



United States Department of Agriculture,
Natural Resources Conservation Service
and Forest Service

In cooperation with
United States Department of the Interior,
Bureau of Indian Affairs and
Bureau of Land Management, and
Montana Agricultural Experiment Station

Soil Survey of Missoula County Area, Montana Part II

How To Use This Soil Survey

This survey is divided into three parts. Part I includes general information about the survey area; descriptions of the general soil map units, detailed soil map units, and soil series in the area; and a description of how the soils formed. Part II describes the use and management of the soils and the major soil properties. This part may be updated as further information about soil management becomes available. Part III includes the maps.

On the **general soil map**, which is the color map preceding the detailed soil maps, the survey area is 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 general 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** in Part I of this survey for a general description of the soils in your area.

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

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

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

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

A **State Soil Geographic Data Base (STATSGO)** is available for this survey area. This data base consists of a soils map at a scale of 1 to 250,000 and descriptions of groups of associated soils. It replaces the general soil map published in older soil surveys. The map and the data base can be used for multicounty planning, and map output can be tailored for a specific use. More information about the State Soil Geographic Data Base for this survey area, or any portion of Montana, is available at the local office of the Natural Resources Conservation Service.

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey.

Major fieldwork for this soil survey was completed in 1983. Soil names and descriptions were approved in 1985. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1983. This survey was made cooperatively by the United States Department of Agriculture, Natural Resources Conservation Service and Forest Service; the United States Department of the Interior, Bureau of Land Management and Bureau of Indian Affairs; and the Montana Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Missoula County Conservation District. Financial assistance was provided by the Forest Service, the Champion International Corporation, and the Missoula County Commissioners in cooperation with the Missoula County Conservation District, the Bureau of Land Management, the Montana Department of State Lands, and the Burlington Northern Corporation.

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.

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Detailed Soil Map Unit Legend

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- 8—Argixerolls-Haploxerolls complex, 4 to 15 percent slopes
- 9—Argixerolls-Haploxerolls complex, 15 to 30 percent slopes
- 10—Argixerolls-Haploxerolls complex, 30 to 60 percent slopes
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- 13—Bata-Waldbillig gravelly silt loams, 4 to 30 percent slopes
- 14—Beeskove gravelly loam, 30 to 60 percent slopes
- 15—Beeskove-Rock outcrop complex, 50 to 80 percent slopes
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Soil Survey of Missoula County Area, Montana

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 woodland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; and for wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

Interpretive ratings help engineers, planners, and others understand how soil properties influence important nonagricultural uses, such as building site development and construction materials. The ratings indicate the most restrictive soil features affecting the suitability of the soils for these uses.

Soils are rated in their natural state. No unusual

modification of the soil site or material is made other than that which is considered normal practice for the rated use. Even though soils may have limitations, it is important to remember that engineers and others can modify soil features or can design or adjust the plans for a structure to compensate for most of the limitations. Most of these practices, however, are costly. The final decision in selecting a site for a particular use generally involves weighing the costs of site preparation and maintenance.

Planners and others using soil survey information can evaluate the effect of specific land uses on productivity and on the environment in all or part of the survey area. The survey can help planners to maintain or create a land use pattern in harmony with the natural soil.

Contractors can use this survey to locate sources of sand and gravel, roadfill, and topsoil. They can use it to identify areas where bedrock, wetness, or very firm soil layers can cause difficulty in excavation.

Health officials, highway officials, engineers, and others may also find this survey useful. The survey can help them plan the safe disposal of wastes and locate sites for pavements, sidewalks, campgrounds, playgrounds, lawns, and trees and shrubs.

The classification and extent of the soils in this survey area are shown in the tables "Classification of the Soils" and "Acreage and Proportionate Extent of the Soils," which are at the end of this section.

CLASSIFICATION OF THE SOILS

Soil name	Family or higher taxonomic class
Alberton-----	Coarse-loamy, mixed, frigid Aridic Haploxerolls
Ambrant-----	Coarse-loamy, mixed, frigid Udic Ustochrepts
Aquic Haploxerolls-----	Aquic Haploxerolls
Aquic Udorthents-----	Aquic Udorthents
Aquepts-----	Aquepts
Aquolls-----	Aquolls
Argixerolls-----	Argixerolls
Auggie-----	Fine-silty, mixed Typic Cryoboralfs
Bata-----	Loamy-skeletal, mixed Andeptic Cryoboralfs
Beeskove-----	Loamy-skeletal, mixed, frigid Typic Eutrochrepts
Bigarm-----	Loamy-skeletal, mixed, frigid Typic Haploxerolls
Biglake-----	Sandy-skeletal, mixed, frigid Typic Haploxerolls
Bignell-----	Clayey-skeletal, mixed Typic Eutroborafls
Borohemists-----	Borohemists
Chickaman-----	Coarse-silty, micaceous Andic Cryochrepts
Coerock-----	Medial-skeletal Lithic Cryandeps
Courville-----	Loamy-skeletal, mixed, frigid Andic Dystric Eutrochrepts
Crow-----	Fine, mixed Typic Eutroborafls
Desmet-----	Coarse-silty, mixed, frigid Calciorthidic Haploxerolls
Elkner-----	Coarse-loamy, mixed Typic Cryochrepts
Evano-----	Loamy-skeletal, mixed Typic Cryochrepts
Felan-----	Loamy-skeletal, mixed Andic Cryochrepts
Glaciercreek-----	Sandy-skeletal, mixed, frigid Andic Dystric Eutrochrepts
Glaciercreek variant-----	Coarse-loamy, mixed, frigid Dystric Eutrochrepts
Grantsdale-----	Coarse-silty over sandy or sandy-skeletal, mixed, frigid Calciorthidic Haploxerolls
Grassvalley-----	Fine, illitic, frigid Typic Haploxerafls
Greenough-----	Fine-silty, mixed Typic Eutroborafls
Hagstadt-----	Fine-silty, mixed, frigid Udic Ustochrepts
Half Moon-----	Fine-silty, mixed Typic Eutroborafls
Hanaker-----	Fine-silty, mixed Typic Argiborolls
Haploxerolls-----	Haploxerolls
Hollandlake-----	Loamy-skeletal, mixed Typic Cryoboralfs
Holloway-----	Loamy-skeletal, mixed Andic Cryochrepts
Jimlake-----	Loamy-skeletal, mixed Andeptic Cryoboralfs
Lantern-----	Loamy-skeletal, mixed, frigid Dystric Eutrochrepts
Lolopeak-----	Sandy-skeletal, mixed Andic Cryumbrepts
Lubrecht-----	Fine, mixed Typic Eutroborafls
Mitten-----	Loamy-skeletal, mixed, frigid Andic Dystric Eutrochrepts
Moiese-----	Sandy-skeletal, mixed, frigid Calciorthidic Haploxerolls
Orthents-----	Orthents
Ovando-----	Sandy-skeletal, mixed Typic Cryorthents
Perma-----	Loamy-skeletal, mixed Typic Haploborolls
Perma variant-----	Loamy-skeletal, mixed Typic Argiborolls
Petty-----	Loamy-skeletal, mixed Andic Cryochrepts
Phillcher-----	Loamy-skeletal, mixed Andic Cryochrepts
Repp-----	Loamy-skeletal, mixed, frigid Typic Ustochrepts
Rochester-----	Sandy-skeletal, mixed, frigid Typic Ustorthents
Rumblecreek-----	Loamy-skeletal, mixed Typic Eutroborafls
Selway-----	Loamy-skeletal, mixed, frigid Dystric Eutrochrepts
Sharrott-----	Loamy-skeletal, mixed, frigid Lithic Ustochrepts
Shooflin-----	Very fine, montmorillonitic Typic Eutroborafls
Tally variant-----	Sandy, mixed Typic Haploborolls
Tervis-----	Loamy-skeletal, mixed, frigid Dystric Eutrochrepts
Totelake-----	Sandy-skeletal, mixed, frigid Udic Ustochrepts
Trapps-----	Loamy-skeletal, mixed Typic Eutroborafls
Turrah-----	Fine, mixed, frigid Cumulic Haplaquolls
Udifluvents-----	Udifluvents
Udorthents-----	Udorthents
Upsata-----	Sandy-skeletal, mixed Andic Cryochrepts
Waldbillig-----	Loamy-skeletal, mixed Andic Cryochrepts
Whitore-----	Loamy-skeletal, carbonatic Typic Cryochrepts
Wildgen-----	Loamy-skeletal, mixed, frigid Udic Ustochrepts
Winfall-----	Loamy-skeletal, mixed, frigid Dystric Eutrochrepts

CLASSIFICATION OF THE SOILS--Continued

Soil name	Family or higher taxonomic class
Winkler-----	Loamy-skeletal, mixed, frigid Udic Ustochrepts
Xerofluvents-----	Xerofluvents
Yourame-----	Loamy-skeletal, mixed Typic Eutroboralfs

ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS

Map symbol	Soil name	Acres	Percent
1	Alberton very fine sandy loam, 0 to 2 percent slopes-----	4,900	0.4
2	Ambrant gravelly sandy loam, 15 to 30 percent slopes-----	3,230	0.3
3	Ambrant-Rochester, warm-Rock outcrop complex, 30 to 60 percent slopes-----	3,210	0.3
4	Aquic Haploxerolls, 0 to 2 percent slopes-----	1,670	0.1
5	Aquic Udorthents, 0 to 2 percent slopes-----	1,480	0.1
6	Aquolls and Aquepts, 0 to 2 percent slopes-----	11,020	0.9
7	Argixerolls-Haploxerolls complex, 0 to 4 percent slopes-----	4,280	0.3
8	Argixerolls-Haploxerolls complex, 4 to 15 percent slopes-----	13,070	1.0
9	Argixerolls-Haploxerolls complex, 15 to 30 percent slopes-----	8,290	0.7
10	Argixerolls-Haploxerolls complex, 30 to 60 percent slopes-----	1,750	0.1
11	Auggie silt loam, 4 to 15 percent slopes-----	3,960	0.3
12	Bata gravelly silt loam, cool, 2 to 8 percent slopes-----	980	*
13	Bata-Waldbillig gravelly silt loams, 4 to 30 percent slopes-----	13,980	1.1
14	Beeskove gravelly loam, 30 to 60 percent slopes-----	14,660	1.1
15	Beeskove-Rock outcrop complex, 50 to 80 percent slopes-----	1,870	0.1
16	Bigarm gravelly loam, 0 to 4 percent slopes-----	9,980	0.8
17	Bigarm gravelly loam, 4 to 15 percent slopes-----	2,760	0.2
18	Bigarm gravelly loam, 15 to 30 percent slopes-----	7,360	0.6
19	Bigarm gravelly loam, 30 to 60 percent slopes-----	18,760	1.5
20	Bigarm-Rock outcrop complex, 30 to 60 percent slopes-----	5,400	0.4
21	Biglake gravelly sandy loam, 8 to 15 percent slopes-----	330	*
22	Biglake gravelly sandy loam, 15 to 30 percent slopes-----	1,710	0.1
23	Bignell gravelly loam, 8 to 30 percent slopes-----	22,110	1.7
24	Bignell-Winkler, cool, complex, 30 to 60 percent slopes-----	2,760	0.2
25	Bignell, warm-Winkler complex, 30 to 60 percent slopes-----	3,120	0.2
26	Borochemists, 0 to 2 percent slopes-----	1,430	0.1
27	Chickaman silt loam, 8 to 30 percent slopes-----	180	*
28	Chickaman silt loam, 30 to 60 percent slopes-----	6,480	0.5
29	Coerock-Rock outcrop complex, 4 to 30 percent slopes-----	6,130	0.5
30	Coerock-Rock outcrop complex, 50 to 80 percent slopes-----	7,610	0.6
31	Courville gravelly silt loam, 8 to 30 percent slopes-----	2,610	0.2
32	Courville-Mitten gravelly silt loams, 30 to 60 percent slopes-----	1,950	0.2
33	Crow silt loam, 4 to 15 percent slopes-----	8,250	0.7
34	Desmet loam, 0 to 2 percent slopes-----	4,700	0.4
35	Elkner-Ovando complex, 8 to 30 percent slopes-----	1,640	0.1
36	Evaro gravelly loam, 8 to 30 percent slopes-----	7,110	0.6
37	Evaro gravelly loam, 30 to 60 percent slopes-----	12,600	1.0
38	Felan gravelly silt loam, 8 to 30 percent slopes-----	6,280	0.5
39	Felan gravelly silt loam, 30 to 60 percent slopes-----	24,960	2.0
40	Felan gravelly silt loam, cool, 8 to 30 percent slopes-----	2,550	0.2
41	Felan gravelly silt loam, cool, 30 to 60 percent slopes-----	6,450	0.5
42	Glaciercreek gravelly silt loam, 0 to 4 percent slopes-----	7,200	0.6
43	Glaciercreek variant-Glaciercreek complex, 4 to 20 percent slopes-----	3,110	0.2
44	Grantsdale loam, 0 to 2 percent slopes-----	7,260	0.6
45	Grassvalley silty clay loam, 0 to 4 percent slopes-----	5,190	0.4
46	Grassvalley silty clay loam, 4 to 8 percent slopes-----	2,460	0.2
47	Grassvalley silty clay loam, 8 to 15 percent slopes-----	2,550	0.2
48	Grassvalley silty clay loam, 15 to 30 percent slopes-----	1,760	0.1
49	Greenough silt loam, 4 to 15 percent slopes-----	3,550	0.3
50	Hagstadt silt loam, 4 to 25 percent slopes-----	1,820	0.1
51	Half Moon silt loam, 4 to 8 percent slopes-----	3,490	0.3
52	Hanaker silt loam, 0 to 6 percent slopes-----	3,700	0.3
53	Hollandlake gravelly loam, 4 to 30 percent slopes-----	6,250	0.5
54	Hollandlake-Bata complex, 4 to 30 percent slopes-----	19,410	1.5
55	Hollandlake-Bata complex, 30 to 60 percent slopes-----	5,070	0.4
56	Holloway gravelly silt loam, 8 to 30 percent slopes-----	11,560	0.9
57	Holloway gravelly silt loam, 30 to 60 percent slopes-----	62,540	4.9
58	Holloway gravelly silt loam, cool, 8 to 30 percent slopes-----	5,350	0.4
59	Holloway gravelly silt loam, cool, 30 to 60 percent slopes-----	3,260	0.3
60	Holloway-Rock outcrop complex, 50 to 80 percent slopes-----	20,380	1.6
61	Jimlake gravelly silt loam, 4 to 30 percent slopes-----	22,790	1.8

* See footnote at end of table.

ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
62	Jimlake gravelly silt loam, 30 to 60 percent slopes-----	3,810	0.3
63	Lantern gravelly sandy loam, 8 to 30 percent slopes-----	470	*
64	Lantern gravelly sandy loam, 30 to 60 percent slopes-----	4,230	0.3
65	Lantern-Rock outcrop complex, 50 to 80 percent slopes-----	1,300	0.1
66	Lolopeak bouldery loam, 50 to 80 percent slopes-----	3,580	0.3
67	Lolopeak-Rock outcrop complex, 50 to 80 percent slopes-----	3,900	0.3
68	Lubrecht silt loam, 4 to 15 percent slopes-----	3,300	0.3
69	Mitten gravelly silt loam, 30 to 60 percent slopes-----	2,960	0.2
70	Mitten-Sharrott, cool, complex, 15 to 40 percent slopes-----	2,580	0.2
71	Mitten-Tevis complex, 30 to 60 percent slopes-----	35,060	2.7
72	Molese gravelly loam, 0 to 2 percent slopes-----	8,170	0.6
73	Orthents, 0 to 4 percent slopes-----	3,170	0.2
74	Ovando-Elkner-Rock outcrop complex, 30 to 60 percent slopes-----	5,440	0.4
75	Perma gravelly loam, 0 to 4 percent slopes-----	8,550	0.7
76	Perma gravelly loam, 20 to 45 percent slopes-----	1,980	0.2
77	Perma stony loam, 2 to 12 percent slopes-----	1,430	0.1
78	Perma variant stony silt loam, 2 to 8 percent slopes-----	840	*
79	Perma variant-Perma complex, 4 to 30 percent slopes-----	2,060	0.2
80	Petty gravelly loam, 8 to 30 percent slopes-----	4,960	0.4
81	Petty gravelly loam, 30 to 60 percent slopes-----	17,210	1.3
82	Petty bouldery loam, 30 to 60 percent slopes-----	6,650	0.5
83	Petty gravelly loam, cool, 8 to 30 percent slopes-----	7,960	0.6
84	Petty bouldery loam, cool, 50 to 80 percent slopes-----	2,610	0.2
85	Petty, cool-Rock outcrop complex, 50 to 80 percent slopes-----	2,340	0.2
86	Phillcher silt loam, 4 to 30 percent slopes-----	3,040	0.2
87	Phillcher-Rock outcrop complex, 50 to 80 percent slopes-----	6,270	0.5
88	Pits, gravel-----	780	*
89	Repp very gravelly loam, 30 to 60 percent slopes-----	19,330	1.5
90	Repp very gravelly loam, cool, 8 to 30 percent slopes-----	4,060	0.3
91	Repp very gravelly loam, cool, 30 to 60 percent slopes-----	22,080	1.7
92	Repp-Rock outcrop complex, 50 to 80 percent slopes-----	1,760	0.1
93	Riverwash-----	1,600	0.1
94	Rock outcrop-Rubble land complex-----	24,300	1.9
95	Rumblecreek gravelly loam, 4 to 30 percent slopes-----	13,310	1.0
96	Selway gravelly sandy loam, 8 to 30 percent slopes-----	1,380	0.1
97	Selway gravelly sandy loam, 30 to 60 percent slopes-----	3,440	0.3
98	Selway bouldery sandy loam, 30 to 60 percent slopes-----	2,810	0.2
99	Sharrott-Rock outcrop complex, 4 to 30 percent slopes-----	2,270	0.2
100	Shooflin silt loam, 4 to 15 percent slopes-----	6,640	0.5
101	Tally variant sandy loam, 0 to 4 percent slopes-----	1,100	*
102	Tevis gravelly loam, 30 to 60 percent slopes-----	28,200	2.2
103	Tevis-Mitten complex, 8 to 30 percent slopes-----	5,500	0.4
104	Tevis-Mitten-Rock outcrop complex, 45 to 70 percent slopes-----	3,590	0.3
105	Totelake gravelly loam, 2 to 8 percent slopes-----	10,210	0.8
106	Totelake gravelly loam, 8 to 30 percent slopes-----	2,620	0.2
107	Totelake extremely stony loam, 2 to 8 percent slopes-----	2,130	0.2
108	Trapps gravelly loam, 8 to 30 percent slopes-----	1,360	0.1
109	Trapps gravelly loam, 30 to 60 percent slopes-----	10,880	0.8
110	Turrah silty clay loam, 0 to 2 percent slopes-----	3,480	0.3
111	Udifluvents, 0 to 2 percent slopes-----	5,160	0.4
112	Udorhents-Glaciercreek complex, 0 to 8 percent slopes-----	2,110	0.2
113	Upsata gravelly fine sandy loam, 2 to 8 percent slopes-----	6,810	0.5
114	Urban land-----	6,230	0.5
115	Waldbillig gravelly silt loam, 4 to 30 percent slopes-----	42,690	3.3
116	Waldbillig gravelly silt loam, 30 to 60 percent slopes-----	1,370	0.1
117	Waldbillig-Auggie complex, 4 to 15 percent slopes-----	5,580	0.4
118	Waldbillig-Holloway gravelly silt loams, 8 to 30 percent slopes-----	29,050	2.3
119	Waldbillig-Holloway gravelly silt loams, 30 to 60 percent slopes-----	49,430	3.9
120	Waldbillig-Holloway gravelly silt loams, cool, 8 to 30 percent slopes-----	15,730	1.2
121	Waldbillig-Holloway gravelly silt loams, cool, 30 to 60 percent slopes-----	3,710	0.3
122	Whitore gravelly clay loam, 8 to 30 percent slopes-----	2,300	0.2

* See footnote at end of table.

ACREAGE AND PROPORTIONATE EXTENT OF THE SOILS--Continued

Map symbol	Soil name	Acres	Percent
123	Whitore gravelly clay loam, 30 to 60 percent slopes-----	2,220	0.2
124	Wildgen gravelly loam, 4 to 30 percent slopes-----	12,240	1.0
125	Wildgen-Winkler, cool, gravelly loams, 15 to 30 percent slopes-----	8,150	0.6
126	Wildgen-Winkler, cool, gravelly loams, 30 to 60 percent slopes-----	4,580	0.4
127	Wildgen, dry-Winkler complex, 15 to 30 percent slopes-----	2,440	0.2
128	Wildgen, dry-Winkler complex, 30 to 60 percent slopes-----	3,670	0.3
129	Winfall gravelly loam, 4 to 30 percent slopes-----	12,800	1.0
130	Winkler very gravelly sandy loam, 8 to 30 percent slopes-----	15,080	1.2
131	Winkler very gravelly sandy loam, 30 to 60 percent slopes-----	88,090	6.9
132	Winkler gravelly loam, cool, 8 to 30 percent slopes-----	21,120	1.6
133	Winkler gravelly loam, cool, 30 to 60 percent slopes-----	99,070	7.7
134	Winkler-Rubble land complex, 50 to 80 percent slopes-----	8,230	0.6
135	Winkler, cool-Rock outcrop complex, 50 to 80 percent slopes-----	12,150	0.9
136	Xerofluvents, 0 to 2 percent slopes-----	15,250	1.2
137	Yourame gravelly loam, 4 to 30 percent slopes-----	4,270	0.3
W	Water-----	23,000	1.8
	Total-----	1,281,500	100.0

* Less than 0.1 percent. The combined extent of the soils assigned an asterisk in the percent column is about 0.4 percent of the survey area.

Agronomy

General management needed for crops and for hay and pasture is suggested in this section. The system of land capability classification used by the Natural Resources Conservation Service is explained, and the estimated yields of the main crops and hay and pasture plants are listed for each soil.

Planners of management systems for individual fields or farms should consider obtaining specific information from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cropland Limitations and Hazards

The management concerns affecting the use of the detailed soil map units in the survey area for crops are shown in the table "Main Cropland Limitations and Hazards." The main concerns in managing nonirrigated cropland are conserving moisture, controlling soil blowing and water erosion, and maintaining soil fertility.

Conserving moisture consists primarily of reducing the evaporation and runoff rates and increasing the water infiltration rate. Applying conservation tillage and conservation cropping systems, farming on the contour, stripcropping, establishing field windbreaks, and leaving crop residue on the surface conserve moisture.

Generally, a combination of several practices is needed to control *soil blowing* and *water erosion*. Conservation tillage, stripcropping, field windbreaks, tall grass barriers, contour farming, conservation cropping systems, crop residue management, diversions, and grassed waterways help to prevent excessive soil loss.

