glaciomarine deposit. Glacially eroded, terrestrially derived sediment (clay, silt, sand, and gravel) that accumulated on the ocean floor. Sediment may be accumulated as an ice-contact deposit or by fluvial transport, ice-rafting, or eolian transport.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors.

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 has 15 to 35 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. Water filling all the unblocked pores of the material below the water table.

Gully. A small channel with steep sides caused by erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. 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 bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hard to reclaim (in tables). Reclamation is difficult after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

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 slope (geomorphology). A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

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. Such crops 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 generic term for an elevated area 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. Slopes are generally more than 15 percent. The distinction between a hill and a mountain is arbitrary and may depend on local usage.

Hillslope. A generic term for the steeper part of a hill between its summit and the drainage line, valley flat, or depression floor at the base of a hill.

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 uppercase letter represents the major horizons. Numbers or lowercase 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.

L horizon.—A layer of organic and mineral limnic materials, including coprogenous earth (sedimentary peat), diatomaceous earth, and marl.

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.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

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.

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, an Arabic numeral, commonly a 2, precedes the letter C.

Cr horizon.—Consolidated bedrock beneath the soil that has an extremely weakly cemented to moderately cemented rupture-resistance class.

R horizon.—Consolidated bedrock beneath the soil that has a strongly cemented or stronger rupture-resistance class.

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 potential. The soil properties that influence this potential are those that affect the minimum rate of water infiltration on a bare soil during periods after prolonged wetting when the soil is not frozen. These properties include depth to a seasonal high water table, the infiltration rate, and depth to a layer that significantly restricts the downward movement of water. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff.

Igneous rock. Rock that was formed by cooling and solidification of magma and that has not been changed appreciably by weathering since its formation. Major varieties include plutonic and volcanic rock (e.g., 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

Interfluve. A landform composed of the relatively undissected upland or ridge between two adjacent valleys containing streams flowing in the same general direction. An elevated area between two drainageways that sheds water to those drainageways.

Interfluve (geomorphology). A geomorphic component of hills consisting of the uppermost, comparatively level or gently sloping area of a hill; shoulders of backwearing hillslopes can narrow the upland or can merge, resulting in a strongly convex shape.

Intermittent stream. A stream, or reach of a stream, that does not flow year-round but that is commonly dry for 3 or more months out of 12 and whose channel is generally below the local water table. It flows only during wet periods or 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.

Iron depletions. See Redoximorphic features.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:

Basin.—Water is applied rapidly to nearly level plains surrounded by levees or dikes.

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.

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. A low mound, knob, hummock, or short irregular ridge composed of stratified sand and gravel deposited by a subglacial stream as a fan or delta at the margin of a melting glacier; by a supraglacial stream in a low place or hole on the surface of the glacier; or as a ponded deposit on the surface or at the margin of stagnant ice.

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.

Ksat. See Saturated hydraulic conductivity.

Lacustrine deposit. Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A nearly level surface marking the floor of an extinct lake filled by well sorted, generally fine textured, stratified deposits, commonly containing varves.

Lake terrace. A narrow shelf, partly cut and partly built, produced along a lakeshore in front of a scarp line of low cliffs and later exposed when the water level falls.

Landslide. A general, encompassing term for most types of mass movement landforms and processes involving the downslope transport and outward deposition of soil and rock materials caused by gravitational forces; the movement may or may not involve saturated materials. 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 (7.6 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.

Leeward. Being in or facing the direction toward which the wind is blowing.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $^1/_3$- or $^1/_{10}$-bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

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. Material transported and deposited by wind and consisting dominantly of silt-sized particles.

Longshore drift. Material (such as sand or gravel) that is moved parallel to and near a shore.

Low strength. The soil is not strong enough to support loads.

Low-residue crops. Such crops 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.

Major Land Resource Area (MLRA). A broad geographic land area characterized by a particular pattern of soils, geology, climate, water resources, and land use. An area is typically continuous, but small separate areas can occur.

Marl. An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.

Mass movement. A generic term for the dislodgment and downslope transport of soil and rock material as a unit under direct gravitational stress.

Masses. See Redoximorphic features.

Meander belt. The zone within which migration of a meandering channel occurs; the flood-plain area included between two imaginary lines drawn tangential to the outer bends of active channel loops.

Meander scar. A crescent-shaped, concave or linear mark on the face of a bluff or valley wall, produced by the lateral erosion of a meandering stream that impinged upon and undercut the bluff.

Meander scroll. One of a series of long, parallel, close-fitting, crescent-shaped ridges and troughs formed along the inner bank of a stream meander as the channel migrated laterally down-valley and toward the outer bank.

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.