Measures that are effective in maintaining *soil fertility* include applying fertilizer, both organic and inorganic, including manure; incorporating crop residue or green manure crops into the soil; and using proper crop rotations. Controlling erosion helps to prevent the loss of organic matter and plant nutrients and thus helps to maintain productivity, although the level of fertility can be reduced even in areas where erosion is controlled. All soils used for nonirrigated crops respond well to applications of fertilizer.

Some of the limitations and hazards shown in the

table cannot be easily overcome. These are *channels, flooding, depth to rock, ponding, gullies, and lack of timely precipitation*.

Additional limitations and hazards are as follows:

Areas of rock outcrop and slick spots.—Farming around these areas may be feasible. Subsoiling or deep ripping soft sedimentary beds increases the effective rooting depth and the rate of water infiltration.

Excessive permeability.—This limitation causes deep leaching of nutrients and pesticides. The capacity of the soil to retain moisture for plant use is poor.

Potential for ground-water pollution.—This is a hazard in soils with excessive permeability, hard bedrock, or a water table within the profile.

Lime content, limited available water capacity, poor tilth, restricted permeability, and surface crusting.—These limitations can be overcome by incorporating green manure crops, manure, or crop residue into the soil; applying a system of conservation tillage; and using conservation cropping systems. Also, crops may respond well to additions of phosphate fertilizer to soils that have a high content of lime.

Short frost-free season.—If the growing season is less than 90 days, short-season crops or grasses should be grown.

Surface coarse fragments.—This limitation causes rapid wear of tillage equipment. It cannot be easily overcome.

Slope.—Where the slope is more than 8 percent, water erosion and soil blowing may be accelerated unless conservation farming practices are applied.

Surface stones.—Stones or boulders on the surface can hinder normal tillage unless they are removed.

Salt and sodium content.—In areas where this is a limitation, only salt- and sodium-tolerant crops should be grown.

On irrigated soils the main management concerns are *efficient water use, nutrient management, control of erosion, pest and weed control, and timely planting and harvesting* for a successful crop. An irrigation system that provides optimum control and distribution of water at minimum cost is needed. Overirrigation wastes water, leaches plant nutrients, and causes erosion. Also, it can

create drainage problems, raise the water table, and increase soil salinity.

Following is an explanation of the criteria used to determine the limitations or hazards.

Areas of rock outcrop.—Rock outcrop is a named component of the map unit.

Areas of rubble land.—Rubble land is a named component of the map unit.

Areas of slick spots.—Slick spots are a named component of the map unit.

Channeled.—The word “channeled” is included in the name of the map unit.

Depth to rock.—Bedrock is within a depth of 40 inches.

Erosion by water.—The surface K factor multiplied by the upper slope limit is more than 2 (same as prime farmland criteria).

Excessive permeability.—The upper limit of the permeability range is 6 inches or more within the soil profile.

Flooding.—The component of the map unit is occasionally flooded or frequently flooded.

Gullied.—The word “gullied” is included in the name of the map unit.

Lack of timely precipitation.—The component of the map unit has a Xeric moisture regime. The amount of annual precipitation is no more than 14 inches.

Lime content.—The component is assigned to wind erodibility group 4L or has more than 5 percent lime in the upper 10 inches.

Limited available water capacity.—The available water capacity calculated to a depth of 60 inches or to a root-limiting layer is 5 inches or less.

Ponding.—Ponding duration is assigned to the component of the map unit.

Potential for ground-water pollution.—The soil has a water table within a depth of 4 feet or hard bedrock within the profile, or permeability is more than 6 inches per hour within the soil.

Poor tilth.—The component of the map unit has more than 35 percent clay in the surface layer.

Restricted permeability.—Permeability is 0.06 inches per hour or less within the soil profile.

Salt content.—The component of the map unit has an electrical conductivity of more than 4 in the surface layer or more than 8 within a depth of 30 inches.

Short frost-free season.—The map unit has a growing season of less than 90 frost-free days.

Slope.—The upper slope range of the component of the map unit is more than 8 percent.

Sodium content.—The sodium adsorption ratio of the component of the map unit is more than 13 within a depth of 30 inches.

Soil blowing.—The wind erodibility index multiplied by

the selected high C factor for the survey area and then divided by the T factor is more than 8 for the component of the map unit.

Surface rock fragments.—The terms describing the texture of the surface layer include any rock fragment modifier except for gravelly or channery, and “surface stones” is not already indicated as a limitation.

Surface crusting.—The sodium adsorption ratio in the surface layer is 5 or more for any texture and 4 or more if the texture is silt, silt loam, loam, or very fine sandy loam.

Surface stones.—The terms describing the texture of the surface layer include any stony or bouldery modifier, or the soil is a stony or bouldery phase.

Water table.—The component of the map unit has a water table within a depth of 60 inches.

Crop Yield Estimates

The average yields per acre that can be expected of the principal crops under a high level of management are shown in the table “Land Capability and Yields per Acre of Crops and Pasture.” 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 each map unit 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 are also 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. Yields for dryland crops are based on a crop-fallow system.

For yields of irrigated crops, it is assumed that the irrigation system is adapted to the soils and to the crops grown, that good-quality irrigation water is uniformly applied as needed, and that tillage is kept to a minimum.

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.

Pasture and Hayland Interpretations

Soils are assigned to pasture and hayland groups according to their suitability for the production of forage. The soils in each group are similar enough to be suited to the same species of grasses or legumes, have similar limitations and hazards, require similar management, and have similar productivity levels and other responses to management.

Under good management, proper grazing is essential for the production of high-quality forage, stand survival, and erosion control. Proper grazing helps plants to maintain sufficient and generally vigorous top growth during the growing season. Brush control is essential in many areas, and weed control generally is needed. Rotation grazing and renovation also are important management practices.

Yield estimates are often provided in animal unit months (AUM), or the amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

The local office of the Natural Resources Conservation Service or of the Cooperative Extension Service can provide information about forage yields other than those shown in the table "Land Capability and Yields per Acre of Crops and Pasture."

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 take into account 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 woodland, and for engineering purposes.

In the capability system, as described in "Land Capability Classification" (13), soils generally are grouped at three levels—capability class, subclass, and unit. These levels indicate the degree and kinds of

limitations affecting mechanized farming systems that produce the more commonly grown field crops, such as corn, small grain, cotton, hay, and field-grown vegetables. Only class and subclass are used in this survey.

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.

If properly managed, soils in classes 1, 2, 3, and 4 are suitable for the mechanized production of commonly grown field crops and for pasture and woodland. The degree of the soil limitations affecting the production of cultivated crops increases progressively from class 1 to class 4. The limitations can affect levels of production and the risk of permanent soil deterioration caused by erosion and other factors.

Soils in classes 5, 6, and 7 are generally not suited to the mechanized production of commonly grown field crops without special management, but they are suitable for plants that provide a permanent cover, such as grasses and trees. The severity of the soil limitations affecting crops increases progressively from class 5 to class 7. The local office of the Cooperative Extension Service can provide guidance on the use of these soils as cropland.

Areas in class 8 are generally not suitable for crops, pasture, or woodland without a level of management that is impractical. These areas may have potential for other uses, such as recreational facilities and wildlife habitat.

Capability subclasses indicate the dominant limitations in the class. They are designated by adding a small letter, *E*, *W*, *S*, or *C*, to the class numeral, for example, 3E. The letter *E* shows that the main hazard is the risk of erosion unless a 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.

There are no subclasses in class 1 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 mainly to pasture, rangeland, woodland, wildlife habitat, or recreation.

The capability classification of each map unit is given in the table "Land Capability and Yields per Acre of Crops and Pasture" at the end of this section.

Prime Farmland and Other Important Farmland

In this section, prime farmland and other important farmland are defined. The soils in the survey area that are considered prime farmland are listed in the table "Prime Farmland" at the end of this section.

Prime Farmland

Prime farmland is of major importance in meeting the Nation's short- and long-range needs for food and fiber. The acreage of high-quality farmland is limited, and the U.S. Department of Agriculture recognizes that government at local, State, and Federal levels, as well as individuals, must encourage and facilitate the wise use of our Nation's prime farmland.

Prime farmland soils, as defined by the U.S. Department of Agriculture, are soils that are best suited to food, feed, forage, fiber, and oilseed crops. Such soils have properties that favor the economic production of sustained high yields of crops. The soils need only to be treated and managed by acceptable farming methods. An adequate moisture supply and a sufficiently long growing season are required. Prime farmland soils produce the highest yields with minimal expenditure of energy and economic resources, and farming these soils results in the least damage to the environment.

Prime farmland soils may presently be used as cropland, pasture, or woodland or for other purposes. They either are used for food and fiber or are available for these uses. Urban or built-up land, public land, and water areas cannot be considered prime farmland. Urban or built-up land is any contiguous unit of land 10 acres or more in size that is used for such purposes as housing, industrial, and commercial sites, sites for institutions or public buildings, small parks, golf courses, cemeteries, railroad yards, airports, sanitary landfills, sewage treatment plants, and water-control structures. Public land is land not available for farming in National forests, National parks, military reservations, and State parks.

Prime farmland soils commonly receive an adequate and dependable supply of moisture from precipitation or irrigation. The temperature and growing season are favorable, and the level of acidity or alkalinity and the content of salts and sodium are acceptable. The soils have few, if any, rocks and are permeable to water and air. They are not excessively erodible or saturated with water for long periods, and they are not frequently flooded during the growing season or are protected from flooding. Slopes range mainly from 0 to 6 percent.

Soils that have a high water table, are subject to flooding, or are droughty may qualify as prime farmland

where these limitations are overcome by drainage measures, flood control, or irrigation. Onsite evaluation is necessary to determine the effectiveness of corrective measures. More information about the criteria for prime farmland can be obtained at the local office of the Natural Resources Conservation Service.

A recent trend in land use has been the conversion of prime farmland to urban and industrial uses. The loss of prime farmland to other uses puts pressure on lands that are less productive than prime farmland.

About 26,500 acres, or nearly 2 percent of the survey area, would meet the requirements for prime farmland if an adequate and dependable supply of irrigation water were available.

The map units in the survey area that meet the requirements for prime farmland are listed in the table "Prime Farmland." On the soils included in the table, measures that overcome limitations are needed. The need for these measures is indicated in parentheses after the map unit name. The location of each map unit is shown on the detailed soil maps at the back of this publication. The soil qualities that affect use and management are described in the section "Soil Series and Detailed Soil Map Units." This list does not constitute a recommendation for a particular land use.

Unique Farmland

Unique farmland is land other than prime farmland that is used for the production of specific high-value food and fiber crops. It has the special combination of soil qualities, location, growing season, and moisture supply needed for the economic production of sustained high yields of a specific high-quality crop when treated and managed by acceptable farming methods. Examples of such crops are citrus, tree nuts, olives, cranberries, and vegetables.

Unique farmland is used for a specific high-value food or fiber crop; has an adequate supply of available moisture for the specific crop because of stored moisture, precipitation, or irrigation; and has a combination of soil qualities, growing season, temperature, humidity, air drainage, elevation, aspect, and other factors, such as nearness to markets, that favors the production of a specific food or fiber crop.

Lists of unique farmland are developed as needed in cooperation with conservation districts and others.

Additional Farmland of Statewide Importance

Some areas other than areas of prime and unique farmland are of statewide importance in the production of food, feed, fiber, forage, and oilseed crops. The criteria used in defining and delineating these areas are determined by the appropriate State agency or agencies. Generally, additional farmland of statewide

importance includes areas that nearly meet the criteria for prime farmland and that economically produce high yields of crops when treated and managed by acceptable farming methods. Some areas can produce as high a yield as areas of prime farmland if conditions are favorable. In some states additional farmland of statewide importance may include tracts of land that have been designated for agriculture by State law.

A list of this land has not been maintained for Montana and thus is not presently available.

Additional Farmland of Local Importance

This land consists of areas that are of local importance in the production of food, feed, fiber, forage, and oilseed crops and are not identified as having national or statewide importance. Where appropriate, this land is identified by local agencies. It may include tracts of land that have been designated for agriculture by local ordinance.

Lists of this land are developed as needed in cooperation with conservation districts and others.

Erosion Factors

Soil erodibility (K) and soil-loss tolerance (T) factors are used in an equation that predicts the amount of soil lost through water erosion in areas of cropland. The procedure for predicting soil loss is useful in guiding the selection of soil and water conservation practices.

Soil Erodibility (K) Factor

The soil erodibility factor (K) indicates the susceptibility of a soil to sheet and rill erosion by water. The soil properties that influence erodibility are those that affect the infiltration rate, the movement of water through the soil, and the water storage capacity of the soil and those that allow the soil to resist dispersion, splashing, abrasion, and the transporting forces of rainfall and runoff. The most important soil properties are the content of silt plus very fine sand, the content of sand coarser than very fine sand, the content of organic matter, soil structure, and permeability.

Fragment-Free Soil Erodibility (Kf) Factor

This is one of the factors used in the revised Universal Soil Loss Equation. It shows the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Soil-Loss Tolerance (T) Factor

The soil-loss tolerance factor (T) is an estimate of the maximum annual rate of soil erosion that can occur over a sustained period without affecting crop productivity. The rate is expressed in tons of soil loss

per acre per year. Ratings of 1 to 5 are used, depending on soil properties and prior erosion. The criteria used in assigning a T factor to a soil include maintenance of an adequate rooting depth for crop production, potential reduction of crop yields, maintenance of water-control structures affected by sedimentation, prevention of gullyng, and the value of nutrients lost through erosion.

Wind Erodibility Groups

Wind erodibility is directly related to the percentage of dry, nonerodible surface soil aggregates larger than 0.84 millimeter in diameter. From this percentage, the wind erodibility index factor (I) is determined. This factor is an expression of the stability of the soil aggregates, or the extent to which they are broken down by tillage and the abrasion caused by windblown soil particles. Soils are assigned to wind erodibility groups (WEG) having similar percentages of dry soil aggregates larger than 0.84 millimeter.

Additional information about wind erodibility groups and K, Kf, T, and I factors can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service.

Windbreaks and Environmental Plantings

Windbreaks protect livestock, buildings, and yards from wind and snow. They also protect fruit trees and gardens, and they furnish habitat for wildlife. Several rows of low- and high-growing broadleaf and coniferous trees and shrubs provide the most protection.

Field windbreaks are narrow plantings made at right angles to the prevailing wind and at specific intervals across the field. The interval depends on the erodibility of the soil. Field windbreaks protect cropland and crops from wind, help to keep snow on the fields, and provide food and cover for wildlife.

Environmental plantings help to beautify and screen houses and other buildings and to abate noise. The plants, mostly evergreen shrubs and trees, are closely spaced. To ensure plant survival, a healthy planting stock of suitable species should be planted properly on a well prepared site and maintained in good condition.

Windbreaks are often planted on land that did not originally support trees. Knowledge of how trees perform on such land can be gained only by observing and recording the performance of trees that have been planted and have survived. Many popular windbreak species are not indigenous to the areas in which they are planted.

Each tree or shrub species has certain climatic and physiographic limits. Within these parameters, a tree or shrub may grow well or grow poorly, depending on the

characteristics of the soil. Each tree or shrub has definable potential heights in a given physiographic area and under a given climate. Accurate definitions of potential heights are necessary when a windbreak is planned and designed.

Information on planning windbreaks and screens and planting and caring for trees and shrubs can be obtained from local offices of the Natural Resources Conservation Service or the Cooperative Extension Service or from a nursery.

MAIN CROPLAND LIMITATIONS AND HAZARDS

(See text for a description of the limitations and hazards listed in this table)

Map symbol and soil name	Cropland limitations or hazards
1: Alberton-----	Excessive permeability Lack of timely precipitation Potential for ground-water pollution
2: Ambrant-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope
3: Ambrant-----	Areas of rock outcrop Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope
Rochester-----	Areas of rock outcrop Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
Rock outcrop-----	Nonsoil material
4: Aquic Haploxerolls-----	Onsite investigation required
5: Aquic Udorthents-----	Onsite investigation required
6: Aquolls-----	Onsite investigation required
Aquepts-----	Onsite investigation required
7: Argixerolls-----	Onsite investigation required
Haploxerolls-----	Onsite investigation required
8: Argixerolls-----	Onsite investigation required
Haploxerolls-----	Onsite investigation required
9: Argixerolls-----	Onsite investigation required

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
10: Argixerolls-----	Onsite investigation required
Haploxerolls-----	Onsite investigation required
11: Auggie-----	Erosion by water Short frost-free period Slope
12: Bata-----	Short frost-free period
13: Bata-----	Erosion by water Short frost-free period Slope
Waldbillig-----	Erosion by water Short frost-free period Slope
14: Beeskove-----	Erosion by water Limited available water capacity Short frost-free period Slope
15: Beeskove-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Rock outcrop-----	Nonsoil material
16: Bigarm-----	None
17: Bigarm-----	Erosion by water Slope
18: Bigarm-----	Erosion by water Slope
19: Bigarm-----	Erosion by water Slope
20: Bigarm-----	Areas of rock outcrop Erosion by water Slope
Rock outcrop-----	Nonsoil material

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
21: Biglake-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
22: Biglake-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Slope Soil blowing
23: Bignell-----	Erosion by water Short frost-free period Slope
24: Bignell-----	Erosion by water Short frost-free period Slope
Winkler-----	Limited available water capacity Short frost-free period Slope Surface rock fragments
25: Bignell-----	Erosion by water Short frost-free period Slope
Winkler-----	Limited available water capacity Short frost-free period Slope Surface rock fragments
26: Borochemists-----	Onsite investigation required
27: Chickaman-----	Erosion by water Short frost-free period Slope
28: Chickaman-----	Erosion by water Short frost-free period Slope
29: Coerock-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Short frost-free period

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
29: Rock outcrop-----	Nonsoil material
30: Coerock-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing Surface rock fragments
Rock outcrop-----	Nonsoil material
31: Courville-----	Erosion by water Short frost-free period Slope
32: Courville-----	Erosion by water Short frost-free period Slope
Mitten-----	Erosion by water Limited available water capacity Short frost-free period Slope
33: Crow-----	Erosion by water Short frost-free period Slope
34: Desmet-----	Lack of timely precipitation
35: Elkner-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope
Ovando-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
36: Evaro-----	Erosion by water Limited available water capacity Short frost-free period Slope

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
37: Evaro-----	Erosion by water Limited available water capacity Short frost-free period Slope
38: Felan-----	Erosion by water Short frost-free period Slope
39: Felan-----	Erosion by water Short frost-free period Slope
40: Felan-----	Erosion by water Short frost-free period Slope
41: Felan-----	Erosion by water Short frost-free period Slope
42: Glaciercreek-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period
43: Glaciercreek variant-----	Erosion by water Short frost-free period Slope
Glaciercreek-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope
44: Grantsdale-----	Excessive permeability Lack of timely precipitation Potential for ground-water pollution
45: Grassvalley-----	Lack of timely precipitation Poor tilth Restricted permeability
46: Grassvalley-----	Erosion by water Lack of timely precipitation Poor tilth Restricted permeability

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
47: Grassvalley-----	Erosion by water Lack of timely precipitation Poor tilth Restricted permeability Slope
48: Grassvalley-----	Erosion by water Lack of timely precipitation Poor tilth Restricted permeability Slope
49: Greenough-----	Erosion by water Short frost-free period Slope
50: Hagstadt-----	Depth to rock Erosion by water Limited available water capacity Short frost-free period Slope
51: Half Moon-----	Erosion by water Short frost-free period
52: Hanaker-----	Erosion by water Short frost-free period
53: Hollandlake-----	Erosion by water Short frost-free period Slope
54: Hollandlake-----	Erosion by water Short frost-free period Slope
Bata-----	Erosion by water Short frost-free period Slope
55: Hollandlake-----	Erosion by water Short frost-free period Slope
Bata-----	Erosion by water Short frost-free period Slope
56: Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
57: Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
58: Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
59: Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
60: Holloway-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Rock outcrop-----	Nonsoil material
61: Jimlake-----	Erosion by water Short frost-free period Slope
62: Jimlake-----	Erosion by water Short frost-free period Slope
63: Lantern-----	Erosion by water Limited available water capacity Short frost-free period Slope
64: Lantern-----	Erosion by water Limited available water capacity Short frost-free period Slope
65: Lantern-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Rock outcrop-----	Nonsoil material

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
66: Lolopeak-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Surface stones
67: Lolopeak-----	Areas of rock outcrop Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Surface stones
Rock outcrop-----	Nonsoil material
68: Lubrecht-----	Depth to rock Erosion by water Short frost-free period Slope
69: Mitten-----	Erosion by water Limited available water capacity Short frost-free period Slope
70: Mitten-----	Erosion by water Limited available water capacity Short frost-free period Slope
Sharrott-----	Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
71: Mitten-----	Erosion by water Limited available water capacity Short frost-free period Slope
Tevis-----	Erosion by water Limited available water capacity Short frost-free period Slope
72: Moiese-----	Excessive permeability Lack of timely precipitation Limited available water capacity Potential for ground-water pollution

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
73: Orthents-----	Onsite investigation required
74: Ovando-----	Areas of rock outcrop Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
Elkner-----	Areas of rock outcrop Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope
Rock outcrop-----	Nonsoil material
75: Perma-----	Limited available water capacity Short frost-free period
76: Perma-----	Erosion by water Limited available water capacity Short frost-free period Slope
77: Perma-----	Erosion by water Limited available water capacity Short frost-free period Slope Surface stones
78: Perma variant-----	Short frost-free period Surface stones
79: Perma variant-----	Erosion by water Short frost-free period Slope Surface stones
Perma-----	Erosion by water Limited available water capacity Short frost-free period Slope Surface stones
80: Petty-----	Erosion by water Limited available water capacity Short frost-free period Slope

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
81: Petty-----	Erosion by water Limited available water capacity Short frost-free period Slope
82: Petty-----	Erosion by water Limited available water capacity Short frost-free period Slope Surface stones
83: Petty-----	Erosion by water Limited available water capacity Short frost-free period Slope
84: Petty-----	Erosion by water Limited available water capacity Short frost-free period Slope Surface stones
85: Petty-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope Surface stones
Rock outcrop-----	Nonsoil material
86: Phillcher-----	Erosion by water Limited available water capacity Short frost-free period Slope
87: Phillcher-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Rock outcrop-----	Nonsoil material
88: Pits-----	Nonsoil material
89: Repp-----	Erosion by water Limited available water capacity Short frost-free period Slope Surface rock fragments

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
90:	
Repp-----	Lime content Limited available water capacity Short frost-free period Slope Surface rock fragments
91:	
Repp-----	Erosion by water Lime content Limited available water capacity Short frost-free period Slope Surface rock fragments
92:	
Repp-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope Surface rock fragments
Rock outcrop-----	Nonsoil material
93:	
Riverwash-----	Nonsoil material
94:	
Rock outcrop-----	Nonsoil material
Rubble land-----	Nonsoil material
95:	
Rumblecreek-----	Erosion by water Short frost-free period Slope
96:	
Selway-----	Erosion by water Limited available water capacity Short frost-free period Slope
97:	
Selway-----	Erosion by water Limited available water capacity Short frost-free period Slope
98:	
Selway-----	Erosion by water Limited available water capacity Short frost-free period Slope Surface stones

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
99: Sharrott-----	Areas of rock outcrop Depth to rock Erosion by water Limited available water capacity Potential for ground-water pollution Short frost-free period Slope Soil blowing
Rock outcrop-----	Nonsoil material
100: Shooflin-----	Erosion by water Restricted permeability Short frost-free period Slope
101: Tally variant-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period
102: Tevis-----	Erosion by water Limited available water capacity Short frost-free period Slope
103: Tevis-----	Erosion by water Limited available water capacity Short frost-free period Slope
Mitten-----	Erosion by water Limited available water capacity Short frost-free period Slope
104: Tevis-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Mitten-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Rock outcrop-----	Nonsoil material
105: Totelake-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
106: Totelake-----	Erosion by water Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Slope
107: Totelake-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Surface stones
108: Trapps-----	Erosion by water Limited available water capacity Short frost-free period Slope
109: Trapps-----	Erosion by water Limited available water capacity Short frost-free period Slope
110: Turrah-----	Poor tilth Potential for ground-water pollution Short frost-free period Water table
111: Udifluvents-----	Onsite investigation required
112: Udorthents-----	Onsite investigation required
Glaciercreek-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period
113: Upsata-----	Excessive permeability Limited available water capacity Potential for ground-water pollution Short frost-free period Soil blowing
114: Urban land-----	Nonsoil material
115: Waldbillig-----	Erosion by water Short frost-free period Slope
116: Waldbillig-----	Erosion by water Short frost-free period Slope

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
117: Waldbillig-----	Erosion by water Short frost-free period Slope
Auggie-----	Erosion by water Short frost-free period Slope
118: Waldbillig-----	Erosion by water Short frost-free period Slope
Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
119: Waldbillig-----	Erosion by water Short frost-free period Slope
Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
120: Waldbillig-----	Erosion by water Short frost-free period Slope
Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
121: Waldbillig-----	Erosion by water Short frost-free period Slope
Holloway-----	Erosion by water Limited available water capacity Short frost-free period Slope
122: Whitore-----	Erosion by water Lime content Limited available water capacity Short frost-free period Slope
123: Whitore-----	Erosion by water Lime content Limited available water capacity Short frost-free period Slope

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
124: Wildgen-----	Erosion by water Short frost-free period Slope
125: Wildgen-----	Erosion by water Short frost-free period Slope
Winkler-----	Erosion by water Limited available water capacity Short frost-free period Slope
126: Wildgen-----	Erosion by water Short frost-free period Slope
Winkler-----	Erosion by water Limited available water capacity Short frost-free period Slope
127: Wildgen-----	Erosion by water Short frost-free period Slope
Winkler-----	Limited available water capacity Short frost-free period Slope Surface rock fragments
128: Wildgen-----	Erosion by water Short frost-free period Slope
Winkler-----	Limited available water capacity Short frost-free period Slope Surface rock fragments
129: Winfall-----	Erosion by water Short frost-free period Slope
130: Winkler-----	Limited available water capacity Short frost-free period Slope Surface rock fragments
131: Winkler-----	Limited available water capacity Short frost-free period Slope Surface rock fragments

MAIN CROPLAND LIMITATIONS AND HAZARDS--Continued

Map symbol and soil name	Cropland limitations or hazards
132: Winkler-----	Erosion by water Limited available water capacity Short frost-free period Slope
133: Winkler-----	Erosion by water Limited available water capacity Short frost-free period Slope
134: Winkler-----	Areas of rubble land Limited available water capacity Short frost-free period Slope Surface rock fragments
Rubble land-----	Nonsoil material
135: Winkler-----	Areas of rock outcrop Erosion by water Limited available water capacity Short frost-free period Slope
Rock outcrop-----	Nonsoil material
136: Xerofluvents-----	Onsite investigation required
137: Yourame-----	Erosion by water Short frost-free period Slope
W: Water-----	Nonsoil material

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE

(Yields in the N columns are for nonirrigated soils; those in the I columns are for irrigated soils. Yields are those that can be expected under a high level of management. Absence of a yield indicates that the soil is not suited to the crop or the crop generally is not grown on the soil. The listing of a crop yield does not endorse the use of a soil for that crop)

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
1: Alberton-----	3C	3C	37.0	---	53.0	60.0	---	5.5	1.0	---	---	---	---	9.0
2: Ambrant-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
3: Ambrant-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rochester-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
4: Aquic Haploxerolls.														
5: Aquic Udorthents.														
6: Aquolls. Aquepts.														
7: Argixerolls. Haploxerolls.														
8: Argixerolls. Haploxerolls.														
9: Argixerolls. Haploxerolls.														
10: Argixerolls. Haploxerolls.														
11: Auggie-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
12: Bata-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
13: Bata-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Waldbillig----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
14: Beeskove-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
15: Beeskove-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
16: Bigarm-----	4E	3E	29.0	---	45.0	---	---	---	1.5	4.0	---	---	1.8	7.0
17: Bigarm-----	4E	4E	27.0	---	41.0	---	---	---	1.2	3.5	---	---	1.5	6.0
18: Bigarm-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
19: Bigarm-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
20: Bigarm-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
21: Biglake-----	6E	---	16.0	---	27.0	---	---	---	---	---	---	---	---	---
22: Biglake-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
23: Bignell-----	6E	---	5.0	---	11.0	---	---	---	---	---	---	---	---	---
24: Bignell-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
25: Bignell-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
26: Borochemists.														
27: Chickaman-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
28: Chickaman-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
29: Coerock----- Rock outcrop.	7S	---	---	---	---	---	---	---	---	---	---	---	---	---
30: Coerock----- Rock outcrop.	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
31: Courville-----	6E	---	17.0	---	27.0	---	---	---	---	---	---	---	---	---
32: Courville----- Mitten-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
33: Crow-----	6E	---	28.0	---	42.0	---	---	---	---	---	---	---	---	---
34: Desmet-----	3C	2C	35.0	---	45.0	55.0	---	---	1.0	---	1.0	5.5	1.0	9.0
35: Elkner----- Ovando-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
36: Evaro-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
37: Evaro-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
38: Felan-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
39: Felan-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
40: Felan-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
41: Felan-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
42: Glaciercreek--	6S	---	17.0	---	27.0	---	---	---	---	---	---	---	---	---
43: Glaciercreek variant----- Glaciercreek--	6E	---	28.0	---	42.0	---	---	---	---	---	---	---	---	---
44: Grantsdale----	3C	2C	37.0	---	45.0	55.0	---	---	1.0	---	1.0	5.5	1.0	9.0

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
45: Grassvalley---	4S	4S	35.0	---	40.0	65.0	---	---	---	---	1.5	5.5	---	---
46: Grassvalley---	4E	4E	35.0	---	40.0	60.0	---	---	---	---	1.5	4.5	---	---
47: Grassvalley---	4E	---	35.0	---	52.0	---	---	---	---	---	1.3	---	---	---
48: Grassvalley---	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
49: Greenough-----	6E	---	37.0	---	52.0	---	---	---	---	---	---	---	---	---
50: Hagstadt-----	6E	---	9.0	---	17.0	---	---	---	---	---	---	---	---	---
51: Half Moon-----	6E	---	38.0	---	53.0	---	---	---	---	---	---	---	---	---
52: Hanaker-----	6E	6E	40.0	---	50.0	70.0	3.5	5.0	---	---	---	---	---	---
53: Hollandlake---	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
54: Hollandlake---	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Bata-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
55: Hollandlake---	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Bata-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
56: Holloway-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
57: Holloway-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
58: Holloway-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
59: Holloway-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
60: Holloway-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
61: Jimlake-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
62: Jimlake-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
63: Lantern-----	6E	---	16.0	---	25.0	---	---	---	---	---	---	---	---	---
64: Lantern-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
65: Lantern-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
66: Lolopeak-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
67: Lolopeak-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
68: Lubrecht-----	6E	---	27.0	---	40.0	---	---	---	---	---	---	---	---	---
69: Mitten-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
70: Mitten-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Sharrott-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
71: Mitten-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Tevis-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
72: Moiese-----	6S	4S	20.0	---	31.0	---	---	---	---	---	4.5	0.5	6.0	
73: Orthents.														
74: Ovando-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Elkner-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
75: Perma-----	6S	---	27.0	---	41.0	---	---	---	---	---	---	---	---	---
76: Perma-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
77: Perma-----	6S	---	23.0	---	36.0	---	---	---	---	---	---	---	---	---
78: Perma variant-	6S	---	34.0	---	50.0	---	---	---	---	---	---	---	---	---

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
79: Perma variant-	6S	---	17.0	---	29.0	---	---	---	---	---	---	---	---	---
Perma-----	6S	---	10.0	---	19.0	---	---	---	---	---	---	---	---	---
80: Petty-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
81: Petty-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
82: Petty-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
83: Petty-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
84: Petty-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
85: Petty-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
86: Phillcher----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
87: Phillcher----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
88: Pits.														
89: Repp-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
90: Repp-----	6E	---	6.0	---	13.0	---	---	---	---	---	---	---	---	---
91: Repp-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
92: Repp-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
93: Riverwash.														
94: Rock outcrop.														
Rubble land.														

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
112: Udorthents.														
Glaciercreek--	6S	---	17.0	---	27.0	---	---	---	---	---	---	---	---	---
113: Upsata-----	6S	---	---	---	---	---	---	---	---	---	---	---	---	---
114: Urban land.														
115: Waldbillig----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
116: Waldbillig----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
117: Waldbillig----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Auggie-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
118: Waldbillig----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Holloway-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
119: Waldbillig----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Holloway-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
120: Waldbillig----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Holloway-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
121: Waldbillig----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Holloway-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
122: Whitore-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
123: Whitore-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
124: Wildgen-----	6E	---	11.0	---	20.0	---	---	---	---	---	---	---	---	---
125: Wildgen-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Winkler-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
126: Wildgen-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---

* See footnote at end of table.

LAND CAPABILITY AND YIELDS PER ACRE OF CROPS AND PASTURE--Continued

Map symbol and soil name	Land capability		Winter wheat		Barley		Alfalfa hay		Grass hay		Grass-legume hay		Pasture	
	N	I	N	I	N	I	N	I	N	I	N	I	N	I
			Bu		Bu		Tons		Tons		Tons		AUM*	
126: Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
127: Wildgen-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
Winkler-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
128: Wildgen-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
129: Winfall-----	6E	---	17.0	---	27.0	---	---	---	---	---	---	---	---	---
130: Winkler-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
131: Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
132: Winkler-----	6E	---	---	---	---	---	---	---	---	---	---	---	---	---
133: Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
134: Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rubble land.														
135: Winkler-----	7E	---	---	---	---	---	---	---	---	---	---	---	---	---
Rock outcrop.														
136: Xerofluvents.														
137: Yourame-----	6E	---	10.0	---	19.0	---	---	---	---	---	---	---	---	---
W: Water.														

* Animal unit month: The amount of forage or feed required to feed one animal unit (one cow, one horse, one mule, five sheep, or five goats) for 30 days.

PRIME FARMLAND

(Only the soils considered primed farmland are listed. Urban or built-up areas of the soils listed are not considered prime farmland. If a soil is prime farmland only under certain conditions, the conditions are specified in parentheses after the soil name)

Map symbol	Soil name
1	Alberton very fine sandy loam, 0 to 2 percent slopes (where irrigated)
16	Bigarm gravelly loam, 0 to 4 percent slopes (where irrigated)
34	Desmet loam, 0 to 2 percent slopes (where irrigated)
44	Grantsdale loam, 0 to 2 percent slopes (where irrigated)

Range

Approximately 6 percent of the survey area supports rangeland vegetation, and about 24 percent supports woodland understory vegetation that is suitable for livestock grazing. Nearly 75 percent of the farm income in the survey area is derived from the sale of livestock, principally cattle. Cow-calf operations are the major type of livestock enterprise, but some are cow-calf yearling operations. A few units have dairy operations or include sheep or hog production. The average size of the ranches is about 735 acres.

Most grazing is on native range. The range is used primarily for grazing by domestic livestock; however, it also is used as wildlife habitat, recreational areas, or watershed and has esthetic value.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on range are closely related to the kind of soil. Effective management is based on the relationship between the soils and vegetation and water.

Range is defined as land on which the native vegetation (the climax, or natural potential, plant community) is predominantly grasses, grasslike plants, forbs, and shrubs suitable for grazing and browsing. Range includes natural grasslands, savannas, many wetlands, some deserts, tundra, and certain shrub and forb communities. Range receives no regular or frequent cultural treatment. The composition and production of the plant community are determined by soil, climate, topography, overstory canopy, and grazing management.

Grazed forest land is defined as land on which the understory includes, as an integral part of the forest plant community, plants that can be grazed without significant impairment of other forest values.

Native pasture is defined as land on which the potential (climax) vegetation is forest but which is used and managed primarily for the production of native forage plants. Native pasture includes cutover forest land and forest land that has been cleared and is managed for native or naturalized forage plants.

The table "Rangeland Productivity and Characteristic Plant Communities" at the end of this section shows, for each listed soil, the range site; the total annual

production of vegetation in favorable, normal, and unfavorable years; the characteristic vegetation; and the average percentage of each species. Only those soils that are used as rangeland or are suited to use as rangeland are listed. Explanation of the column headings in this table follows.

Range site is a distinctive kind of rangeland that produces a characteristic natural plant community that differs from natural plant communities on other range sites in kind, amount, and proportion of range plants.

Many different range sites are in the survey area. Over time, the combination of plants best suited to a particular soil and climate has become established. If the soil is not excessively disturbed, this group of plants is the natural plant community for the site. Natural plant communities are not static but vary slightly from year to year and place to place.

The relationship between soils and vegetation was ascertained during this survey; thus, range sites generally can be determined directly from the soil map. Soil properties that affect moisture supply and plant nutrients have the greatest influence on the productivity of range plants. Soil reaction, salt content, and a seasonal high water table are also important. The "Field Office Technical Guide," which is available at local offices of the Natural Resources Conservation Service, can provide specific information about range sites.

Total production is the amount of vegetation that can be expected to grow annually on well managed range that is supporting the potential natural plant community. It includes all vegetation, whether or not it is palatable to grazing animals. It includes the current year's growth of leaves, twigs, and fruit of woody plants. It does not include the increase in stem diameter of trees and shrubs. It is expressed in pounds per acre of air-dry vegetation for favorable, normal, and unfavorable years. In a favorable year, the amount and distribution of precipitation and the temperatures make growing conditions substantially better than average. In a normal year, growing conditions are about average. In an unfavorable year, growing conditions are well below average, generally because of low available soil moisture.

Dry weight is the total annual yield per acre of air-dry vegetation. Yields are adjusted to a common percent of air-dry moisture content. The relationship of green weight to air-dry weight varies according to such factors as exposure, amount of shade, recent rains, and unseasonable dry periods.

Characteristic vegetation consists of the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil. The plants are listed by common name. Under *composition*, the expected percentage of the total annual production is given for each species making up the characteristic vegetation. The amount that can be used as forage depends on the kinds of grazing animals and on the grazing season.

Range Condition

Range condition is based on a comparison of the present plant community with the potential natural plant community on a particular range site. The more closely the existing community resembles the natural community, the better the range condition.

Abnormal disturbances that change the natural plant community include repeated overuse by livestock, excessive burning, erosion, and plowing. Grazing animals select the most palatable plants. These plants will eventually die if they are continually grazed. A very severe disturbance can completely destroy the natural community. Under these conditions, the less desirable plants, such as annuals and weedlike plants, can invade. If the plant community has not deteriorated significantly, it eventually can return to dominantly natural plants if proper grazing management is applied.

Four range condition classes are used to show the degree of deterioration of the natural plant community.

An area of rangeland is in *excellent condition* if more than 75 percent of the present plant community is the same as the natural plant community. It is in *good condition* if the natural plants make up 51 to 75 percent of the present plant community, in *fair condition* if those plants make up 26 to 50 percent, and in *poor condition* if they make up less than 25 percent.

Knowledge of the range site and condition is necessary as a basis for planning and applying the management needed to maintain or improve the desired plant community for selected uses. Such information is needed to determine management objectives, proper grazing systems and stocking rates, suitable wildlife management practices, the potential for recreational uses, and the condition of watersheds.

Rangeland Management

Rangeland management requires a knowledge of the kinds of soil and of the potential natural plant community. It also requires an evaluation of the present range condition.

The objective in range management is to control grazing so that the plants growing on a site are about the same in kind and amount as the potential natural plant community for that site. Such management generally results in the optimum production of vegetation, reduction of less desirable species, conservation of water, and control of erosion. Sometimes, however, a range condition somewhat below the potential meets grazing needs, provides wildlife habitat, and protects soil and water resources.

Grazing management is the most important part of any rangeland management program. Proper grazing use, timely deferment of grazing, and planned rotation grazing systems are key practices. The experience of ranchers and research have shown that if no more than one-half of the current year's growth is grazed, a plant community in good or excellent condition can be maintained and one in fair condition can be improved. The remaining one-half enables plants to make and store food for regrowth and root development. As a result, the desirable plants remain healthy and are not replaced by less desirable grasses and weeds. Also, the plant cover protects the soil from water erosion and soil blowing, improves tilth, increases the rate of water infiltration, and helps to control runoff.

Certain practices commonly are needed to obtain a uniform distribution of grazing. These include developing livestock watering facilities, fencing, properly locating salt and mineral supplements, constructing livestock trails in steeply sloping areas, and riding or herding.

Various kinds of grazing systems can be used in range management. No single grazing system is best under all conditions. The grazing system should increase the quantity and improve the quality of the range vegetation, should meet the needs of the individual operator, and should be designed according to the topography, the type of grazing animals, and the resource management objectives.

Special improvement practices are needed in areas where management practices do not achieve the desired results or where recovery is too slow under forage management alone. These include range seeding, brush management, water spreading, prescribed burning, and mechanical treatment.

Some soils are suited to mechanical treatment for range improvement. On other soils, however, only proper grazing management can improve the range.

Many soils in capability classes 1 through 4 are suited to such practices as seeding, mechanical brush and weed control, and water spreading. Those in capability classes 7 and 8, however, are not suitable. Many soils in capability classes 1 through 4 are suited to tillage for seedbed preparation before native or introduced forage plant species are seeded. Soils in capability class 6 may be suited to limited surface disturbance, such as scarification, for the purpose of seeding and as a means of increasing the rate of water infiltration for seed germination.

Where feasible, mechanical renovation practices, such as shallow chiseling, can help to speed recovery of the desired plants. These practices open up the surface and thus allow the absorption of more moisture and production of the more desirable plants. Mechanical renovation, brush management, and timely deferment of grazing allow recovery of the desired plants.

Seeding may be needed in areas where the less desirable plants are dominant. A clean, firm seedbed should be prepared, suitable species should be selected for seeding, and rest periods should be long enough to allow the new plants to become established.

Special improvement practices can be effective only if the management system helps to keep the desirable plants healthy.

Forest Land Understory Vegetation

Understory vegetation consists of grasses, forbs, shrubs, and other plants. If well managed, some forest

land can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

The quantity and quality of understory vegetation vary with the kind of soil, the age and kind of trees in the canopy, the density of the canopy, and the depth and condition of the litter. The density of the canopy determines the amount of light that understory plants receive.

The table "Understory Vegetation and Habitat Types" at the end of this section shows, for each soil suitable for forest land, the potential for producing understory vegetation. The *total production* of understory vegetation includes the herbaceous plants and the leaves, twigs, and fruit of woody plants up to a height of 4.5 feet. It is expressed in pounds per acre of air-dry vegetation in favorable, normal, and unfavorable years. In a favorable year, soil moisture is above average during the optimal part of the growing season; in a normal year, soil moisture is average; and in an unfavorable year, it is below average.

The table also lists the common names of the *characteristic vegetation* on each soil and the *composition*, by percentage of air-dry weight, of each kind of plant. The table shows the kind and percentage of understory plants expected under a canopy density that is most nearly typical of forest land in which the production of wood crops is highest. The *representative habitat type or phase* displayed in this table is documented in the "Forest Habitat Types of Montana" habitat types system (12).