Metamorphic rock. Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement at depth in the earth's crust. Nearly all such rocks are crystalline.

Mine spoil. An accumulation of displaced earthy material, rock, or other waste material removed during mining or excavation. Also called earthy fill.

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. A kind of map unit component that has little or no natural soil and supports little or no vegetation.

Moderately coarse textured soil. Coarse sandy loam, sandy loam, or fine sandy loam.

Moderately fine textured soil. Clay loam, sandy clay loam, or silty clay loam.

Mollic epipedon. A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil (Soil Survey Staff, 1999).

Moraine. In terms of glacial geology, a mound, ridge, or other topographically distinct accumulation of unsorted, unstratified drift, predominantly till, deposited primarily by the direct action of glacial ice in a variety of landforms. Also, a general term for a landform composed mainly of till (except for kame moraines, which are composed mainly of stratified outwash) that has been deposited by a glacier. Some types of moraines are disintegration, end, ground, kame, lateral, recessional, and terminal.

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. 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 generic term for an elevated area of the land surface, rising more than 1,000 feet (300 meters) above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are formed primarily by tectonic activity and/or volcanic action but can also be formed by differential erosion.

Muck. Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)

Mudstone. A blocky or massive, fine grained sedimentary rock in which the proportions of clay and silt are approximately equal. Also, a general term for such material as clay, silt, claystone, siltstone, shale, and argillite and that should be used only when the amounts of clay and silt are not known or cannot be precisely identified.

Munsell notation. A designation of color by degrees of three simple variables—hue, value, and chroma. For example, a notation of 10YR 6/4 is a color with hue of 10YR, value of 6, and chroma of 4.

Neutral soil. A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)

Nodules. See Redoximorphic features.

Nose slope (geomorphology). A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent. Nose slopes consist dominantly of colluvium and slope-wash sediments (for example, slope alluvium).

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.

Organic matter. Plant and animal residue in the soil in various stages of decomposition. The content of organic matter in the surface layer is described as follows:

Very low	less than 0.5 percent
Low	0.5 to 1.0 percent
Moderately low	1.0 to 2.0 percent
Moderate	2.0 to 4.0 percent
High	4.0 to 8.0 percent
Very high	more than 8.0 percent

Orogenic. Of or pertaining to the process of mountain formation.

Outwash. Stratified and sorted sediment (mainly sand and gravel) removed or “washed out” from a glacier by meltwater streams and deposited in front of or beyond the end moraine or the margin of a glacier. The coarser material is deposited nearer to the ice.

Outwash plain. An extensive lowland area of coarse textured glaciofluvial material. An outwash plain is commonly smooth; where pitted, it generally is low in relief.

Paleoterrace. An erosional remnant of a terrace that retains the surface form and alluvial deposits of its origin but was not emplaced by, and commonly does not grade to, a present-day stream or drainage network.

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.

Pedisediment. A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is being (or was) transported across a gently sloping erosional surface at the foot of a receding hill or mountain slope.

Pedologic. Of or pertaining to the processes of soil formation.

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 movement of water through the soil.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.

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.

Plant association. A kind of climax plant community consisting of stands with essentially the same dominant species in corresponding layers.

Plant community. An assemblage of plants living together, reflecting no particular ecological status; a vegetative complex unique in its combination of plants.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

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. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.

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.

Pore linings. See Redoximorphic features.

Potential native plant community. 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. Deliberately burning an area for specific management purposes, under the appropriate conditions of weather and soil moisture and at the proper time of day.

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 practice increases the vigor and reproduction capacity 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.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed as 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 degrees of acidity or alkalinity, expressed as pH values, are:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
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
Slightly 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

Redoximorphic concentrations. See Redoximorphic features.

Redoximorphic depletions. See Redoximorphic features.

Redoximorphic features. Redoximorphic features are associated with wetness and result from alternating periods of reduction and oxidation of iron and manganese compounds in the soil. Reduction occurs during saturation with water, and oxidation occurs when the soil is not saturated. Characteristic color patterns are created by these processes. The reduced iron and manganese ions may be removed from a soil if vertical or lateral fluxes of water occur, in which case there is no iron or manganese precipitation in that soil. Wherever the iron and manganese are oxidized and precipitated, they form either soft masses or hard concretions or nodules. Movement of iron and manganese as a result of redoximorphic processes in a soil may result in redoximorphic features that are defined as follows:

1. Redoximorphic concentrations.—These are zones of apparent accumulation of iron-manganese oxides, including:

   A. Nodules and concretions, which are cemented bodies that can be removed from the soil intact. Concretions are distinguished from nodules on the basis of internal organization. A concretion typically has concentric layers that are visible to the naked eye. Nodules do not have visible organized internal structure; *and*

   B. Masses, which are noncemented concentrations of substances within the soil matrix; *and*

   C. Pore linings, i.e., zones of accumulation along pores that may be either coatings on pore surfaces or impregnations from the matrix adjacent to the pores.