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES

(Only the soils that support rangeland vegetation suitable for grazing are listed. Ppt means precipitation)

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
		Lb/acre		Pct	
17: Bigarm-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	2,000	Bluebunch wheatgrass-----	45
		Normal	1,500	Rough fescue-----	25
		Unfavorable	1,100	Idaho fescue-----	5
				Arrowleaf balsamroot-----	5
				Lupine-----	5
				Columbia needlegrass-----	5
				Prairie junegrass-----	3
				Sandberg bluegrass-----	2
18: Bigarm-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,700	Bluebunch wheatgrass-----	60
		Normal	1,300	Rough fescue-----	10
		Unfavorable	900	Idaho fescue-----	5
				Arrowleaf balsamroot-----	5
				Prairie junegrass-----	3
				Other shrubs-----	3
				Lupine-----	3
				Sandberg bluegrass-----	2
19: Bigarm-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,700	Bluebunch wheatgrass-----	60
		Normal	1,300	Rough fescue-----	10
		Unfavorable	900	Idaho fescue-----	5
				Arrowleaf balsamroot-----	5
				Prairie junegrass-----	3
				Other shrubs-----	3
				Lupine-----	3
				Sandberg bluegrass-----	2
20: Bigarm-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,700	Bluebunch wheatgrass-----	60
		Normal	1,300	Rough fescue-----	10
		Unfavorable	900	Idaho fescue-----	5
				Arrowleaf balsamroot-----	5
				Prairie junegrass-----	3
				Other shrubs-----	3
				Lupine-----	3
				Sandberg bluegrass-----	2
Rock outcrop.					
21: Biglake-----	Shallow to gravel, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	2,000	Bluebunch wheatgrass-----	50
		Normal	1,600	Idaho fescue-----	5
		Unfavorable	1,300	Rough fescue-----	5
				Sandberg bluegrass-----	5
				Prairie junegrass-----	5
				Lupine-----	5
22: Biglake-----	Shallow to gravel, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	2,000	Bluebunch wheatgrass-----	50
		Normal	1,600	Idaho fescue-----	5
		Unfavorable	1,300	Rough fescue-----	5
				Sandberg bluegrass-----	5
				Prairie junegrass-----	5
				Lupine-----	5

RANGELAND PRODUCTIVITY AND CHARACTERISTIC PLANT COMMUNITIES--Continued

Map symbol and soil name	Range site	Total production		Characteristic vegetation	Compo- sition
		Kind of year	Dry weight		
			Lb/acre		Pct
47: Grassvalley----	Silty, 10- to 14-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,200	Bluebunch wheatgrass-----	90
		Normal	1,000	Other perennial forbs-----	5
		Unfavorable	700	Prairie junegrass-----	2
				Sandberg bluegrass-----	1
48: Grassvalley----	Silty, 10- to 14-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,200	Bluebunch wheatgrass-----	90
		Normal	1,000	Other perennial forbs-----	5
		Unfavorable	700	Prairie junegrass-----	2
				Sandberg bluegrass-----	1
75: Perma-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,800	Rough fescue-----	50
		Normal	1,500	Bluebunch wheatgrass-----	20
		Unfavorable	1,100	Other perennial grasses-----	10
				Other perennial forbs-----	10
				Idaho fescue-----	5
				Other shrubs-----	3
76: Perma-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,800	Rough fescue-----	50
		Normal	1,500	Bluebunch wheatgrass-----	20
		Unfavorable	1,100	Other perennial grasses-----	10
				Other perennial forbs-----	10
				Idaho fescue-----	5
				Other shrubs-----	3
77: Perma-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,800	Rough fescue-----	50
		Normal	1,500	Bluebunch wheatgrass-----	20
		Unfavorable	1,100	Other perennial grasses-----	10
				Other perennial forbs-----	10
				Idaho fescue-----	5
				Other shrubs-----	3
78: Perma variant---	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	2,000	Rough fescue-----	50
		Normal	1,600	Bluebunch wheatgrass-----	20
		Unfavorable	1,100	Other perennial grasses-----	10
				Other perennial forbs-----	10
				Idaho fescue-----	5
				Other shrubs-----	3
79: Perma variant---	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	2,000	Rough fescue-----	50
		Normal	1,600	Bluebunch wheatgrass-----	20
		Unfavorable	1,100	Other perennial grasses-----	10
				Other perennial forbs-----	10
				Idaho fescue-----	5
				Other shrubs-----	3
Perma-----	Silty, 15- to 19-inch Ppt zone, Northern Rocky Mountain valleys, West	Favorable	1,800	Rough fescue-----	50
		Normal	1,500	Bluebunch wheatgrass-----	20
		Unfavorable	1,100	Other perennial grasses-----	10
				Other perennial forbs-----	10
				Idaho fescue-----	5
				Other shrubs-----	3

UNDERSTORY VEGETATION AND HABITAT TYPES

(Absence of an entry indicates that data were not available)

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase	
	Kind of year	Dry weight				
		Lb/acre		Pct		
2:						
Ambrant-----	Favorable	600	Pinegrass-----	35	Douglas-fir/snowberry	
	Normal	450	Common snowberry-----	15		
	Unfavorable	300	Elk sedge-----	10		
			White spirea-----	10		
			Blue huckleberry-----	5		
			Heartleaf arnica-----	5		
			Kinnikinnick-----	5		
			Saskatoon serviceberry-----	2		
			Common beargrass-----	1		
			Oregongrape-----	1		
			Twinflower-----	1		
3:						
Ambrant-----	Favorable	600	Pinegrass-----	35	Douglas-fir/snowberry	
	Normal	450	Common snowberry-----	15		
	Unfavorable	300	Elk sedge-----	10		
			White spirea-----	10		
			Blue huckleberry-----	5		
			Heartleaf arnica-----	5		
			Kinnikinnick-----	5		
			Saskatoon serviceberry-----	2		
			Common beargrass-----	1		
			Oregongrape-----	1		
			Twinflower-----	1		
Rochester-----	Favorable	600	Pinegrass-----	35	Douglas-fir/snowberry	
	Normal	450	Common snowberry-----	15		
	Unfavorable	300	Elk sedge-----	10		
			White spirea-----	10		
			Heartleaf arnica-----	5		
			Kinnikinnick-----	5		
			Saskatoon serviceberry-----	2		
			Oregongrape-----	1		
			Twinflower-----	1		
Rock outcrop.						
11:						
Auggie-----	Favorable	600	Pinegrass-----	45	Subalpine fir/queencup beadlily	
	Normal	500	Common beargrass-----	15		
	Unfavorable	400	Dwarf huckleberry-----	15		
			Heartleaf arnica-----	5		
			White spirea-----	5		
			Blue huckleberry-----	2		
			Common pipsissewa-----	2		
			Grouse whortleberry-----	2		
			Twinflower-----	2		
			Kinnikinnick-----	1		
			Queencup beadlily-----	1		
12:						
Bata-----	Favorable	300	Rusty menziesia-----	25	Subalpine fir/menziesia	
	Normal	250	Arnica-----	20		
	Unfavorable	200	Grouse whortleberry-----	15		
			Blue huckleberry-----	10		
			Common beargrass-----	10		

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
13: Bata-----	Favorable	800	Pinegrass-----	25	Subalpine fir/queencup beadlily
	Normal	600	Blue huckleberry-----	20	
	Unfavorable	400	Common beargrass-----	20	
			Arnica-----	10	
			Grouse whortleberry-----	10	
			Myrtle pachistima-----	5	
			Rusty menziesia-----	5	
			Twinflower-----	2	
			Queencup beadlily-----	1	
			Scouler willow-----	1	
Waldbillig-----	Favorable	800	Blue huckleberry-----	25	Subalpine fir/queencup beadlily
	Normal	600	Common beargrass-----	25	
	Unfavorable	400	Arnica-----	10	
			Pinegrass-----	10	
			Grouse whortleberry-----	5	
			Rusty menziesia-----	5	
			Dwarf huckleberry-----	2	
			Elk sedge-----	2	
			Myrtle pachistima-----	2	
			Queencup beadlily-----	2	
			Western meadowrue-----	2	
			White spirea-----	2	
			Twinflower-----	1	
14: Beeskove-----	Favorable	500	Pinegrass-----	30	Douglas-fir/blue huckleberry, Douglas-fir/twinflower
	Normal	400	Common beargrass-----	15	
	Unfavorable	300	Blue huckleberry-----	10	
			Heartleaf arnica-----	10	
			Common snowberry-----	5	
			Dwarf huckleberry-----	5	
			Elk sedge-----	5	
			White spirea-----	5	
			Mallow ninebark-----	2	
			Rocky Mountain maple-----	2	
			Twinflower-----	2	
			Kinnikinnick-----	1	
			Myrtle pachistima-----	1	
			Oregongrape-----	1	
15: Beeskove-----	Favorable	500	Pinegrass-----	30	Douglas-fir/blue huckleberry
	Normal	400	Common beargrass-----	15	
	Unfavorable	300	Blue huckleberry-----	10	
			Heartleaf arnica-----	10	
			Common snowberry-----	5	
			Dwarf huckleberry-----	5	
			Elk sedge-----	5	
			White spirea-----	5	
			Mallow ninebark-----	2	
			Rocky Mountain maple-----	2	
			Twinflower-----	2	
			Kinnikinnick-----	1	
			Myrtle pachistima-----	1	
			Oregongrape-----	1	
Rock outcrop.					

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
23: Bignell-----	Favorable	800	Pinegrass-----	30	Douglas-fir/dwarf huckleberry, Douglas-fir/snowberry
	Normal	700	Dwarf huckleberry-----	10	
	Unfavorable	600	Elk sedge-----	10	
			Blue huckleberry-----	5	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Twinflower-----	2	
			Oregongrape-----	1	
24: Bignell-----	Favorable	800	Pinegrass-----	30	Douglas-fir/dwarf huckleberry, Douglas-fir/twinflower
	Normal	700	Dwarf huckleberry-----	10	
	Unfavorable	600	Elk sedge-----	10	
			Blue huckleberry-----	5	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Twinflower-----	2	
			Oregongrape-----	1	
Winkler-----	Favorable	600	Pinegrass-----	25	Douglas-fir/dwarf huckleberry, Douglas-fir/twinflower
	Normal	450	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
25: Bignell-----	Favorable	450	Common snowberry-----	30	Douglas-fir/snowberry, Douglas-fir/pinegrass
	Normal	350	Bluebunch wheatgrass-----	15	
	Unfavorable	250	Pinegrass-----	15	
			Elk sedge-----	10	
			Heartleaf arnica-----	5	
			Idaho fescue-----	5	
			Lupine-----	5	
			White spirea-----	5	
			Arrowleaf balsamroot-----	2	
			Kinnikinnick-----	2	
			Oregongrape-----	2	
			Saskatoon serviceberry-----	2	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
25: Winkler-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/snowberry, Douglas-fir/pinegrass
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
27: Chickaman-----	Favorable	800	Pinegrass-----	25	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Grouse whortleberry-----	20	
	Unfavorable	400	Blue huckleberry-----	15	
			Arnica-----	10	
			Common beargrass-----	10	
			Common pipsissewa-----	2	
			Twinflower-----	2	
			Alder-----	1	
			Sidebells wintergreen-----	1	
28: Chickaman-----	Favorable	800	Pinegrass-----	25	Subalpine fir/beargrass, subalpine fir/menziesia
	Normal	600	Grouse whortleberry-----	20	
	Unfavorable	400	Blue huckleberry-----	15	
			Arnica-----	10	
			Common beargrass-----	10	
			Common pipsissewa-----	2	
			Twinflower-----	2	
			Alder-----	1	
			Sidebells wintergreen-----	1	
29: Coerock-----	Favorable	250	Grouse whortleberry-----	65	Subalpine fir/smooth woodrush
	Normal	200	Arnica-----	5	
	Unfavorable	150	Common beargrass-----	5	
			Elk sedge-----	5	
			Lupine-----	5	
Rock outcrop.					
30: Coerock-----	Favorable	250	Grouse whortleberry-----	65	Subalpine fir/smooth woodrush
	Normal	200	Arnica-----	5	
	Unfavorable	150	Common beargrass-----	5	
			Elk sedge-----	5	
			Lupine-----	5	
Rock outcrop.					

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
31: Courville-----	Favorable	1,200	Pinegrass-----	25	Douglas-fir/dwarf huckleberry,
	Normal	1,000	Common snowberry-----	20	Douglas-fir/snowberry
	Unfavorable	800	Elk sedge-----	10	
			Arnica-----	5	
			Dwarf huckleberry-----	5	
			Mallow ninebark-----	5	
			Saskatoon serviceberry-----	5	
			Western meadowrue-----	5	
			White spirea-----	5	
			Common beargrass-----	2	
			Twinflower-----	1	
32: Courville-----	Favorable	1,200	Pinegrass-----	25	Douglas-fir/twinflower,
	Normal	1,000	Common snowberry-----	20	Douglas-fir/blue huckleberry
	Unfavorable	800	Elk sedge-----	10	
			Arnica-----	5	
			Dwarf huckleberry-----	5	
			Mallow ninebark-----	5	
			Saskatoon serviceberry-----	5	
			Western meadowrue-----	5	
			White spirea-----	5	
			Common beargrass-----	2	
			Twinflower-----	1	
Mitten-----	Favorable	500	Pinegrass-----	30	Douglas-fir/twinflower,
	Normal	400	Blue huckleberry-----	20	Douglas-fir/blue huckleberry
	Unfavorable	300	Common beargrass-----	5	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Mallow ninebark-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Common snowberry-----	1	
			Grouse whortleberry-----	1	
			Oregongrape-----	1	
			Saskatoon serviceberry-----	1	
			Twinflower-----	1	
33: Crow-----	Favorable	700	Pinegrass-----	25	Douglas-fir/dwarf huckleberry,
	Normal	600	Common snowberry-----	10	Douglas-fir/snowberry
	Unfavorable	500	Elk sedge-----	10	
			Heartleaf arnica-----	10	
			Dwarf huckleberry-----	5	
			White spirea-----	5	
			Blue huckleberry-----	2	
			Kinnikinnick-----	2	
			Oregongrape-----	2	
			Saskatoon serviceberry-----	2	
			Twinflower-----	2	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
35: Elkner-----	Favorable	600	Pinegrass-----	25	Subalpine fir/beargrass, subalpine fir/grouse whortleberry
	Normal	500	Blue huckleberry-----	20	
	Unfavorable	400	Elk sedge-----	10	
			Heartleaf arnica-----	10	
			Common beargrass-----	5	
			Grouse whortleberry-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Common pipsissewa-----	1	
			Kinnikinnick-----	1	
			Oregongrape-----	1	
			Twinflower-----	1	
Ovando-----	Favorable	400	Pinegrass-----	25	
	Normal	350	Blue huckleberry-----	20	
	Unfavorable	300	Elk sedge-----	10	
			Heartleaf arnica-----	10	
			Common beargrass-----	5	
			Grouse whortleberry-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Common pipsissewa-----	1	
			Kinnikinnick-----	1	
			Oregongrape-----	1	
			Twinflower-----	1	
36: Evaro-----	Favorable	500	Pinegrass-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	400	Grouse whortleberry-----	20	
	Unfavorable	300	Rusty menziesia-----	10	
			Common beargrass-----	5	
			Elk sedge-----	5	
			Russet buffaloberry-----	5	
			Twinflower-----	5	
			Heartleaf arnica-----	2	
			Kinnikinnick-----	1	
			White spirea-----	1	
37: Evaro-----	Favorable	500	Pinegrass-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	400	Grouse whortleberry-----	20	
	Unfavorable	300	Rusty menziesia-----	10	
			Common beargrass-----	5	
			Elk sedge-----	5	
			Russet buffaloberry-----	5	
			Twinflower-----	5	
			Heartleaf arnica-----	2	
			Kinnikinnick-----	1	
			White spirea-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
38: Felan-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			Twinflower-----	2	
			White spirea-----	2	
			Lupine-----	1	
39: Felan-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			Twinflower-----	2	
			White spirea-----	2	
			Lupine-----	1	
40: Felan-----	Favorable	300	Grouse whortleberry-----	45	Subalpine fir/grouse whortleberry, subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Blue huckleberry-----	5	
			Pinegrass-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Twinflower-----	2	
			Lupine-----	1	
			White spirea-----	1	
41: Felan-----	Favorable	300	Grouse whortleberry-----	45	Subalpine fir/grouse whortleberry, subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Blue huckleberry-----	5	
			Pinegrass-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Twinflower-----	2	
			Lupine-----	1	
			White spirea-----	1	
42: Glaciercreek----	Favorable	300	Pinegrass-----	30	Douglas-fir/dwarf huckleberry
	Normal	200	Elk sedge-----	15	
	Unfavorable	100	Common snowberry-----	10	
			Kinnikinnick-----	10	
			Common juniper-----	5	
			Dwarf huckleberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
43: Glaciercreek variant-----	Favorable	300	Pinegrass-----	30	Douglas-fir/snowberry
	Normal	200	Elk sedge-----	15	
	Unfavorable	100	Common snowberry-----	10	
			Kinnikinnick-----	10	
			Common juniper-----	5	
			Dwarf huckleberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
Glaciercreek-----	Favorable	300	Pinegrass-----	30	Douglas-fir/snowberry
	Normal	200	Elk sedge-----	15	
	Unfavorable	100	Common snowberry-----	10	
			Kinnikinnick-----	10	
			Common juniper-----	5	
			Dwarf huckleberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
49: Greenough-----	Favorable	800	Common snowberry-----	20	Douglas-fir/dwarf huckleberry, Douglas-fir/snowberry
	Normal	650	Pinegrass-----	20	
	Unfavorable	500	Idaho fescue-----	10	
			White spirea-----	10	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Oregongrape-----	5	
			Common juniper-----	2	
			Kinnikinnick-----	2	
			Saskatoon serviceberry-----	2	
			Arrowleaf balsamroot-----	1	
			Lupine-----	1	
50: Hagstadt-----	Favorable	700	Common snowberry-----	25	Douglas-fir/snowberry
	Normal	500	Arrowleaf balsamroot-----	15	
	Unfavorable	400	Idaho fescue-----	15	
			White spirea-----	10	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Pinegrass-----	5	
			Kinnikinnick-----	2	
			Oregongrape-----	2	
			Saskatoon serviceberry-----	2	
			Bluebunch wheatgrass-----	1	
51: Half Moon-----	Favorable	700	Pinegrass-----	30	Douglas-fir/snowberry
	Normal	650	Common snowberry-----	15	
	Unfavorable	400	Elk sedge-----	15	
			Heartleaf arnica-----	10	
			Western meadowrue-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Kinnikinnick-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
53: Hollandlake-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/queencup beadlily
	Normal	600	Common beargrass-----	25	
	Unfavorable	400	Arnica-----	15	
			Myrtle pachistima-----	5	
			Pinegrass-----	5	
			Rusty menziesia-----	5	
			Scouler willow-----	3	
			Queencup beadlily-----	2	
			Twinflower-----	2	
			Western meadowrue-----	1	
54: Hollandlake-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower
	Normal	600	Common beargrass-----	25	
	Unfavorable	400	Arnica-----	15	
			Myrtle pachistima-----	5	
			Pinegrass-----	5	
			Rusty menziesia-----	5	
			Scouler willow-----	3	
			Queencup beadlily-----	2	
			Twinflower-----	2	
			Western meadowrue-----	1	
Bata-----	Favorable	800	Pinegrass-----	25	Subalpine fir/twinflower
	Normal	600	Blue huckleberry-----	20	
	Unfavorable	400	Common beargrass-----	20	
			Arnica-----	10	
			Grouse whortleberry-----	10	
			Myrtle pachistima-----	5	
			Rusty menziesia-----	5	
			Twinflower-----	2	
			Queencup beadlily-----	1	
			Scouler willow-----	1	
55: Hollandlake-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower
	Normal	600	Common beargrass-----	25	
	Unfavorable	400	Arnica-----	15	
			Myrtle pachistima-----	5	
			Pinegrass-----	5	
			Rusty menziesia-----	5	
			Scouler willow-----	3	
			Queencup beadlily-----	2	
			Twinflower-----	2	
			Western meadowrue-----	1	
Bata-----	Favorable	800	Pinegrass-----	25	Subalpine fir/twinflower
	Normal	600	Blue huckleberry-----	20	
	Unfavorable	400	Common beargrass-----	20	
			Arnica-----	10	
			Grouse whortleberry-----	10	
			Myrtle pachistima-----	5	
			Rusty menziesia-----	5	
			Twinflower-----	2	
			Queencup beadlily-----	1	
			Scouler willow-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
56: Holloway-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			White spirea-----	2	
57: Holloway-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			White spirea-----	2	
58: Holloway-----	Favorable	300	Grouse whortleberry-----	40	Subalpine fir/grouse whortleberry, subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Pinegrass-----	10	
			Blue huckleberry-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Common juniper-----	1	
			White spirea-----	1	
59: Holloway-----	Favorable	300	Grouse whortleberry-----	40	Subalpine fir/grouse whortleberry, subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Pinegrass-----	10	
			Blue huckleberry-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Common juniper-----	1	
			White spirea-----	1	
60: Holloway-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			White spirea-----	2	
Rock outcrop.					

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
61: Jimlake-----	Favorable	900	Arnica-----	20	Subalpine fir/queencup beadlily
	Normal	700	Queencup beadlily-----	15	
	Unfavorable	500	Blue huckleberry-----	10	
			Pinegrass-----	10	
			Myrtle pachistima-----	5	
			Thimbleberry-----	5	
			Twinflower-----	5	
			Western meadowrue-----	5	
			White spirea-----	5	
			Common beargrass-----	2	
			Saskatoon serviceberry-----	1	
62: Jimlake-----	Favorable	900	Arnica-----	20	Subalpine fir/queencup beadlily, subalpine fir/menziesia
	Normal	700	Queencup beadlily-----	15	
	Unfavorable	500	Blue huckleberry-----	10	
			Pinegrass-----	10	
			Myrtle pachistima-----	5	
			Thimbleberry-----	5	
			Twinflower-----	5	
			Western meadowrue-----	5	
			White spirea-----	5	
			Common beargrass-----	2	
			Saskatoon serviceberry-----	1	
63: Lantern-----	Favorable	600	Pinegrass-----	30	Douglas-fir/twinflower, Douglas-fir/ninebark
	Normal	500	Common beargrass-----	10	
	Unfavorable	400	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Blue huckleberry-----	5	
			Kinnikinnick-----	5	
			Oregongrape-----	5	
			Twinflower-----	5	
64: Lantern-----	Favorable	600	Pinegrass-----	30	Douglas-fir/twinflower, Douglas-fir/ninebark
	Normal	500	Common beargrass-----	10	
	Unfavorable	400	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Blue huckleberry-----	5	
			Kinnikinnick-----	5	
			Oregongrape-----	5	
			Twinflower-----	5	
65: Lantern-----	Favorable	600	Pinegrass-----	30	Douglas-fir/twinflower, Douglas-fir/ninebark
	Normal	500	Common beargrass-----	10	
	Unfavorable	400	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Blue huckleberry-----	5	
			Kinnikinnick-----	5	
			Oregongrape-----	5	
			Twinflower-----	5	
Rock outcrop.					

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
66: Lolopeak-----	Favorable	250	Grouse whortleberry-----	55	Subalpine fir/grouse whortleberry, whitebark pine- subalpine fir
	Normal	200	Arnica-----	5	
	Unfavorable	150	Common beargrass-----	5	
			Elk sedge-----	5	
			Lupine-----	5	
			Red mountainheath-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
67: Lolopeak-----	Favorable	250	Grouse whortleberry-----	55	Subalpine fir/grouse whortleberry, whitebark pine- subalpine fir
	Normal	200	Arnica-----	5	
	Unfavorable	150	Common beargrass-----	5	
			Elk sedge-----	5	
			Lupine-----	5	
			Red mountainheath-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
Rock outcrop.					
68: Lubrecht-----	Favorable	800	Pinegrass-----	30	Douglas-fir/dwarf huckleberry, Douglas-fir/snowberry
	Normal	650	Common snowberry-----	15	
	Unfavorable	500	Elk sedge-----	10	
			Dwarf huckleberry-----	5	
			Heartleaf arnica-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Mallow ninebark-----	2	
			Oregongrape-----	1	
69: Mitten-----	Favorable	500	Pinegrass-----	30	Douglas-fir/twinflower, Douglas-fir/blue huckleberry
	Normal	400	Blue huckleberry-----	20	
	Unfavorable	300	Common beargrass-----	5	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Mallow ninebark-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Common snowberry-----	1	
			Grouse whortleberry-----	1	
			Oregongrape-----	1	
			Saskatoon serviceberry-----	1	
			Twinflower-----	1	
70: Mitten-----	Favorable	500	Pinegrass-----	30	Douglas-fir/blue huckleberry, Douglas-fir/twinflower
	Normal	400	Blue huckleberry-----	20	
	Unfavorable	300	Common beargrass-----	5	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Mallow ninebark-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Common snowberry-----	1	
			Grouse whortleberry-----	1	
			Oregongrape-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
70: Sharrott-----	Favorable	400	Pinegrass-----	35	---
	Normal	300	Elk sedge-----	20	
	Unfavorable	200	Mallow ninebark-----	20	
			Arrowleaf balsamroot-----	5	
			Common snowberry-----	5	
			Oregongrape-----	5	
71: Mitten-----	Favorable	500	Pinegrass-----	30	Douglas-fir/twinflower,
	Normal	400	Blue huckleberry-----	20	Douglas-fir/blue huckleberry
	Unfavorable	300	Common beargrass-----	5	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Mallow ninebark-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Common snowberry-----	1	
			Grouse whortleberry-----	1	
			Oregongrape-----	1	
			Saskatoon serviceberry-----	1	
			Twinflower-----	1	
Tevis-----	Favorable	600	Pinegrass-----	25	Douglas-fir/twinflower,
	Normal	450	Common beargrass-----	15	Douglas-fir/blue huckleberry
	Unfavorable	350	Common snowberry-----	15	
			Blue huckleberry-----	10	
			Heartleaf arnica-----	10	
			Elk sedge-----	5	
			Grouse whortleberry-----	5	
			White spirea-----	5	
			Western meadowrue-----	3	
			Mountain sweetroot-----	2	
			Twinflower-----	2	
			Kinnikinnick-----	1	
			Saskatoon serviceberry-----	1	
74: Ovando-----	Favorable	400	Pinegrass-----	25	Subalpine fir/menziesia,
	Normal	350	Blue huckleberry-----	20	subalpine fir/twinflower
	Unfavorable	300	Elk sedge-----	10	
			Heartleaf arnica-----	10	
			Common beargrass-----	5	
			Grouse whortleberry-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Common pipsissewa-----	1	
			Kinnikinnick-----	1	
			Oregongrape-----	1	
			Twinflower-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
74: Elkner-----	Favorable	600	Pinegrass-----	25	Subalpine fir/menziesia, subalpine fir/twinflower
	Normal	500	Blue huckleberry-----	20	
	Unfavorable	400	Elk sedge-----	10	
			Heartleaf arnica-----	10	
			Common beargrass-----	5	
			Grouse whortleberry-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Common pipsissewa-----	1	
			Kinnikinnick-----	1	
			Oregongrape-----	1	
			Twinflower-----	1	
Rock outcrop.					
80: Petty-----	Favorable	900	Rusty menziesia-----	40	Subalpine fir/menziesia, subalpine fir/queencup beadlily
	Normal	800	Blue huckleberry-----	20	
	Unfavorable	700	Arnica-----	10	
			Common beargrass-----	10	
			Bunchberry dogwood-----	1	
			Grouse whortleberry-----	1	
			Queencup beadlily-----	1	
			Sweetscented bedstraw-----	1	
			Twinflower-----	1	
			Wintergreen-----	1	
81: Petty-----	Favorable	900	Rusty menziesia-----	40	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	800	Blue huckleberry-----	20	
	Unfavorable	700	Arnica-----	10	
			Common beargrass-----	10	
			Bunchberry dogwood-----	1	
			Grouse whortleberry-----	1	
			Queencup beadlily-----	1	
			Sweetscented bedstraw-----	1	
			Twinflower-----	1	
			Wintergreen-----	1	
82: Petty-----	Favorable	900	Rusty menziesia-----	40	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	800	Blue huckleberry-----	20	
	Unfavorable	700	Arnica-----	10	
			Common beargrass-----	10	
			Bunchberry dogwood-----	1	
			Grouse whortleberry-----	1	
			Queencup beadlily-----	1	
			Sweetscented bedstraw-----	1	
			Twinflower-----	1	
			Wintergreen-----	1	
83: Petty-----	Favorable	700	Rusty menziesia-----	30	Subalpine fir/menziesia, subalpine fir/queencup beadlily
	Normal	500	Blue huckleberry-----	15	
	Unfavorable	400	Arnica-----	10	
			Common beargrass-----	10	
			Grouse whortleberry-----	10	
			Alder-----	5	
			Smooth woodrush-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
84: Petty-----	Favorable	700	Rusty menziesia-----	30	Subalpine fir/menziesia
	Normal	500	Blue huckleberry-----	15	
	Unfavorable	400	Arnica-----	10	
			Common beargrass-----	10	
			Grouse whortleberry-----	10	
			Alder-----	5	
			Smooth woodrush-----	1	
			Twinflower-----	1	
			Wintergreen-----	1	
85: Petty-----	Favorable	700	Rusty menziesia-----	30	Subalpine fir/menziesia
	Normal	500	Blue huckleberry-----	15	
	Unfavorable	400	Arnica-----	10	
			Common beargrass-----	10	
			Grouse whortleberry-----	10	
			Alder-----	5	
			Smooth woodrush-----	1	
			Twinflower-----	1	
			Wintergreen-----	1	
Rock outcrop.					
86: Phillcher-----	Favorable	250	Grouse whortleberry-----	35	Subalpine fir/smooth woodrush
	Normal	200	Arnica-----	10	
	Unfavorable	150	Sedge-----	10	
			Smooth woodrush-----	10	
			Blue huckleberry-----	5	
			Common beargrass-----	5	
			Lupine-----	5	
			Red mountainheath-----	5	
			Rusty menziesia-----	5	
87: Phillcher-----	Favorable	250	Grouse whortleberry-----	35	Subalpine fir/smooth woodrush
	Normal	200	Arnica-----	10	
	Unfavorable	150	Sedge-----	10	
			Smooth woodrush-----	10	
			Blue huckleberry-----	5	
			Common beargrass-----	5	
			Lupine-----	5	
			Red mountainheath-----	5	
			Rusty menziesia-----	5	
Rock outcrop.					
89: Repp-----	Favorable	600	Bluebunch wheatgrass-----	30	Douglas-fir/snowberry, Douglas-fir/ninebark- pinegrass phase
	Normal	450	Common snowberry-----	15	
	Unfavorable	300	Pinegrass-----	15	
			Arrowleaf balsamroot-----	10	
			Rough fescue-----	10	
			Heartleaf arnica-----	5	
			Idaho fescue-----	5	
			Mallow ninebark-----	2	
			Oregongrape-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
90: Repp-----	Favorable	800	Common snowberry-----	25	Douglas-fir/ninebark-ninebark phase
	Normal	600	Pinegrass-----	20	
	Unfavorable	400	Mallow ninebark-----	15	
			Elk sedge-----	10	
			Heartleaf arnica-----	5	
			Idaho fescue-----	5	
			White spirea-----	5	
			Arrowleaf balsamroot-----	1	
			Bluebunch wheatgrass-----	1	
			Oregongrape-----	1	
			Rough fescue-----	1	
			Saskatoon serviceberry-----	1	
91: Repp-----	Favorable	800	Common snowberry-----	25	Douglas-fir/ninebark-ninebark phase
	Normal	600	Pinegrass-----	20	
	Unfavorable	400	Mallow ninebark-----	15	
			Elk sedge-----	10	
			Heartleaf arnica-----	5	
			Idaho fescue-----	5	
			White spirea-----	5	
			Arrowleaf balsamroot-----	1	
			Bluebunch wheatgrass-----	1	
			Oregongrape-----	1	
			Rough fescue-----	1	
			Saskatoon serviceberry-----	1	
92: Repp-----	Favorable	600	Bluebunch wheatgrass-----	30	Douglas-fir/snowberry
	Normal	450	Common snowberry-----	15	
	Unfavorable	300	Pinegrass-----	15	
			Arrowleaf balsamroot-----	10	
			Rough fescue-----	10	
			Heartleaf arnica-----	5	
			Idaho fescue-----	5	
			Mallow ninebark-----	2	
			Oregongrape-----	1	
Rock outcrop.					
95: Rumblecreek-----	Favorable	700	Pinegrass-----	35	Douglas-fir/dwarf huckleberry, Douglas-fir/snowberry
	Normal	500	Arnica-----	10	
	Unfavorable	300	Common snowberry-----	10	
			Elk sedge-----	10	
			Dwarf huckleberry-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Oregongrape-----	1	
96: Selway-----	Favorable	350	Pinegrass-----	35	Douglas-fir/dwarf huckleberry, Douglas-fir/blue huckleberry-beargrass phase
	Normal	300	Dwarf huckleberry-----	10	
	Unfavorable	250	Elk sedge-----	10	
			Kinnikinnick-----	10	
			White spirea-----	10	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
97: Selway-----	Favorable	350	Pinegrass-----	35	Douglas-fir/dwarf huckleberry,
	Normal	300	Dwarf huckleberry-----	10	Douglas-fir/blue
	Unfavorable	250	Elk sedge-----	10	huckleberry-beargrass phase
			Kinnikinnick-----	10	
			White spirea-----	10	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			Twinflower-----	5	
98: Selway-----	Favorable	350	Pinegrass-----	35	Douglas-fir/dwarf huckleberry,
	Normal	300	Dwarf huckleberry-----	10	Douglas-fir/blue
	Unfavorable	250	Elk sedge-----	10	huckleberry-beargrass phase
			Kinnikinnick-----	10	
			White spirea-----	10	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			Twinflower-----	5	
99: Sharrott-----	Favorable	300	Bluebunch wheatgrass-----	60	Ponderosa pine/bluebunch
	Normal	200	Arrowleaf balsamroot-----	15	wheatgrass
	Unfavorable	100	Idaho fescue-----	15	
Rock outcrop.					
100: Shooflin-----	Favorable	800	Pinegrass-----	30	Douglas-fir/dwarf huckleberry,
	Normal	650	Common snowberry-----	10	Douglas-fir/snowberry
	Unfavorable	500	Elk sedge-----	10	
			Arnica-----	5	
			Dwarf huckleberry-----	5	
			Kinnikinnick-----	5	
			Saskatoon serviceberry-----	5	
			White spirea-----	5	
			Common juniper-----	1	
			Mallow ninebark-----	1	
			Oregongrape-----	1	
			Twinflower-----	1	
102: Tevis-----	Favorable	600	Pinegrass-----	25	Douglas-fir/blue huckleberry
	Normal	450	Common beargrass-----	15	
	Unfavorable	350	Common snowberry-----	15	
			Blue huckleberry-----	10	
			Heartleaf arnica-----	10	
			Elk sedge-----	5	
			Grouse whortleberry-----	5	
			White spirea-----	5	
			Western meadowrue-----	3	
			Mountain sweetroot-----	2	
			Twinflower-----	2	
			Kinnikinnick-----	1	
			Saskatoon serviceberry-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
103: Tevis-----	Favorable	600	Pinegrass-----	25	Douglas-fir/blue huckleberry-beargrass phase
	Normal	450	Common beargrass-----	15	
	Unfavorable	350	Common snowberry-----	15	
			Blue huckleberry-----	10	
			Heartleaf arnica-----	10	
			Elk sedge-----	5	
			Grouse whortleberry-----	5	
			White spirea-----	5	
			Western meadowrue-----	3	
			Mountain sweetroot-----	2	
			Twinflower-----	2	
			Kinnikinnick-----	1	
			Saskatoon serviceberry-----	1	
Mitten-----	Favorable	500	Pinegrass-----	30	Douglas-fir/blue huckleberry-beargrass phase
	Normal	400	Blue huckleberry-----	20	
	Unfavorable	300	Common beargrass-----	5	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Mallow ninebark-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Common snowberry-----	1	
			Grouse whortleberry-----	1	
			Oregongrape-----	1	
			Saskatoon serviceberry-----	1	
			Twinflower-----	1	
104: Tevis-----	Favorable	600	Pinegrass-----	25	Douglas-fir/twinflower, Douglas-fir/blue huckleberry
	Normal	450	Common beargrass-----	15	
	Unfavorable	350	Common snowberry-----	15	
			Blue huckleberry-----	10	
			Heartleaf arnica-----	10	
			Elk sedge-----	5	
			Grouse whortleberry-----	5	
			White spirea-----	5	
			Western meadowrue-----	3	
			Mountain sweetroot-----	2	
			Twinflower-----	2	
			Kinnikinnick-----	1	
			Saskatoon serviceberry-----	1	
Mitten-----	Favorable	500	Pinegrass-----	30	Douglas-fir/twinflower, Douglas-fir/blue huckleberry
	Normal	400	Blue huckleberry-----	20	
	Unfavorable	300	Common beargrass-----	5	
			Elk sedge-----	5	
			Heartleaf arnica-----	5	
			Mallow ninebark-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Common snowberry-----	1	
			Grouse whortleberry-----	1	
			Oregongrape-----	1	
			Saskatoon serviceberry-----	1	
			Twinflower-----	1	
Rock outcrop.					

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
105: Totelake-----	Favorable	500	Pinegrass-----	25	Douglas-fir/ninebark, Douglas-fir/pinegrass
	Normal	350	Elk sedge-----	15	
	Unfavorable	200	Idaho fescue-----	10	
			Rough fescue-----	10	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
			Common juniper-----	2	
			Kinnikinnick-----	2	
			Mallow ninebark-----	2	
			Oregongrape-----	2	
			Bluebunch wheatgrass-----	1	
106: Totelake-----	Favorable	500	Pinegrass-----	25	Douglas-fir/ninebark, Douglas-fir/pinegrass
	Normal	350	Elk sedge-----	15	
	Unfavorable	200	Idaho fescue-----	10	
			Rough fescue-----	10	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
			Common juniper-----	2	
			Kinnikinnick-----	2	
			Mallow ninebark-----	2	
			Oregongrape-----	2	
			Bluebunch wheatgrass-----	1	
107: Totelake-----	Favorable	400	Pinegrass-----	25	Douglas-fir/snowberry, Douglas-fir/pinegrass
	Normal	300	Elk sedge-----	15	
	Unfavorable	200	Idaho fescue-----	10	
			Rough fescue-----	10	
			Common snowberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
			Kinnikinnick-----	2	
			Mallow ninebark-----	2	
			Oregongrape-----	2	
			Bluebunch wheatgrass-----	1	
			Common juniper-----	1	
			Western meadowrue-----	1	
108: Trapps-----	Favorable	500	Pinegrass-----	25	Douglas-fir/ninebark
	Normal	400	Common snowberry-----	20	
	Unfavorable	300	Elk sedge-----	10	
			Heartleaf arnica-----	5	
			Western meadowrue-----	5	
			White spirea-----	5	
			Oregongrape-----	2	
			Saskatoon serviceberry-----	2	
			Common pipsissewa-----	1	
			Kinnikinnick-----	1	
			Russet buffaloberry-----	1	
			Woods rose-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Compo- sition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
109: Trapps-----	Favorable	500	Pinegrass-----	25	Douglas-fir/ninebark
	Normal	400	Common snowberry-----	20	
	Unfavorable	300	Elk sedge-----	10	
			Heartleaf arnica-----	5	
			Western meadowrue-----	5	
			White spirea-----	5	
			Oregongrape-----	2	
			Saskatoon serviceberry-----	2	
			Common pipsissewa-----	1	
			Kinnikinnick-----	1	
			Russet buffaloberry-----	1	
			Woods rose-----	1	
112: Udorthents.					
Glaciercreek----	Favorable	300	Pinegrass-----	30	Douglas-fir/twinflower
	Normal	200	Elk sedge-----	15	
	Unfavorable	100	Common snowberry-----	10	
			Kinnikinnick-----	10	
			Common juniper-----	5	
			Dwarf huckleberry-----	5	
			Heartleaf arnica-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
113: Upsata-----	Favorable	300	Pinegrass-----	40	Subalpine fir/dwarf huckleberry, subalpine fir/beargrass
	Normal	200	Dwarf huckleberry-----	20	
	Unfavorable	100	Common beargrass-----	10	
			Elk sedge-----	5	
			Grouse whortleberry-----	5	
			Blue huckleberry-----	2	
			Kinnikinnick-----	2	
			Myrtle pachistima-----	2	
			Common juniper-----	1	
			Common pipsissewa-----	1	
			Heartleaf arnica-----	1	
			Oregongrape-----	1	
			Russet buffaloberry-----	1	
			Twinflower-----	1	
			White spirea-----	1	
115: Waldbillig-----	Favorable	800	Blue huckleberry-----	25	Subalpine fir/queencup beadlily
	Normal	600	Common beargrass-----	25	
	Unfavorable	400	Arnica-----	10	
			Pinegrass-----	10	
			Grouse whortleberry-----	5	
			Rusty menziesia-----	5	
			Dwarf huckleberry-----	2	
			Elk sedge-----	2	
			Myrtle pachistima-----	2	
			Queencup beadlily-----	2	
			Western meadowrue-----	2	
			White spirea-----	2	
			Twinflower-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase	
	Kind of year	Dry weight				
		Lb/acre		Pct		
116: Waldbillig-----	Favorable	800	Blue huckleberry-----	25	Subalpine fir/twinflower, subalpine fir/menziesia	
	Normal	600	Common beargrass-----	25		
	Unfavorable	400	Arnica-----	10		
			Pinegrass-----	10		
			Grouse whortleberry-----	5		
			Rusty menziesia-----	5		
			Dwarf huckleberry-----	2		
			Elk sedge-----	2		
			Myrtle pachistima-----	2		
			Queencup beadlily-----	2		
			Western meadowrue-----	2		
			White spirea-----	2		
			Twinflower-----	1		
117: Waldbillig-----	Favorable	800	Blue huckleberry-----	25	Subalpine fir/queencup beadlily	
	Normal	600	Common beargrass-----	25		
	Unfavorable	400	Arnica-----	10		
			Pinegrass-----	10		
			Grouse whortleberry-----	5		
			Rusty menziesia-----	5		
			Dwarf huckleberry-----	2		
			Elk sedge-----	2		
			Myrtle pachistima-----	2		
			Queencup beadlily-----	2		
			Western meadowrue-----	2		
			White spirea-----	2		
			Twinflower-----	1		
Auggie-----	Favorable	600	Pinegrass-----	45	Subalpine fir/queencup beadlily	
	Normal	500	Common beargrass-----	15		
	Unfavorable	400	Dwarf huckleberry-----	15		
			Heartleaf arnica-----	5		
			White spirea-----	5		
			Blue huckleberry-----	2		
			Common pipsissewa-----	2		
			Grouse whortleberry-----	2		
			Twinflower-----	2		
			Kinnikinnick-----	1		
			Queencup beadlily-----	1		
118: Waldbillig-----	Favorable	800	Blue huckleberry-----	25		Subalpine fir/twinflower
	Normal	600	Common beargrass-----	25		
	Unfavorable	400	Arnica-----	10		
			Pinegrass-----	10		
			Grouse whortleberry-----	5		
			Rusty menziesia-----	5		
			Dwarf huckleberry-----	2		
			Elk sedge-----	2		
			Myrtle pachistima-----	2		
			Queencup beadlily-----	2		
			Western meadowrue-----	2		
			White spirea-----	2		
			Twinflower-----	1		

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
118: Holloway-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			White spirea-----	2	
119: Waldbillig-----	Favorable	800	Blue huckleberry-----	25	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	25	
	Unfavorable	400	Arnica-----	10	
			Pinegrass-----	10	
			Grouse whortleberry-----	5	
			Rusty menziesia-----	5	
			Dwarf huckleberry-----	2	
			Elk sedge-----	2	
			Myrtle pachistima-----	2	
			Queencup beadlily-----	2	
			Western meadowrue-----	2	
			White spirea-----	2	
			Twinflower-----	1	
Holloway-----	Favorable	800	Blue huckleberry-----	30	Subalpine fir/twinflower, subalpine fir/menziesia
	Normal	600	Common beargrass-----	30	
	Unfavorable	400	Arnica-----	10	
			Grouse whortleberry-----	5	
			Pinegrass-----	5	
			Dwarf huckleberry-----	2	
			Myrtle pachistima-----	2	
			Rusty menziesia-----	2	
			White spirea-----	2	
120: Waldbillig-----	Favorable	300	Grouse whortleberry-----	40	Subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Pinegrass-----	10	
			Blue huckleberry-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Common juniper-----	1	
			White spirea-----	1	
Holloway-----	Favorable	300	Grouse whortleberry-----	40	Subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Pinegrass-----	10	
			Blue huckleberry-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Common juniper-----	1	
			White spirea-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
121: Waldbillig-----	Favorable	300	Grouse whortleberry-----	40	Subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Pinegrass-----	10	
			Blue huckleberry-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Common juniper-----	1	
			White spirea-----	1	
Holloway-----	Favorable	300	Grouse whortleberry-----	40	Subalpine fir/menziesia
	Normal	250	Arnica-----	10	
	Unfavorable	200	Common beargrass-----	10	
			Elk sedge-----	10	
			Pinegrass-----	10	
			Blue huckleberry-----	5	
			Rusty menziesia-----	5	
			Smooth woodrush-----	5	
			Common juniper-----	1	
			White spirea-----	1	
122: Whitore-----	Favorable	450	Pinegrass-----	30	Douglas-fir/twinflower
	Normal	350	Common snowberry-----	15	
	Unfavorable	250	Heartleaf arnica-----	10	
			White spirea-----	5	
			Mallow ninebark-----	2	
			Twinflower-----	1	
123: Whitore-----	Favorable	450	Pinegrass-----	30	Douglas-fir/twinflower
	Normal	350	Common snowberry-----	15	
	Unfavorable	250	Heartleaf arnica-----	10	
			White spirea-----	5	
			Mallow ninebark-----	2	
			Twinflower-----	1	
124: Wildgen-----	Favorable	500	Pinegrass-----	25	Douglas-fir/snowberry
	Normal	400	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
125: Wildgen-----	Favorable	500	Pinegrass-----	25	Douglas-fir/snowberry
	Normal	400	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
125:					
Winkler-----	Favorable	600	Pinegrass-----	25	Douglas-fir/snowberry
	Normal	450	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
126:					
Wildgen-----	Favorable	500	Pinegrass-----	25	Douglas-fir/snowberry
	Normal	400	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
Winkler-----	Favorable	600	Pinegrass-----	25	Douglas-fir/snowberry
	Normal	450	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
127:					
Wildgen-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
127: Winkler-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
128: Wildgen-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
Winkler-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
129: Winfall-----	Favorable	1,000	Pinegrass-----	22	Douglas-fir/dwarf huckleberry, Douglas-fir/snowberry
	Normal	800	Elk sedge-----	13	
	Unfavorable	600	Kinnikinnick-----	10	
			Dwarf huckleberry-----	8	
			Blue huckleberry-----	6	
			Heartleaf arnica-----	6	
			Common beargrass-----	4	
			Common snowberry-----	3	
			Oregongrape-----	2	
			White spirea-----	2	
			Saskatoon serviceberry-----	1	
			Twinflower-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
130: Winkler-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
131: Winkler-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/ninebark-pinegrass phase, Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
132: Winkler-----	Favorable	600	Pinegrass-----	25	Douglas-fir/ninebark-ninebark phase
	Normal	450	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
133: Winkler-----	Favorable	600	Pinegrass-----	25	Douglas-fir/ninebark-ninebark phase
	Normal	450	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	

UNDERSTORY VEGETATION AND HABITAT TYPES--Continued

Map symbol and soil name	Total production		Characteristic vegetation	Composition	Representative habitat type or phase
	Kind of year	Dry weight			
		Lb/acre		Pct	
134: Winkler-----	Favorable	400	Bluebunch wheatgrass-----	20	Douglas-fir/ninebark-pinegrass phase, Douglas-fir/snowberry
	Normal	300	Arrowleaf balsamroot-----	15	
	Unfavorable	200	Elk sedge-----	15	
			Pinegrass-----	10	
			Common snowberry-----	5	
			Idaho fescue-----	5	
			Rough fescue-----	5	
			Heartleaf arnica-----	2	
			Saskatoon serviceberry-----	2	
			Oregongrape-----	1	
			Rocky Mountain juniper-----	1	
			Skunkbush sumac-----	1	
			White spirea-----	1	
Rubble land.					
135: Winkler-----	Favorable	600	Pinegrass-----	25	Douglas-fir/ninebark-ninebark phase
	Normal	450	Elk sedge-----	20	
	Unfavorable	300	Common snowberry-----	10	
			Mallow ninebark-----	10	
			Heartleaf arnica-----	5	
			Kinnikinnick-----	5	
			White spirea-----	5	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	
Rock outcrop.					
137: Yourame-----	Favorable	500	Pinegrass-----	30	Douglas-fir/snowberry
	Normal	400	Elk sedge-----	14	
	Unfavorable	300	Mallow ninebark-----	10	
			Common snowberry-----	8	
			White spirea-----	5	
			Heartleaf arnica-----	4	
			Kinnikinnick-----	4	
			Dwarf huckleberry-----	2	
			Saskatoon serviceberry-----	2	
			Idaho fescue-----	1	
			Oregongrape-----	1	

Forest Land

The Missoula County area is one of the more important timber-producing regions in Montana. The forests are among the most important natural resources in the survey area. They supply raw material for the major industries, provide recreational opportunities for many people, provide food and cover for many forms of wildlife and suitable understory grazing for livestock at lower elevations, maintain water quality, and form the backdrop for much of the outdoor beauty of the area. The survey area contains more State and private commercial forest land than any other county in Montana.