2. Redoximorphic depletions.—These are zones of low chroma (chroma less than that of the matrix) where either iron-manganese oxides alone or both iron-manganese oxides and clay have been stripped out, including:

   A. Iron depletions, i.e., zones that contain low amounts of iron and manganese oxides but have a clay content similar to that of the adjacent matrix; *and*

   B. Clay depletions, i.e., zones that contain low amounts of iron, manganese, and clay (often referred to as silt coatings or skeletans).

3. Reduced matrix.—This is a soil matrix that has low chroma *in situ* but undergoes a change in hue or chroma within 30 minutes after the soil material has been exposed to air.

Reduced matrix. See Redoximorphic features.

Regolith. All unconsolidated earth materials above the solid bedrock. It includes material weathered in place from all kinds of bedrock and alluvial, glacial, eolian, lacustrine, and pyroclastic deposits.

Relief. The relative difference in elevation between the upland summits and the lowlands or valleys of a given region.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as bedrock disintegrated in place.

Rill. A very small, steep-sided channel resulting from erosion and cut in unconsolidated materials by concentrated but intermittent flow of water. A rill generally is not an obstacle to wheeled vehicles and is shallow enough to be smoothed over by ordinary tillage.

Riser. The vertical or steep side slope (e.g., escarpment) of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural, steplike landforms, such as successive stream terraces.

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 that are 2 millimeters in diameter or more (i.e., gravel, cobbles, stones, and boulders). Rock fragments have a strongly cemented or stronger rupture-resistance class.

Rock outcrop. Exposures of bare bedrock.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that consist of cobbles, stones, and boulders, commonly at the base of mountains.

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.

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-sized 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.

Saturated hydraulic conductivity (Ksat). The ease with which pores of a saturated soil transmit water. Formally, the proportionality coefficient that expresses the relationship of the rate of water movement to hydraulic gradient in Darcy's Law, a law that describes the rate of water movement through porous media. Commonly abbreviated as "Ksat." Terms describing saturated hydraulic conductivity are *very high*, 100 or more micrometers per second (14.17 or more inches per hour); *high*, 10 to 100 micrometers per second (1.417 to 14.17 inches per hour); *moderately high*, 1 to 10 micrometers per second (0.1417 inch to 1.417 inches per hour); *moderately low*, 0.1 to 1 micrometer per second (0.01417 to 0.1417 inch per hour); *low*, 0.01 to 0.1 micrometer per second (0.001417 to 0.01417 inch per hour); and *very low*, less than 0.01 micrometer per second (less than 0.001417 inch per hour). To convert inches per hour to micrometers per second, multiply inches per hour by 7.0572. To convert micrometers per second to inches per hour, multiply micrometers per second by 0.1417.

Saturation. Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

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. A consolidated deposit of clastic particles, chemical precipitates, or organic remains accumulated at or near the surface of the earth under normal low temperature and pressure conditions. Sedimentary rocks include consolidated equivalents of alluvium, colluvium, drift, and eolian, lacustrine, and marine deposits. Examples are sandstone, siltstone, mudstone, claystone, shale, conglomerate, limestone, dolomite, and coal.

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. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock that formed by the hardening of a deposit of clay, silty clay, or silty clay loam and that has a tendency to split into thin layers.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shoulder. The convex, erosional surface near the top of a hillslope. A shoulder is a transition from summit to backslope.

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.

Shrub-coppice dune. A small, streamlined dune that forms around brush and clump vegetation.

Side slope (geomorphology). A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel. Side slopes are dominantly colluvium and slope-wash sediments.

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. An indurated silt having the texture and composition of shale but lacking its fine lamination or fissility; a massive mudstone in which silt predominates over clay.

Similar soils. Soils that share limits of diagnostic criteria, behave and perform in a similar manner, and have similar conservation needs or management requirements for the major land uses in the survey area.

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 (pedogenic). Grooved, striated, and/or glossy (shiny) slip faces on structural peds, such as wedges; produced by shrink-swell processes, most commonly in soils that have a high content of expansive clays.

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.

Slope alluvium. Sediment gradually transported down the slopes of mountains or hills primarily by nonchannel alluvial processes (i.e., slope-wash processes) and characterized by particle sorting. Lateral particle sorting is evident on long slopes. In a profile sequence, sediments may be distinguished by differences in size and/or specific gravity of rock fragments and may be separated by stone lines. Burnished peds and sorting of rounded or subrounded pebbles or cobbles distinguish these materials from unsorted colluvial deposits.