Fifty-three percent of the survey area is classified as commercial forest land. Forty-six percent of the commercial forest land is privately owned, and the remainder is publicly owned—47 percent by the Federal government and 7 percent by State and county governments.

The largest plywood mill in the Rocky Mountain area, with an annual output of 300 million square feet, is in the survey area. The survey area also has two particleboard plants that produce approximately 100 million square feet annually, a paper mill that produces approximately 600,000 tons, a log-home builder that produces about 500 houses per year, three post and pole operators, and a cedar mill.

The existing wood manufacturing capacity may exceed current forest growth rates. The application of intensive forest management practices, such as thinning, planting, sanitation, and control of competing vegetation, particularly on the most productive soils, can significantly increase tree growth rates and help to ensure a supply of wood for the manufacturing plants.

The most extensive forest types are Douglas-fir, ponderosa pine, lodgepole pine, western larch, subalpine fir, and Engelmann spruce. Other forest types of lesser extent are western white pine, western redcedar, grand fir, and whitebark pine. Western black cottonwood and quaking aspen are in small patches or stringers along streams or in other wetter areas.

Tree growth rates and the kinds of trees that grow vary among different types of soils in the survey area. Soil depth, chemistry, texture, and available water

capacity, in combination with aspect, elevation, and precipitation, are the major factors that influence the kinds of trees that grow and the productivity of the tree species. The soils in forest areas range from shallow to very deep, from nongravelly to extremely gravelly, and from fine textured to coarse textured. Because of differences among the soils, as well as differences in climate, topography, and geology, the forests vary dramatically in composition and productivity.

Moving from the broad valley floor to the foothills and mountains, precipitation increases and temperatures generally become cooler. Aspect becomes a significant environmental factor as the topography becomes more rugged. On steep south- and west-facing mountain slopes at the lower elevations (below 4,500 to 5,000 feet), ponderosa pine and Douglas-fir dominate. Winkler, Wildgen, dry, Repp and Sharrott soils are the more extensive soils in this environment. Bunchgrass is a common understory species on these soils. In the more gently sloping landscape positions at the lower elevations and on the steeper, cooler north and east aspects at elevations below 4,500 feet, ponderosa pine and Douglas-fir are still the primary adapted tree species, but pinegrass, common snowberry, white spirea, mallow ninebark, Oregongrape, and kinnikinnick are the common understory species. The presence of these species indicates a cooler environment and more effective precipitation. The productivity of the overstory and understory plants is generally greater on these soils. Associated soils include Winkler, cool, Wildgen, and Trapps soils. The temperature regime associated with the soils in these two environments is "frigid," and the moisture regime is "ustic," as defined in "Soil Taxonomy" (14).

In areas where precipitation in relation to elevation is greatest, such as the Montana-Idaho divide and the head of the Swan River drainage, western larch, lodgepole pine, and grand fir are common forest overstory species along with Douglas-fir and ponderosa pine. Some areas also support western white pine and western redcedar. In addition to the understory plants listed for the cooler environment, blue huckleberry, common beargrass, and twinflower are common

species in this moister environment. Commonly associated soils include Tevis, Rumblecreek, Courville, Mitten, Winfall, and Jimlake soils. These soils generally occur on steep, north and east aspects below an elevation of 5,000 feet and on all aspects where the average annual precipitation exceeds about 25 inches annually. The temperature regime associated with the soils in this environment is "frigid," and the moisture regime is "udic," as defined in "Soil Taxonomy" (14). The soils in this group generally produce the most overstory and understory vegetation in the survey area.

Holloway, Waldbillig, Felan, and Phillcher soils are in cool, moist environments on north and east aspects at an elevation above about 5,000 feet and on all aspects and slopes above about 5,500 feet. Western larch, Douglas-fir, lodgepole pine, subalpine fir, and Engelmann spruce are commonly associated with the Holloway, Waldbillig, and Felan soils at the lower elevations. Blue huckleberry, common beargrass, and twinflower frequently dominate the understory. At the higher elevations and in the areas of colder temperature, Holloway, Waldbillig, and Felan soils support lodgepole pine, Engelmann spruce, and subalpine fir as the common overstory species. Grouse whortleberry is conspicuous in the understory plant community along with blue huckleberry and common beargrass. In this setting, cool phases of the Holloway, Waldbillig, and Felan soils are mapped. The overstory and understory plant communities associated with the cool phases are significantly less productive than the regular phases of these soil series. The Phillcher series occurs only at the highest elevations, in nearly timberline conditions. In these areas, whitebark pine, stunted subalpine fir, and Engelmann spruce are significant species. These areas are generally considered noncommercial forest land. The temperature regime associated with these soils is "cryic," and the moisture regime is "udic," as defined in "Soil Taxonomy" (14).

The tables "Forest Land Productivity" and "Forest Land Management" can be used by forest managers in planning the use of soils for wood crops. Only those soils suitable for wood crops are listed. Estimates of the productivity of the soils are based on published data (1, 2, 5, 7, 8, 9, 10, 11).

Woodland Ordination System

The table "Forest Land Management" lists the ordination (woodland suitability) symbol for each soil. The ordination system is a nationwide uniform system of labeling soils or groups of soils that are similar in use and management. The primary factors evaluated in the woodland ordination system are productivity of the

forest overstory tree species and the principal soil properties resulting in hazards and limitations that affect forest management. There are three parts of the ordination system—class, subclass, and group. The class and subclass are referred to as the ordination symbol.

Ordination Class Symbol

The first element of the ordination symbol is a number that denotes potential productivity in terms of cubic meters of wood per hectare per year for the indicator tree species. The larger the number, the greater the potential productivity. Potential productivity is based on site index and the corresponding culmination of mean annual increment. For example, the number 1 indicates a potential production of 1 cubic meter of wood per hectare per year (14.3 cubic feet per acre per year) and 10 indicates a potential production of 10 cubic meters of wood per hectare per year (143 cubic feet per acre per year).

Indicator species is a species that is common in the area and is generally, but not necessarily, the most productive on the soil. It is the species that determines the ordination class. It is the first species listed for a particular map unit in the table "Forest Land Productivity." This table shows the productivity for all species where data have been collected.

Site index is determined by taking height measurements and determining the age of selected trees within stands of a given species. This index is the average height, in feet, that the trees attain in a specified number of years. This index applies to fully stocked, even-aged, unmanaged stands. The site indexes shown in the table "Forest Land Productivity" are averages based on measurements made at sites that are representative of the soil series. When the site index and forest land productivity of different soils are compared, the values for the same tree species should be compared. The higher the site index number, the more productive the soil for that species. Site index values are used in conjunction with yield tables to determine average annual yields. Indirectly, they are used to determine the productivity class in the ordination class symbol.

Ordination Subclass Symbol

The second element of the ordination symbol, or subclass, is a capital letter that indicates certain soil or physiographic characteristics that contribute to important hazards or limitations to be considered in management. The subclasses are defined as follows:

Subclass X indicates that forest land use and management are limited by stones or rocks.

Subclass W indicates that forest land use and management are significantly limited by excess water, either seasonally or throughout the year. Restricted drainage, a high water table, or flooding can adversely affect either stand development or management.

Subclass T indicates that the root zone has toxic substances. Excessive alkalinity, acidity, sodium salts, or other toxic substances impede the development of desirable species.

Subclass D indicates that forest land use and management are limited by a restricted rooting depth. The rooting depth is restricted by hard bedrock, a hardpan, or other restrictive layers in the soil.

Subclass C indicates that forest land use and management are limited by the kind or amount of clay in the upper part of the soil.

Subclass S indicates that the soil is sandy, has a low available water capacity, and normally has a low content of available plant nutrients. The use of equipment is limited during dry periods.

Subclass F indicates that forest land use and management are limited by a high content of rock fragments that are larger than 2 millimeters and smaller than 10 inches. This subclass includes flaggy soils.

Subclass R indicates that forest land use and management are limited by excessive slope.

Subclass A indicates that no significant limitations affect forest land use and management.

Forest Land Management and Productivity

Information about the productivity and management of the forested map units in the survey area is given in the tables "Forest Land Management" and "Forest Land Productivity."

Management Concerns

In the table "Forest Land Management," the soils are rated for the erosion hazard, the equipment limitation, seedling mortality, the windthrow hazard, and plant competition.

The *erosion hazard* is *slight* if the expected soil loss is small; *moderate* if some measures are needed to control erosion during logging and road construction; and *severe* if intensive management or special equipment and methods are needed to prevent excessive soil loss.

The *equipment limitation* is *slight* if the use of equipment is not limited to a particular kind of equipment or time of year; *moderate* if there is a short seasonal limitation or a need for some modification in the management of equipment; and *severe* if there is a seasonal limitation, a need for special equipment or management, or a hazard in the use of equipment.

Seedling mortality ratings are for seedlings that are from a good planting stock and that are properly planted during a period of average rainfall. A rating of *slight* indicates that the expected mortality of the planted seedlings is less than 25 percent; *moderate*, 25 to 50 percent; and *severe*, more than 50 percent.

Windthrow hazard is *slight* if trees in wooded areas are not expected to be blown down by commonly occurring winds; *moderate* if some trees are blown down during periods of excessive soil wetness and strong winds; and *severe* if many trees are blown down during periods of excessive soil wetness and moderate or strong winds.

Plant competition is *slight* if there is little or no competition from other plants; *moderate* if plant competition is expected to hinder the development of a fully stocked stand of desirable trees; and *severe* if plant competition is expected to prevent the establishment of a desirable stand unless the site is intensively prepared, weeded, or otherwise managed for the control of undesirable plants.

Potential Productivity

The potential productivity of merchantable or *common trees* is expressed as a site index, which is described under the heading "Ordination Class Symbol." Commonly grown trees are those that forest land managers generally favor in intermediate or improvement cuttings. They are selected on the basis of growth rate, quality, value, and marketability.

The column *trees that stands are commonly managed for* in the table "Forest Land Productivity" lists trees that are suitable for commercial wood production and that are suited to the soils.

Forest Access Road Limitations and Hazards

The major management concerns affecting the use of the detailed soil map units in the survey area for forest access roads are listed in the table "Main Forest Access Road Limitations and Hazards." The significance of each limitation or hazard and the criteria used to determine the limitation or hazard are described in this section.

Areas of rock outcrop and depth to bedrock can increase the cost of road construction and influence route planning. Constructing the roads is difficult because of the need for rock removal and for additional soil material to provide a suitable road surface.

Boulders increase the cost of road construction and influence route planning. Construction is difficult mainly because of the need for extraction and disposal of the boulders.

Dustiness of the road surface material may cause

safety problems and accelerate equipment wear. Dust-abatement measures are needed during dry periods.

The erodibility of the soil material in the roadbed influences the probability of *erosion by water* resulting from the channeling of runoff in the roadway. Erosion can result in the sedimentation of streams. It can be controlled by reducing road grades and controlling runoff onto and off of the road surface through the installation of drainage measures.

Flooding in the area where a road is constructed may restrict use, result in damage to the roadway, and result in the sedimentation of waterways. The hazard of flooding can be reduced by installing a drainage system, elevating the roadbed, and using riprap and diversions.

Low soil strength of the soil material used to construct the road surface can result in rutting, in drainage problems, and in poor trafficability during wet periods. The road should be used only during dry periods or when the surface is frozen. Surfacing with material of suitable strength and installing a drainage system can help to overcome this limitation.

Roadbed material that has a high *shrink-swell potential* shrinks and swells markedly during dry and wet periods. Excessive shrinking and swelling can damage the road surface or other features, such as bridge abutments, culverts, and erosion-control structures.

A steep *slope* results in increased construction and maintenance costs and increased sedimentation because of the large cuts necessary to create an adequate roadbed. Seeding the cut slope to suitable vegetation minimizes sedimentation. Large cuts can increase instability of the slope. Where slumping is a hazard, slope failure can become a significant maintenance and environmental problem. Areas where the slope is steep should not be used as sites for roads.

Slumping causes safety problems and increases maintenance costs. Frequent clearing of slumped soil in the roadbed or rebuilding of the roadway may be needed to keep the road serviceable and drainage systems functioning.

Stones cause problems in maintaining a smooth road surface that has good trafficability. Unless the stones

are removed, additions of suitable stone-free material may be needed when the road is surfaced.

Roads built across soils that have a *water table* may require substantial ballast, fabric, internal drainage systems, and other measures that maintain a road surface that has good trafficability. Construction and use of the road only during periods when the water table is not near the surface or when the road is frozen help to maintain trafficability and reduce the potential for site damage.

Following is an explanation of the criteria used to determine the limitations or hazards.

Areas of rock outcrop.—Rock outcrop is a named component of the map unit.

Areas of rubble land.—Rubble land is a named component of the map unit.

Boulders.—The terms describing the texture within a depth of 24 inches include a bouldery modifier, or the soil is a bouldery phase.

Depth to rock.—Hard bedrock is within a depth of 60 inches.

Dustiness.—The surface layer is silt, silt loam, loam, or very fine sandy loam.

Erosion by water.—The surface K factor multiplied by the upper slope limit is more than 10.

Flooding.—The component of the map unit is occasionally flooded or frequently flooded.

Low soil strength.—The component of the map unit has one of the following Unified classifications within the 60-inch profile: ML, CL, MH, CH, OL, PT, or GC.

Shrink-swell potential.—The component of the map unit has a high shrink-swell potential in a layer that is at least 10 inches thick and is within 40 inches of the surface.

Slope.—The upper slope limit is more than 35 percent.

Slumping.—The component of the map unit meets the requirements for low soil strength and has slopes of more than 35 percent.

Stones.—The terms describing the texture within a depth of 24 inches include a very stony or extremely stony modifier, or the soil is a very stony or extremely stony phase.

Water table.—The component of the map unit has a water table within a depth of 60 inches.

FOREST LAND MANAGEMENT

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Ordination symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
2: Ambrant-----	4S	---	Moderate	Severe	Slight	Severe
3: Ambrant-----	4R	---	Severe	Severe	Slight	Severe
Rochester-----	4R	---	Severe	Severe	Slight	Severe
Rock outcrop.						
11: Auggie-----	6C	---	Moderate	Moderate	Moderate	Severe
12: Bata-----	3A	---	Slight	Slight	Moderate	Moderate
13: Bata-----	5A	---	Slight	Slight	Moderate	Moderate
Waldbillig-----	6A	---	Slight	Slight	Moderate	Moderate
14: Beeskove-----	5R	---	Severe	Moderate	Slight	Moderate
15: Beeskove-----	5R	---	Severe	Moderate	Slight	Moderate
Rock outcrop.						
23: Bignell-----	5A	---	Slight	Moderate	Slight	Severe
24: Bignell-----	5R	---	Severe	Moderate	Slight	Severe
Winkler-----	6R	---	Severe	Severe	Slight	Severe
25: Bignell-----	4R	---	Severe	Severe	Slight	Severe
Winkler-----	4R	---	Severe	Severe	Slight	Severe
27: Chickaman-----	7C	---	Moderate	Slight	Moderate	Moderate
28: Chickaman-----	7R	---	Severe	Slight	Moderate	Moderate
29: Coerock-----	2R	---	Moderate	Moderate	Severe	Moderate
Rock outcrop.						
30: Coerock-----	2D	---	Severe	Moderate	Severe	Moderate

FOREST LAND MANAGEMENT--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
31: Courville-----	6A	---	Slight	Moderate	Slight	Severe
32: Courville-----	6R	---	Severe	Moderate	Slight	Severe
Mitten-----	5R	---	Severe	Moderate	Moderate	Severe
33: Crow-----	6C	---	Moderate	Slight	Slight	Moderate
35: Elkner-----	5S	---	Moderate	Slight	Moderate	Severe
Ovando-----	5S	---	Moderate	Slight	Moderate	Severe
36: Evaro-----	5A	---	Slight	Moderate	Slight	Moderate
37: Evaro-----	5R	---	Severe	Moderate	Slight	Moderate
38: Felan-----	7A	---	Slight	Slight	Moderate	Moderate
39: Felan-----	7R	---	Severe	Slight	Moderate	Moderate
40: Felan-----	4A	---	Slight	Slight	Moderate	Moderate
41: Felan-----	4R	---	Severe	Slight	Moderate	Moderate
42: Glaciercreek-----	6F	---	Moderate	Moderate	Slight	Moderate
43: Glaciercreek variant--	6F	---	Moderate	Moderate	Slight	Moderate
Glaciercreek-----	6F	---	Moderate	Moderate	Slight	Moderate
49: Greenough-----	5C	---	Moderate	Moderate	Slight	Severe
50: Hagstadt-----	4D	---	Moderate	Moderate	Severe	Slight
51: Half Moon-----	6C	---	Moderate	Moderate	Slight	Severe
53: Hollandlake-----	5A	---	Slight	Slight	Moderate	Moderate
54: Hollandlake-----	5A	---	Slight	Slight	Moderate	Moderate
Bata-----	5A	---	Slight	Slight	Moderate	Moderate
55: Hollandlake-----	5R	---	Severe	Slight	Moderate	Moderate

FOREST LAND MANAGEMENT--Continued

Map symbol and soil name	Ordination symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
55: Bata-----	5R	---	Severe	Slight	Moderate	Moderate
56: Holloway-----	5A	---	Slight	Slight	Moderate	Moderate
57: Holloway-----	5R	---	Severe	Slight	Moderate	Moderate
58: Holloway-----	4A	---	Slight	Slight	Moderate	Moderate
59: Holloway-----	4R	---	Severe	Slight	Moderate	Moderate
60: Holloway-----	5R	---	Severe	Slight	Moderate	Moderate
Rock outcrop.						
61: Jimlake-----	7R	---	Moderate	Slight	Moderate	Moderate
62: Jimlake-----	7R	---	Severe	Slight	Moderate	Moderate
63: Lantern-----	6C	---	Moderate	Moderate	Moderate	Severe
64: Lantern-----	6R	---	Severe	Moderate	Moderate	Severe
65: Lantern-----	6R	---	Severe	Moderate	Moderate	Severe
Rock outcrop.						
66: Lolopeak-----	2R	---	Severe	Moderate	Moderate	Moderate
67: Lolopeak-----	2R	---	Severe	Moderate	Moderate	Moderate
Rock outcrop.						
68: Lubrecht-----	5C	---	Moderate	Slight	Slight	Moderate
69: Mitten-----	5R	---	Severe	Moderate	Moderate	Severe
70: Mitten-----	5R	---	Moderate	Moderate	Moderate	Severe
Sharrott-----	4D	---	Severe	Severe	Slight	Severe
71: Mitten-----	5R	---	Severe	Moderate	Moderate	Severe
Tevis-----	5R	---	Severe	Moderate	Slight	Severe

FOREST LAND MANAGEMENT--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
74: Ovando-----	5R	---	Severe	Slight	Moderate	Severe
Elkner-----	5R	---	Severe	Slight	Moderate	Severe
Rock outcrop.						
80: Petty-----	6S	---	Moderate	Slight	Moderate	Moderate
81: Petty-----	6R	---	Severe	Slight	Moderate	Moderate
82: Petty-----	6R	---	Severe	Slight	Moderate	Moderate
83: Petty-----	7S	---	Severe	Slight	Moderate	Moderate
84: Petty-----	7R	---	Severe	Slight	Moderate	Moderate
85: Petty-----	7R	---	Severe	Slight	Moderate	Moderate
Rock outcrop.						
86: Phillcher-----	2A	---	Slight	Slight	Moderate	Moderate
87: Phillcher-----	2R	---	Severe	Slight	Moderate	Moderate
Rock outcrop.						
89: Repp-----	4R	---	Severe	Severe	Slight	Severe
90: Repp-----	6A	---	Slight	Severe	Slight	Severe
91: Repp-----	6R	---	Severe	Severe	Slight	Severe
92: Repp-----	4R	---	Severe	Severe	Slight	Severe
Rock outcrop.						
95: Rumblecreek-----	7A	---	Slight	Moderate	Slight	Severe
96: Selway-----	5S	---	Moderate	Moderate	Slight	Severe
97: Selway-----	5R	---	Severe	Moderate	Slight	Severe
98: Selway-----	5R	---	Severe	Moderate	Slight	Severe

FOREST LAND MANAGEMENT--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
99: Sharrott----- Rock outcrop.	3D	---	Slight	Severe	Slight	Severe
100: Shooflin-----	6C	---	Moderate	Slight	Slight	Moderate
102: Tevis-----	6R	---	Severe	Moderate	Slight	Severe
103: Tevis----- Mitten-----	6A 6A	---	Slight Slight	Moderate Moderate	Slight Moderate	Severe Severe
104: Tevis----- Mitten----- Rock outcrop.	6R 6R	---	Severe Severe	Moderate Moderate	Slight Moderate	Severe Severe
105: Totelake-----	5F	---	Moderate	Severe	Slight	Severe
106: Totelake-----	5F	---	Moderate	Severe	Slight	Severe
107: Totelake-----	5X	---	Moderate	Severe	Slight	Severe
108: Trapps-----	5A	---	Slight	Moderate	Slight	Severe
109: Trapps-----	5R	---	Severe	Moderate	Slight	Severe
112: Udorthents. Glaciercreek-----	6F	---	Moderate	Moderate	Slight	Moderate
113: Upsata-----	6F	Slight	Moderate	Moderate	Moderate	Severe
115: Waldbillig-----	6A	---	Slight	Slight	Moderate	Moderate
116: Waldbillig-----	6R	---	Severe	Slight	Moderate	Moderate
117: Waldbillig----- Auggie-----	6A 6C	---	Slight Moderate	Slight Moderate	Moderate Moderate	Moderate Severe
118: Waldbillig-----	6A	---	Slight	Slight	Moderate	Moderate