Slow refill (in tables). The slow filling of ponds, resulting from restricted water transmission in the soil.

Slow water movement (in tables). Restricted downward movement of water through the soil. See Saturated hydraulic conductivity.

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 adsorption ratio (SAR) of a saturation extract, or the ratio of Na^+ to $Ca^{++} + Mg^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock 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 and by the passage of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, in millimeters, of separates recognized in the United States are as follows:

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 material below the solum. The living roots and plant and animal activities are largely confined to the solum.

Stone line. In a vertical cross section, a line formed by scattered fragments or a discrete layer of angular and subangular rock fragments (commonly a gravel- or cobble-sized lag concentration) that formerly was draped across a topographic surface and was later buried by additional sediments. A stone line generally caps material that was subject to weathering, soil formation, and erosion before burial. Many stone lines seem to be buried erosion pavements, originally formed by sheet and rill erosion across the land surface.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 15 to 24 inches (38 to 60 centimeters) in length if flat.

Stony. Refers to a soil containing stones in numbers that interfere with or prevent tillage.

Strath terrace. A type of stream terrace; formed as an erosional surface cut on bedrock and thinly mantled with stream deposits (alluvium).

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel, originally formed near the level of the stream; represents the remnants of an abandoned flood plain, stream bed, or valley floor produced during a former state of fluvial erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to wind erosion 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 erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.

Subduction. The process of one lithospheric plate descending beneath another.

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. Any surface soil horizon (A, E, AB, or EB) below the 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.

Summit. The topographically highest position of a hillslope. It has a nearly level (planar or only slightly convex) surface.

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."

Surface soil. The A, E, AB, and EB horizons, considered collectively. It includes all subdivisions of these horizons.

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. Soils are recognized as taxadjuncts only when one or more of their characteristics are slightly outside the range defined for the family of the series for which the soils are named.

Tectonic. Pertaining to the forces involved in, or the resulting structures of, deformation of the earth's crust.

Terminal moraine. An end moraine that marks the farthest advance of a glacier. It typically has the form of a massive arcuate or concentric ridge, or complex of ridges, and is underlain by till and other types of drift.

Terrace (conservation). 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. (geomorphology). A steplike surface, bordering a valley floor or shoreline, that represents the former position of a flood plain, lake, or seashore. The term is usually applied both to the relatively flat summit surface (tread) that was cut or built by stream or wave action and to the steeper descending slope (scarp or riser) that has graded to a lower base level of erosion.

Terracettes. Small, irregular steplike forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may be induced or enhanced by trampling of livestock, such as sheep or cattle.

Terrane. A group of related rocks and the area in which they are exposed at the earth's surface.

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 that is too thin for the specified use.

Thrust fault. A fault with a dip of 45 degrees or less on which the hanging wall appears to have moved upward relative to the footwall.

Till. Dominantly unsorted and nonstratified drift, generally unconsolidated and deposited directly by a glacier without subsequent reworking by meltwater, and consisting of a heterogeneous mixture of clay, silt, sand, gravel, stones, and boulders; rock fragments of various lithologies are embedded within a finer matrix that can range from clay to sandy loam.

Till plain. An extensive area of level to gently undulating soils underlain predominantly by till and bounded at the distal end by subordinate recessional or end moraines.

Tilth, soil. The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.

Toeslope. The gently inclined surface at the base of a hillslope. Toeslopes in profile are commonly gentle and linear and are constructional surfaces forming the lower part of a hillslope continuum that grades to valley or closed-depression floors.

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.

Trace elements. Chemical elements, for example, zinc, cobalt, manganese, copper, and iron, in soils in extremely small amounts. They are essential to plant growth.

Tread. The flat to gently sloping, topmost, laterally extensive slope of terraces, flood-plain steps, or other stepped landforms; commonly a recurring part of a series of natural steplike landforms, such as successive stream terraces.

Upland. An informal, general term for the higher ground of a region, in contrast with a low-lying adjacent area, such as a valley or plain, or for land at a higher elevation than the flood plain or low stream terrace; land above the footslope zone of the hillslope continuum.

Valley fill. The unconsolidated sediment deposited by any agent (water, wind, ice, or mass wasting) so as to fill or partly fill a valley.

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 disintegration, chemical decomposition, and biologically induced changes in rocks or other deposits at or near the earth's surface by atmospheric or biologic agents or by circulating surface waters but involving essentially no transport of the altered 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 oven-dry basis, at which a plant (specifically a sunflower) wilts so much that it does not recover when placed in a humid, dark chamber.

Windthrow. The uprooting and tipping over of trees by the wind.

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