FOREST LAND MANAGEMENT--Continued

Map symbol and soil name	Ordination symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
119: Waldbillig-----	6R	---	Severe	Slight	Moderate	Moderate
Holloway-----	5R	---	Severe	Slight	Moderate	Moderate
120: Waldbillig-----	4A	---	Slight	Slight	Moderate	Moderate
Holloway-----	4A	---	Slight	Slight	Moderate	Moderate
121: Waldbillig-----	4R	---	Severe	Slight	Moderate	Moderate
Holloway-----	4R	---	Severe	Slight	Moderate	Moderate
122: Whitore-----	5A	---	Slight	Moderate	Slight	Severe
123: Whitore-----	5R	---	Severe	Moderate	Slight	Severe
124: Wildgen-----	6A	---	Slight	Severe	Slight	Severe
125: Wildgen-----	6A	---	Slight	Severe	Slight	Severe
Winkler-----	6A	---	Slight	Severe	Slight	Severe
126: Wildgen-----	6R	---	Severe	Severe	Slight	Severe
Winkler-----	6R	---	Severe	Severe	Slight	Severe
127: Wildgen-----	4A	---	Slight	Severe	Slight	Severe
Winkler-----	4A	---	Slight	Severe	Slight	Severe
128: Wildgen-----	4R	---	Severe	Severe	Slight	Severe
Winkler-----	4R	---	Severe	Severe	Slight	Severe
129: Winfall-----	6A	---	Slight	Moderate	Slight	Severe
130: Winkler-----	4A	---	Slight	Severe	Slight	Severe
131: Winkler-----	4R	---	Severe	Severe	Slight	Severe
132: Winkler-----	6A	---	Slight	Severe	Slight	Severe
133: Winkler-----	6R	---	Severe	Severe	Slight	Severe

FOREST LAND MANAGEMENT--Continued

Map symbol and soil name	Ordi- nation symbol	Management concerns				
		Erosion hazard	Equipment limitation	Seedling mortality	Windthrow hazard	Plant competition
134: Winkler----- Rubble land.	4R	---	Severe	Severe	Slight	Severe
135: Winkler----- Rock outcrop.	6R	---	Severe	Severe	Slight	Severe
137: Yourame-----	6A	---	Slight	Severe	Slight	Severe

FOREST LAND PRODUCTIVITY

(Only the soils suitable for production of commercial trees are listed. Absence of an entry indicates that data were not available)

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
2:						
Ambrant-----	Douglas-fir-----	45	4	196	60	Ponderosa pine,
	Ponderosa pine-----	74	4	198	60	Douglas-fir
3:						
Ambrant-----	Douglas-fir-----	45	4	196	60	Ponderosa pine,
	Ponderosa pine-----	74	4	198	60	Douglas-fir
Rochester-----	Douglas-fir-----	45	4	196	60	Ponderosa pine
	Ponderosa pine-----	74	4	198	60	
Rock outcrop.						
11:						
Auggie-----	Douglas-fir-----	60	6	320	92	Western larch,
	Western larch-----	60	6	306	90	lodgepole pine,
	Lodgepole pine-----	96	6	411	85	Engelmann spruce,
	Subalpine fir-----	---	---	---	---	Douglas-fir
	Engelmann spruce-----	---	---	---	---	
12:						
Bata-----	Lodgepole pine-----	60	3	156	50	Lodgepole pine,
	Engelmann spruce-----	40	2	110	28	Engelmann spruce
	Subalpine fir-----	---	---	---	---	
13:						
Bata-----	Lodgepole pine-----	85	5	344	74	Western larch,
	Western larch-----	49	4	212	65	lodgepole pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
	Subalpine fir-----	---	---	---	---	
Waldbillig-----	Douglas-fir-----	59	6	309	90	Western larch,
	Lodgepole pine-----	81	5	309	70	lodgepole pine,
	Western larch-----	46	4	189	60	Douglas-fir
	Subalpine fir-----	---	---	---	---	
14:						
Beeskove-----	Douglas-fir-----	55	5	266	81	Western larch,
	Ponderosa pine-----	75	4	203	62	ponderosa pine,
	Western larch-----	47	4	197	61	Douglas-fir
	Lodgepole pine-----	70	4	219	59	
15:						
Beeskove-----	Douglas-fir-----	55	5	266	81	Western larch,
	Ponderosa pine-----	75	4	203	62	ponderosa pine,
	Western larch-----	47	4	197	61	Douglas-fir
	Lodgepole pine-----	70	4	219	59	
Rock outcrop.						
23:						
Bignell-----	Douglas-fir-----	52	5	244	74	Western larch,
	Ponderosa pine-----	80	5	232	69	ponderosa pine,
	Western larch-----	47	4	197	61	Douglas-fir

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
24:						
Bignell-----	Douglas-fir-----	52	5	244	74	Western larch, ponderosa pine, Douglas-fir
	Ponderosa pine-----	80	5	232	69	
	Western larch-----	47	4	197	61	
	Lodgepole pine-----	---	---	---	---	
Winkler-----	Douglas-fir-----	56	6	277	83	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	75	4	203	62	
25:						
Bignell-----	Douglas-fir-----	47	4	210	64	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	74	4	198	60	
Winkler-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	64	3	147	50	
27:						
Chickaman-----	Engelmann spruce-----	96	7	450	100	Western larch, Engelmann spruce, Douglas-fir
	Douglas-fir-----	60	6	320	92	
	Western larch-----	61	6	317	92	
	Lodgepole pine-----	90	5	380	79	
	Subalpine fir-----	---	---	---	---	
28:						
Chickaman-----	Engelmann spruce-----	96	7	450	100	Western larch, Engelmann spruce, Douglas-fir
	Douglas-fir-----	60	6	320	92	
	Western larch-----	61	6	317	92	
	Lodgepole pine-----	90	5	380	79	
	Subalpine fir-----	---	---	---	---	
29:						
Coerock-----	Subalpine fir-----	---	---	---	---	Lodgepole pine, Engelmann spruce
	Whitebark pine-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
	Lodgepole pine-----	---	---	---	---	
Rock outcrop.						
30:						
Coerock-----	Engelmann spruce-----	40	2	110	28	Lodgepole pine, Engelmann spruce
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	35	---	---	---	
	Lodgepole pine-----	35	---	---	---	
Rock outcrop.						
31:						
Courville-----	Douglas-fir-----	58	6	298	88	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	88	6	291	82	
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	70	4	219	59	
32:						
Courville-----	Douglas-fir-----	58	6	298	88	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	88	6	291	82	
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	70	4	219	59	
Mitten-----	Douglas-fir-----	56	6	277	83	Western larch, Douglas-fir
	Ponderosa pine-----	85	5	268	77	
	Western larch-----	52	5	235	71	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
33: Crow-----	Ponderosa pine-----	93	6	330	90	Ponderosa pine, Douglas-fir
	Douglas-fir-----	54	5	259	79	
	Western larch-----	47	4	197	61	
35: Elkner-----	Douglas-fir-----	51	5	237	71	Western larch, Douglas-fir
	Lodgepole pine-----	75	4	259	64	
	Western larch-----	42	4	166	53	
	Subalpine fir-----	---	---	---	---	
35: Ovando-----	Douglas-fir-----	51	5	237	71	Western larch, Douglas-fir
	Lodgepole pine-----	75	4	259	64	
	Western larch-----	42	4	166	53	
	Subalpine fir-----	---	---	---	---	
36: Evaro-----	Lodgepole pine-----	78	5	284	67	Lodgepole pine
	Douglas-fir-----	45	4	196	60	
	Western larch-----	45	4	182	58	
	Subalpine fir-----	---	---	---	---	
37: Evaro-----	Lodgepole pine-----	78	5	284	67	Lodgepole pine
	Douglas-fir-----	45	4	196	60	
	Western larch-----	45	4	182	58	
	Subalpine fir-----	---	---	---	---	
38: Felan-----	Douglas-fir-----	65	7	377	101	Western larch, Engelmann spruce, Douglas-fir
	Western larch-----	55	5	260	78	
	Lodgepole pine-----	80	5	300	69	
	Subalpine fir-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
39: Felan-----	Douglas-fir-----	65	7	377	101	Western larch, Engelmann spruce, Douglas-fir
	Western larch-----	55	5	260	78	
	Lodgepole pine-----	80	5	300	69	
	Subalpine fir-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
40: Felan-----	Engelmann spruce-----	68	4	261	60	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	---	---	---	---	
41: Felan-----	Engelmann spruce-----	68	4	261	60	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	---	---	---	---	
42: Glaciercreek-----	Ponderosa pine-----	88	6	291	82	Ponderosa pine
	Douglas-fir-----	54	5	259	79	
	Lodgepole pine-----	70	4	219	59	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
43:						
Glaciercreek variant-----	Ponderosa pine-----	88	6	291	82	Ponderosa pine
	Douglas-fir-----	54	5	259	79	
Glaciercreek-----	Ponderosa pine-----	88	6	291	82	Ponderosa pine
	Douglas-fir-----	54	5	259	79	
49:						
Greenough-----	Ponderosa pine-----	86	5	276	78	Western larch,
	Douglas-fir-----	46	4	203	62	ponderosa pine,
	Western larch-----	---	---	---	---	Douglas-fir
50:						
Hagstadt-----	Douglas-fir-----	45	4	196	60	Ponderosa pine,
	Ponderosa pine-----	74	4	198	60	Douglas-fir
51:						
Half Moon-----	Douglas-fir-----	60	6	320	92	Ponderosa pine,
	Ponderosa pine-----	86	5	276	78	Douglas-fir
53:						
Hollandlake-----	Lodgepole pine-----	85	5	344	74	Western larch,
	Western larch-----	49	4	212	65	lodgepole pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
	Grand fir-----	---	---	---	---	
	Subalpine fir-----	---	---	---	---	
54:						
Hollandlake-----	Lodgepole pine-----	85	5	344	74	Western larch,
	Western larch-----	49	4	212	65	lodgepole pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
	Grand fir-----	---	---	---	---	
	Subalpine fir-----	---	---	---	---	
Bata-----	Lodgepole pine-----	85	5	344	74	Western larch,
	Western larch-----	49	4	212	65	lodgepole pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
	Subalpine fir-----	---	---	---	---	
55:						
Hollandlake-----	Lodgepole pine-----	85	5	344	74	Western larch,
	Western larch-----	49	4	212	65	lodgepole pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
	Subalpine fir-----	---	---	---	---	
Bata-----	Lodgepole pine-----	85	5	344	74	Western larch,
	Western larch-----	49	4	212	65	lodgepole pine,
	Douglas-fir-----	46	4	203	62	Douglas-fir
	Subalpine fir-----	---	---	---	---	
56:						
Holloway-----	Douglas-fir-----	52	5	244	74	Western larch,
	Lodgepole pine-----	75	4	259	64	Douglas-fir
	Western larch-----	47	4	197	61	
57:						
Holloway-----	Douglas-fir-----	52	5	244	74	Western larch,
	Lodgepole pine-----	75	4	259	64	Douglas-fir
	Western larch-----	47	4	197	61	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
58: Holloway-----	Engelmann spruce-----	62	4	226	52	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
59: Holloway-----	Engelmann spruce-----	62	4	226	52	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
60: Holloway-----	Douglas-fir-----	52	5	244	74	Western larch, Douglas-fir
	Lodgepole pine-----	75	4	259	64	
	Western larch-----	47	4	197	61	
Rock outcrop.						
61: Jimlake-----	Engelmann spruce-----	94	7	435	97	Western larch, Engelmann spruce, western white pine, Douglas-fir
	Douglas-fir-----	55	5	266	81	
	Lodgepole pine-----	90	5	380	79	
	Western larch-----	55	5	260	78	
	Grand fir-----	---	---	---	---	
	Subalpine fir-----	---	---	---	---	
	Western redcedar-----	---	---	---	---	
	Western white pine-----	55	---	---	---	
62: Jimlake-----	Engelmann spruce-----	94	7	435	97	Western larch, Engelmann spruce, western white pine, Douglas-fir
	Douglas-fir-----	55	5	266	81	
	Lodgepole pine-----	90	5	380	79	
	Western larch-----	55	5	260	78	
	Grand fir-----	---	---	---	---	
	Subalpine fir-----	---	---	---	---	
	Western redcedar-----	---	---	---	---	
	Western white pine-----	55	---	---	---	
63: Lantern-----	Western larch-----	59	6	297	87	Western larch, Douglas-fir
	Douglas-fir-----	57	6	288	85	
	Lodgepole pine-----	90	5	380	79	
	Ponderosa pine-----	80	5	232	69	
64: Lantern-----	Western larch-----	59	6	297	87	Western larch, Douglas-fir
	Douglas-fir-----	57	6	288	85	
	Lodgepole pine-----	90	5	380	79	
	Ponderosa pine-----	80	5	232	69	
65: Lantern-----	Western larch-----	59	6	297	87	Western larch, Douglas-fir
	Douglas-fir-----	57	6	288	85	
	Lodgepole pine-----	90	5	380	79	
	Ponderosa pine-----	80	5	232	69	
Rock outcrop.						
66: Lolopeak-----	Lodgepole pine-----	---	---	---	---	Engelmann spruce
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
67: Lolopeak-----	Lodgepole pine-----	---	---	---	---	Engelmann spruce
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
Rock outcrop.						
68: Lubrecht-----	Douglas-fir-----	54	5	259	79	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	78	5	220	65	
69: Mitten-----	Douglas-fir-----	55	5	266	81	Western larch, Douglas-fir
	Ponderosa pine-----	85	5	268	77	
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	75	4	259	64	
70: Mitten-----	Douglas-fir-----	55	5	266	81	Western larch, Douglas-fir
	Ponderosa pine-----	85	5	268	77	
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	75	4	259	64	
Sharrott-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	63	3	142	49	
71: Mitten-----	Douglas-fir-----	55	5	266	81	Western larch, Douglas-fir
	Ponderosa pine-----	85	5	268	77	
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	75	4	259	64	
Tevis-----	Douglas-fir-----	55	5	266	81	Western larch, ponderosa pine, Douglas-fir
	Western larch-----	50	5	219	67	
	Ponderosa pine-----	78	5	220	65	
	Lodgepole pine-----	70	4	219	59	
74: Ovando-----	Douglas-fir-----	51	5	237	71	Western larch, Douglas-fir
	Lodgepole pine-----	75	4	259	64	
	Western larch-----	42	4	166	53	
	Subalpine fir-----	---	---	---	---	
Elkner-----	Douglas-fir-----	51	5	237	71	Western larch, Douglas-fir
	Lodgepole pine-----	75	4	259	64	
	Western larch-----	42	4	166	53	
	Subalpine fir-----	---	---	---	---	
Rock outcrop.						
80: Petty-----	Douglas-fir-----	60	6	320	92	Western larch, Engelmann spruce, Douglas-fir
	Lodgepole pine-----	90	5	380	79	
	Western larch-----	55	5	260	78	
	Subalpine fir-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
81: Petty-----	Douglas-fir-----	60	6	320	92	Western larch, Engelmann spruce, Douglas-fir
	Lodgepole pine-----	90	5	380	79	
	Western larch-----	55	5	260	78	
	Subalpine fir-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
82: Petty-----	Douglas-fir-----	60	6	320	92	Western larch, Engelmann spruce, Douglas-fir
	Lodgepole pine-----	90	5	380	79	
	Western larch-----	55	5	260	78	
	Subalpine fir-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
83: Petty-----	Engelmann spruce-----	92	7	420	94	Engelmann spruce
	Lodgepole pine-----	80	5	300	69	
	Subalpine fir-----	---	---	---	---	
84: Petty-----	Engelmann spruce-----	92	7	420	94	Engelmann spruce
	Lodgepole pine-----	80	5	300	69	
	Subalpine fir-----	---	---	---	---	
85: Petty-----	Engelmann spruce-----	92	7	420	94	Engelmann spruce
	Lodgepole pine-----	80	5	300	69	
	Subalpine fir-----	---	---	---	---	
Rock outcrop.						
86: Phillcher-----	Lodgepole pine-----	---	---	---	---	Engelmann spruce
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
87: Phillcher-----	Lodgepole pine-----	---	---	---	---	Engelmann spruce
	Subalpine fir-----	---	---	---	---	
	Whitebark pine-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	
Rock outcrop.						
89: Repp-----	Douglas-fir-----	47	4	210	64	Douglas-fir
	Ponderosa pine-----	60	3	129	46	
90: Repp-----	Douglas-fir-----	57	6	288	85	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	88	6	291	82	
91: Repp-----	Douglas-fir-----	57	6	288	85	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	88	6	291	82	
92: Repp-----	Douglas-fir-----	47	4	210	64	Douglas-fir
	Ponderosa pine-----	60	3	129	46	
Rock outcrop.						

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
95:						
Rumblecreek-----	Ponderosa pine-----	96	7	352	96	Grand fir, lodgepole pine, ponderosa pine, Douglas-fir
	Douglas-fir-----	56	6	277	83	
	Lodgepole pine-----	86	5	351	75	
	Western larch-----	46	4	189	60	
	Grand fir-----	---	---	---	---	
96:						
Selway-----	Douglas-fir-----	50	5	230	69	Ponderosa pine, Douglas-fir
	Lodgepole pine-----	70	4	219	59	
	Ponderosa pine-----	73	4	193	59	
	Western larch-----	45	4	182	58	
97:						
Selway-----	Douglas-fir-----	50	5	230	69	Ponderosa pine, Douglas-fir
	Lodgepole pine-----	70	4	219	59	
	Ponderosa pine-----	73	4	193	59	
	Western larch-----	45	4	182	58	
98:						
Selway-----	Douglas-fir-----	50	5	230	69	Ponderosa pine, Douglas-fir
	Lodgepole pine-----	70	4	219	59	
	Ponderosa pine-----	73	4	193	59	
	Western larch-----	45	4	182	58	
99:						
Sharrott-----	Ponderosa pine-----	---	---	---	---	Ponderosa pine
	Rock outcrop.					
100:						
Shooflin-----	Douglas-fir-----	58	6	298	88	Western larch, ponderosa pine, Douglas-fir
	Ponderosa pine-----	84	5	261	75	
	Western larch-----	50	5	219	67	
102:						
Tevis-----	Douglas-fir-----	56	6	277	83	Western larch, ponderosa pine, Douglas-fir
	Western larch-----	50	5	219	67	
	Ponderosa pine-----	78	5	220	65	
	Lodgepole pine-----	70	4	219	59	
103:						
Tevis-----	Douglas-fir-----	56	6	277	83	Western larch, ponderosa pine, Douglas-fir
	Western larch-----	50	5	219	67	
	Ponderosa pine-----	78	5	220	65	
	Lodgepole pine-----	70	4	219	59	
Mitten-----	Douglas-fir-----	56	6	277	83	Western larch, Douglas-fir
	Ponderosa pine-----	85	5	268	77	
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	75	4	259	64	
104:						
Tevis-----	Douglas-fir-----	56	6	277	83	Western larch, ponderosa pine, Douglas-fir
	Western larch-----	50	5	219	67	
	Ponderosa pine-----	78	5	220	65	
	Lodgepole pine-----	70	4	219	59	
Mitten-----	Douglas-fir-----	56	6	277	83	Western larch, Douglas-fir
	Ponderosa pine-----	85	5	268	77	
	Western larch-----	52	5	235	71	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
104: Rock outcrop.						
105: Totelake-----	Douglas-fir-----	51	5	237	71	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	80	5	232	69	
106: Totelake-----	Douglas-fir-----	51	5	237	71	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	80	5	232	69	
107: Totelake-----	Douglas-fir-----	51	5	237	71	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	80	5	232	69	
108: Trapps-----	Douglas-fir-----	50	5	230	69	Douglas-fir
	Ponderosa pine-----	75	4	203	62	
109: Trapps-----	Douglas-fir-----	50	5	230	69	Douglas-fir
	Ponderosa pine-----	75	4	203	62	
112: Udorthents.						
Glaciercreek-----	Ponderosa pine-----	88	6	291	82	Ponderosa pine
	Douglas-fir-----	54	5	259	79	
	Lodgepole pine-----	70	4	219	59	
113: Upsata-----	Engelmann spruce-----	88	6	389	88	Lodgepole pine, Engelmann spruce, Douglas-fir
	Lodgepole pine-----	70	4	219	59	
	Western larch-----	45	4	182	58	
	Subalpine fir-----	---	---	---	---	
	Douglas-fir-----	---	---	---	---	
115: Waldbillig-----	Douglas-fir-----	59	6	309	90	Western larch, lodgepole pine, Douglas-fir
	Lodgepole pine-----	81	5	309	70	
	Western larch-----	46	4	189	60	
	Subalpine fir-----	---	---	---	---	
116: Waldbillig-----	Douglas-fir-----	59	6	309	90	Western larch, lodgepole pine, Douglas-fir
	Lodgepole pine-----	81	5	309	70	
	Western larch-----	46	4	189	60	
	Subalpine fir-----	---	---	---	---	
117: Waldbillig-----	Douglas-fir-----	59	6	309	90	Western larch, lodgepole pine, Douglas-fir
	Lodgepole pine-----	81	5	309	70	
	Western larch-----	46	4	189	60	
	Engelmann spruce-----	---	---	---	---	
	Subalpine fir-----	---	---	---	---	
Auggie-----	Douglas-fir-----	60	6	320	92	Western larch, lodgepole pine, Engelmann spruce, Douglas-fir
	Western larch-----	60	6	306	90	
	Lodgepole pine-----	96	6	411	85	
	Subalpine fir-----	---	---	---	---	
	Engelmann spruce-----	---	---	---	---	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
118:						
Waldbillig-----	Douglas-fir-----	59	6	309	90	Western larch, Lodgepole pine, Douglas-fir
	Lodgepole pine-----	81	5	309	70	
	Western larch-----	46	4	189	60	
	Subalpine fir-----	---	---	---	---	
Holloway-----	Douglas-fir-----	52	5	244	74	Western larch, Douglas-fir
	Lodgepole pine-----	75	4	259	64	
	Western larch-----	47	4	197	61	
	Subalpine fir-----	---	---	---	---	
119:						
Waldbillig-----	Douglas-fir-----	59	6	309	90	Western larch, Lodgepole pine, Douglas-fir
	Lodgepole pine-----	81	5	309	70	
	Western larch-----	46	4	189	60	
	Subalpine fir-----	---	---	---	---	
Holloway-----	Douglas-fir-----	52	5	244	74	Western larch, Douglas-fir
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	75	4	259	64	
	Subalpine fir-----	---	---	---	---	
120:						
Waldbillig-----	Engelmann spruce-----	62	4	226	52	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
Holloway-----	Engelmann spruce-----	62	4	226	52	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
121:						
Waldbillig-----	Engelmann spruce-----	62	4	226	52	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
Holloway-----	Engelmann spruce-----	62	4	226	52	Lodgepole pine, Engelmann spruce
	Lodgepole pine-----	60	3	156	50	
	Subalpine fir-----	---	---	---	---	
122:						
Whitore-----	Douglas-fir-----	50	5	230	69	Douglas-fir
123:						
Whitore-----	Douglas-fir-----	50	5	230	69	Douglas-fir
124:						
Wildgen-----	Douglas-fir-----	56	6	277	83	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	79	5	226	67	
125:						
Wildgen-----	Douglas-fir-----	56	6	277	83	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	79	5	226	67	
Winkler-----	Douglas-fir-----	56	6	277	83	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	79	5	226	67	
126:						
Wildgen-----	Douglas-fir-----	56	6	277	83	Ponderosa pine, Douglas-fir
	Ponderosa pine-----	79	5	226	67	

FOREST LAND PRODUCTIVITY--Continued

Map symbol and soil name	Common trees	Site index	Productivity class	Board feet	Cubic feet	Trees that stands are commonly managed for
127:						
Wildgen-----	Douglas-fir-----	45	4	196	60	Ponderosa pine
	Ponderosa pine-----	64	3	147	50	
Winkler-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	64	3	147	50	
128:						
Wildgen-----	Douglas-fir-----	45	4	196	60	Ponderosa pine
	Ponderosa pine-----	64	3	147	50	
Winkler-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	64	3	147	50	
129:						
Winfall-----	Douglas-fir-----	56	6	277	83	Ponderosa pine,
	Ponderosa pine-----	85	5	268	77	Douglas-fir
	Western larch-----	52	5	235	71	
	Lodgepole pine-----	70	4	219	59	
130:						
Winkler-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	64	3	147	50	
131:						
Winkler-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	64	3	147	50	
132:						
Winkler-----	Douglas-fir-----	56	6	277	83	Ponderosa pine,
	Ponderosa pine-----	75	4	203	62	Douglas-fir
133:						
Winkler-----	Douglas-fir-----	56	6	277	83	Ponderosa pine,
	Ponderosa pine-----	75	4	203	62	Douglas-fir
134:						
Winkler-----	Douglas-fir-----	45	4	196	60	Douglas-fir
	Ponderosa pine-----	64	3	147	50	
Rubble land.						
135:						
Winkler-----	Douglas-fir-----	56	6	277	83	Ponderosa pine,
	Ponderosa pine-----	75	4	203	62	Douglas-fir
Rock outcrop.						
137:						
Yourame-----	Ponderosa pine-----	87	6	284	80	Ponderosa pine,
	Douglas-fir-----	53	5	252	76	Douglas-fir

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS

(See text for a description of the limitations and hazards listed in this table)

Soil name and map symbol	Forest access road limitations or hazards
2: Ambrant-----	None
3: Ambrant-----	Areas of rock outcrop Slope
Rochester-----	Areas of rock outcrop Slope
Rock outcrop-----	Nonsoil material
11: Auggie-----	Dustiness Low soil strength
12: Bata-----	Dustiness Low soil strength
13: Bata-----	Dustiness Low soil strength
Waldbillig-----	Dustiness Low soil strength
14: Beeskove-----	Slope Water erosion
15: Beeskove-----	Areas of rock outcrop Slope Water erosion
Rock outcrop-----	Nonsoil material
23: Bignell-----	Low soil strength
24: Bignell-----	Low soil strength Slope Water erosion
Winkler-----	Slope
25: Bignell-----	Low soil strength Slope Water erosion
Winkler-----	Slope
27: Chickaman-----	Dustiness

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
28: Chickaman-----	Dustiness Low soil strength Slope Water erosion
29: Coerock-----	Areas of rock outcrop Depth to rock Dustiness
Rock outcrop-----	Nonsoil material
30: Coerock-----	Areas of rock outcrop Depth to rock Dustiness Slope
Rock outcrop-----	Nonsoil material
31: Courville-----	Dustiness Low soil strength
32: Courville-----	Dustiness Low soil strength Slope Water erosion
Mitten-----	Dustiness Slope
33: Crow-----	Dustiness Low soil strength Shrink swell potential
35: Elkner-----	None
Ovando-----	None
36: Evaro-----	Low soil strength
37: Evaro-----	Low soil strength Slope Water erosion
38: Felan-----	Dustiness Low soil strength
39: Felan-----	Dustiness Low soil strength Slope

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
40:	
Felan-----	Dustiness
	Low soil strength
41:	
Felan-----	Dustiness
	Low soil strength
	Slope
42:	
Glaciercreek-----	Dustiness
43:	
Glaciercreek variant----	None
Glaciercreek-----	Dustiness
49:	
Greenough-----	Dustiness
	Low soil strength
50:	
Hagstadt-----	Dustiness
	Low soil strength
51:	
Half Moon-----	Dustiness
	Low soil strength
53:	
Hollandlake-----	Low soil strength
54:	
Hollandlake-----	Low soil strength
Bata-----	Dustiness
	Low soil strength
55:	
Hollandlake-----	Low soil strength
	Slope
	Water erosion
Bata-----	Dustiness
	Low soil strength
	Slope
	Water erosion
56:	
Holloway-----	Dustiness
57:	
Holloway-----	Dustiness
	Slope
58:	
Holloway-----	Dustiness
59:	
Holloway-----	Dustiness
	Slope

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
60: Holloway-----	Areas of rock outcrop Dustiness Slope Water erosion
Rock outcrop-----	Nonsoil material
61: Jimlake-----	Dustiness Low soil strength
62: Jimlake-----	Dustiness Low soil strength Slope Water erosion
63: Lantern-----	None
64: Lantern-----	Slope
65: Lantern-----	Areas of rock outcrop Slope
Rock outcrop-----	Nonsoil material
66: Lolopeak-----	Boulders Slope Stones
67: Lolopeak-----	Areas of rock outcrop Boulders Slope Stones
Rock outcrop-----	Nonsoil material
68: Lubrecht-----	Dustiness Low soil strength Shrink swell potential
69: Mitten-----	Dustiness Slope Water erosion
70: Mitten-----	Dustiness Slope
Sharrott-----	Depth to rock Low soil strength Slope

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
71:	
Mitten-----	Dustiness Slope Water erosion
Tevis-----	Slope Water erosion
74:	
Ovando-----	Areas of rock outcrop Slope
Elkner-----	Areas of rock outcrop Slope
Rock outcrop-----	Nonsoil material
80:	
Petty-----	None
81:	
Petty-----	Slope
82:	
Petty-----	Boulders Slope
83:	
Petty-----	None
84:	
Petty-----	Boulders Slope Water erosion
85:	
Petty-----	Areas of rock outcrop Boulders Slope Water erosion
Rock outcrop-----	Nonsoil material
86:	
Phillcher-----	Dustiness
87:	
Phillcher-----	Areas of rock outcrop Dustiness Slope Water erosion
Rock outcrop-----	Nonsoil material
89:	
Repp-----	Low soil strength Slope
90:	
Repp-----	Low soil strength

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
91: Repp-----	Low soil strength Slope
92: Repp-----	Areas of rock outcrop Low soil strength Slope
Rock outcrop-----	Nonsoil material
95: Rumblecreek-----	Low soil strength
96: Selway-----	None
97: Selway-----	Slope
98: Selway-----	Boulders Slope
99: Sharrott-----	Areas of rock outcrop Depth to rock Low soil strength
Rock outcrop-----	Nonsoil material
100: Shooflin-----	Dustiness Low soil strength Shrink swell potential
102: Tevis-----	Slope Water erosion
103: Tevis-----	None
Mitten-----	Dustiness
104: Tevis-----	Areas of rock outcrop Slope Water erosion
Mitten-----	Areas of rock outcrop Dustiness Slope Water erosion
Rock outcrop-----	Nonsoil material
105: Totelake-----	None
106: Totelake-----	None

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
107: Totelake-----	None
108: Trapps-----	Low soil strength
109: Trapps-----	Low soil strength Slope Water erosion
112: Udorthents-----	Onsite investigation required
Glaciercreek-----	Dustiness
113: Upsata-----	None
115: Waldbillig-----	Dustiness Low soil strength
116: Waldbillig-----	Dustiness Low soil strength Slope Water erosion
117: Waldbillig-----	Dustiness Low soil strength
Auggie-----	Dustiness Low soil strength
118: Waldbillig-----	Dustiness Low soil strength
Holloway-----	Dustiness
119: Waldbillig-----	Dustiness Low soil strength Slope Water erosion
Holloway-----	Dustiness Slope
120: Waldbillig-----	Dustiness Low soil strength
Holloway-----	Dustiness
121: Waldbillig-----	Dustiness Low soil strength Slope

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
121: Holloway-----	Dustiness Slope
122: Whitore-----	Low soil strength
123: Whitore-----	Low soil strength Slope Water erosion
124: Wildgen-----	Low soil strength
125: Wildgen-----	Low soil strength
Winkler-----	None
126: Wildgen-----	Low soil strength Slope
Winkler-----	Slope
127: Wildgen-----	Low soil strength
Winkler-----	None
128: Wildgen-----	Low soil strength Slope
Winkler-----	Slope
129: Winfall-----	Low soil strength
130: Winkler-----	None
131: Winkler-----	Slope
132: Winkler-----	None
133: Winkler-----	Slope
134: Winkler-----	Areas of rubble land Slope
Rubble land-----	Nonsoil material
135: Winkler-----	Areas of rock outcrop Slope Water erosion

MAIN FOREST ACCESS ROAD LIMITATIONS AND HAZARDS--Continued

Soil name and map symbol	Forest access road limitations or hazards
135: Rock outcrop-----	Nonsoil material
137: Yourame-----	Low soil strength

Recreation

The soils of the survey area are rated in the table "Recreational Development" according to limitations that affect their suitability for recreation. The ratings are based on restrictive soil features, such as wetness, slope, and texture of the surface layer. Susceptibility to flooding is considered. Not considered in the ratings, but important in evaluating a site, are the location and accessibility of the area, the size and shape of the area and its scenic quality, the ability of the soil to support vegetation, access to water, potential water impoundment sites, and either access to public sewer lines or the capacity of the soil to absorb septic tank effluent. Soils subject to flooding are limited, in varying degrees, for recreational uses by the duration of flooding and the season when it occurs. Onsite assessment of the height, duration, intensity, and frequency of flooding is essential in planning recreational facilities.

Camp areas are tracts of land used intensively as sites for tents, trailers, and campers and for outdoor activities that accompany such sites. These areas require site preparation, such as shaping and leveling the tent and parking areas, stabilizing roads and intensively used areas, and installing sanitary facilities and utility lines. Camp areas are subject to heavy foot traffic and some vehicular traffic. The soils are rated on the basis of soil properties that influence the ease of developing camp areas and performance of the areas after development. Also considered are the soil properties that influence trafficability and promote the growth of vegetation after heavy use.

Picnic areas are natural or landscaped tracts of land that are subject to heavy foot traffic. Most vehicular traffic is confined to access roads and parking areas. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation after development. The surface of picnic areas should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Playgrounds are areas used intensively for baseball, football, or similar activities. These areas require a nearly level soil that is free of stones and that can

withstand heavy foot traffic and maintain an adequate cover of vegetation. The soils are rated on the basis of soil properties that influence the cost of shaping the site, trafficability, and the growth of vegetation. Slope and stoniness are the main concerns in developing playgrounds. The surface of the playgrounds should absorb rainfall readily, remain firm under heavy foot traffic, and not be dusty when dry.

Paths and trails are areas used for hiking and horseback riding. The areas should require little or no cutting and filling during site preparation. The soils are rated on the basis of soil properties that influence trafficability and erodibility. Paths and trails should remain firm under foot traffic and not be dusty when dry.

Golf fairways are subject to heavy foot traffic and some light vehicular traffic. Cutting or filling may be required. The best soils for use as golf fairways are firm when wet, are not dusty when dry, and are not subject to prolonged flooding during the period of use. They have moderate slopes and no stones or boulders on the surface. The suitability of the soil for tees or greens is not considered in rating the soils.

The interpretive ratings in this table help engineers, planners, and others to understand how soil properties influence recreational uses. Ratings for proposed uses are given in terms of limitations. Only the most restrictive features are listed. Other features may limit a specific recreational use.

The degree of soil limitation is expressed as slight, moderate, or severe.

Slight means that soil properties are favorable for the rated use. The limitations are minor and can be easily overcome. Good performance and low maintenance are expected.

Moderate means that soil properties are moderately favorable for the rated use. The limitations can be overcome or modified by special planning, design, or maintenance. During some part of the year, the expected performance may be less desirable than that of soils rated *slight*.

Severe means that soil properties are unfavorable for the rated use. Examples of limitations are slope,

bedrock near the surface, flooding, and a seasonal high water table. These limitations generally require major soil reclamation, special design, or intensive maintenance. Overcoming the limitations generally is difficult and costly.

The information in the table "Recreational

Development" can be supplemented by other information in this survey, for example, interpretations for dwellings without basements and for local roads and streets in the table "Building Site Development" and interpretations for septic tank absorption fields in the table "Sanitary Facilities."

RECREATIONAL DEVELOPMENT

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
1: Alberton-----	Moderate: dusty	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
2: Ambrant-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
3: Ambrant-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rochester-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
Rock outcrop.					
4: Aquic Haploxerolls.					
5: Aquic Udorthents.					
6: Aquolls.					
Aquepts.					
7: Argixerolls.					
Haploxerolls.					
8: Argixerolls.					
Haploxerolls.					
9: Argixerolls.					
Haploxerolls.					
10: Argixerolls.					
Haploxerolls.					
11: Auggie-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
12: Bata-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
13: Bata-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
14: Beeskove-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
15: Beeskove-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rock outcrop.					
16: Bigarm-----	Moderate: small stones, dusty	Moderate: small stones, dusty	Severe: small stones	Moderate: dusty	Moderate: small stones, large stones, droughty
17: Bigarm-----	Moderate: slope, small stones, dusty	Moderate: slope, small stones, dusty	Severe: slope, small stones	Moderate: dusty	Moderate: small stones, large stones, droughty
18: Bigarm-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope, dusty	Severe: slope
19: Bigarm-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
20: Bigarm-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rock outcrop.					
21: Biglake-----	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Severe: droughty

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
22: Biglake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
23: Bignell-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
24: Bignell-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones, droughty, slope
25: Bignell-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones, slope
26: Borochemists.					
27: Chickaman-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
28: Chickaman-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
29: Coerock-----	Severe: slope, small stones, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope, small stones, depth to rock	Severe: small stones	Severe: small stones, slope, depth to rock
Rock outcrop.					
30: Coerock-----	Severe: slope, small stones, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope, small stones	Severe: small stones, slope, depth to rock
Rock outcrop.					
31: Courville-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
32: Courville-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Mitten-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
33: Crow-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
34: Desmet-----	Moderate: dusty	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
35: Elkner-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Ovando-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
36: Evaro-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
37: Evaro-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
38: Felan-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
39: Felan-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
40: Felan-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
41: Felan-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
42: Glaciercreek----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
43: Glaciercreek variant-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
Glaciercreek----	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Moderate: small stones, large stones, droughty
44: Grantsdale-----	Moderate: dusty	Moderate: dusty	Moderate: dusty	Moderate: dusty	Slight
45: Grassvalley-----	Moderate: percs slowly	Moderate: percs slowly	Moderate: slope, percs slowly	Slight	Slight
46: Grassvalley-----	Moderate: percs slowly	Moderate: percs slowly	Severe: slope	Slight	Slight
47: Grassvalley-----	Moderate: slope, percs slowly	Moderate: slope, percs slowly	Severe: slope	Severe: erodes easily	Moderate: slope
48: Grassvalley-----	Severe: slope	Severe: slope	Severe: slope	Severe: erodes easily	Severe: slope
49: Greenough-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
50: Hagstadt-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope, depth to rock
51: Half Moon-----	Slight	Slight	Severe: slope	Slight	Moderate: large stones
52: Hanaker-----	Slight	Slight	Moderate: slope	Slight	Slight
53: Hollandlake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
54: Hollandlake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Bata-----	Severe:	Severe:	Severe:	Moderate:	Severe:

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
55: Hollandlake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Bata-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
56: Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
57: Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
58: Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
59: Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
60: Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rock outcrop.					
61: Jimlake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
62: Jimlake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
63: Lantern-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
64: Lantern-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
65: Lantern-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rock outcrop.					

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
66: Lolopeak-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: droughty, slope
67: Lolopeak-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: droughty, slope
Rock outcrop.					
68: Lubrecht-----	Moderate: slope	Moderate: slope	Severe: slope	Severe: erodes easily	Moderate: slope, depth to rock
69: Mitten-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
70: Mitten-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Sharrott-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Severe: slope	Severe: slope, depth to rock
71: Mitten-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Tevis-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
72: Moiese-----	Moderate: small stones, dusty	Moderate: small stones, dusty	Severe: small stones	Moderate: dusty	Moderate: small stones, large stones, droughty
73: Orthents.					
74: Ovando-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
Elkner-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.					

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
75: Perma-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
76: Perma-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
77: Perma-----	Moderate: small stones	Moderate: small stones	Severe: slope, small stones	Moderate: large stones	Moderate: small stones, large stones, droughty
78: Perma variant---	Slight	Slight	Moderate: large stones, slope, small stones	Slight	Moderate: large stones
79: Perma variant---	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
Perma-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: large stones, slope	Severe: slope
80: Petty-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
81: Petty-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
82: Petty-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope
83: Petty-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
84: Petty-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope
85: Petty-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: slope

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
85: Rock outcrop.					
86: Phillcher-----	Severe: slope	Severe: slope	Severe: slope	Moderate: slope	Severe: slope
87: Phillcher-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.					
88: Pits.					
89: Repp-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope	Severe: small stones, slope
90: Repp-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Moderate: slope	Severe: small stones, slope
91: Repp-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope	Severe: small stones, slope
92: Repp-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope	Severe: small stones, slope
Rock outcrop.					
93: Riverwash.					
94: Rock outcrop.					
Rubble land.					
95: Rumblecreek----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
96: Selway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
97: Selway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
98: Selway-----	Severe: slope	Severe: slope	Severe: large stones, slope, small stones	Severe: slope	Severe: droughty, slope
99: Sharrott-----	Severe: slope, depth to rock	Severe: slope, depth to rock	Severe: slope, small stones, depth to rock	Moderate: slope	Severe: slope, depth to rock
Rock outcrop.					
100: Shooflin-----	Moderate: slope, percs slowly	Moderate: slope, percs slowly	Severe: slope	Severe: erodes easily	Moderate: large stones, slope
101: Tally variant---	Slight	Slight	Moderate: slope	Slight	Moderate: droughty
102: Tevis-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
103: Tevis-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: droughty, slope
Mitten-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
104: Tevis-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: droughty, slope
Mitten-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rock outcrop.					
105: Totelake-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
106: Totelake-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
107: Totelake-----	Severe: large stones	Severe: large stones	Severe: large stones, small stones	Slight	Severe: droughty

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
108: Trapps-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
109: Trapps-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
110: Turrah-----	Severe: wetness	Moderate: wetness, percs slowly	Severe: wetness	Moderate: wetness	Moderate: wetness
111: Udifluents.					
112: Udorthents.					
Glaciercreek---	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Moderate: small stones, large stones, droughty
113: Upsata-----	Moderate: small stones	Moderate: small stones	Severe: small stones	Slight	Severe: droughty
114: Urban land.					
115: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
116: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
117: Waldbillig-----	Moderate: slope, small stones	Moderate: slope, small stones	Severe: slope, small stones	Slight	Moderate: small stones, large stones, droughty
Auggie-----	Moderate: slope	Moderate: slope	Severe: slope	Slight	Moderate: slope
118: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
119: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
120: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
121: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Holloway-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
122: Whitore-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
123: Whitore-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
124: Wildgen-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
125: Wildgen-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
126: Wildgen-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
127: Wildgen-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones	Severe: small stones, droughty, slope
128: Wildgen-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones, droughty, slope
129: Winfall-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
130: Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones	Severe: small stones, slope
131: Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones, slope
132: Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope
133: Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
134: Winkler-----	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: slope, small stones	Severe: small stones, slope
Rubble land.					
135: Winkler-----	Severe: slope	Severe: slope	Severe: slope, small stones	Severe: slope	Severe: slope
Rock outcrop.					
136: Xerofluvents.					

RECREATIONAL DEVELOPMENT--Continued

Map symbol and soil name	Camp areas	Picnic areas	Playgrounds	Paths and trails	Golf fairways
137: Yourame-----	Severe: slope	Severe: slope	Severe: slope, small stones	Moderate: slope	Severe: slope

Wildlife Habitat

Soils affect the kind and amount of vegetation that is available to wildlife as food and cover. They also affect the construction of water impoundments. If food, cover, or water is missing, inadequate, or inaccessible, wildlife will be scarce or will not inhabit the area.

If the soils have potential for habitat development, wildlife habitat can be created or improved by planting appropriate vegetation, properly managing the existing plant cover, and fostering the natural establishment of desirable plants.

Elements of Wildlife Habitat

The elements of wildlife habitat are described in the following paragraphs.

Grain and seed crops are domestic grains and seed-producing herbaceous plants used by wildlife. Examples are wheat, rye, oats, and barley.

Grasses and legumes are domestic perennial grasses and herbaceous legumes planted for wildlife food and cover. Examples are fescue, bromegrass, timothy, orchardgrass, clover, alfalfa, trefoil, reed canarygrass, and crownvetch.

Wild herbaceous plants are native or naturally established grasses and forbs, including weeds, that provide food and cover for wildlife. Examples are bluestem, indiagrass, blueberry, goldenrod, lambsquarters, dandelions, blackberry, ragweed, wheatgrass, fescue, and nightshade.

The major soil properties affecting the growth of grain and forage crops and wild herbaceous plants are depth of the root zone, texture of the surface layer, the amount of water available to plants, wetness, salinity or sodicity, and flooding. The length of the growing season also is important.

Hardwood trees and woody understory produce nuts or other fruit, buds, catkins, twigs, bark, and foliage that wildlife eat. Examples are oak, poplar, boxelder, birch, maple, green ash, willow, and American elm. Examples of fruit-producing shrubs that are suitable for planting on soils that have good potential for these plants are hawthorn, honeysuckle, American plum, redosier dogwood, chokecherry, serviceberry, silver buffaloberry, and crabapple.

Coniferous plants are cone-bearing trees, shrubs, or ground cover that provide habitat or supply food in the form of browse, seed, or fruitlike cones. Examples are pine, spruce, hemlock, fir, yew, cedar, larch, and juniper.

The major soil properties affecting the growth of hardwood and coniferous trees and shrubs are depth of the root zone, the amount of water available to plants, and wetness.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Wetland plants produce food or cover for wetland wildlife. Examples of these plants are smartweed, wild millet, rushes, sedges, bulrushes, wild rice, arrowhead, waterplantain, pickerelweed, and cattail.

The major soil properties affecting wetland plants are texture of the surface layer, wetness, acidity or alkalinity, and slope.

Shallow water areas have an average depth of less than 5 feet. They are useful as habitat for some wildlife species. They are naturally wet areas or are created by dams, levees, or water-control measures in marshes or streams. Examples are muskrat marshes, waterfowl feeding areas, wildlife watering developments, beaver ponds, and other wildlife ponds.

The major soil properties affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability.

Kinds of Wildlife Habitat

Habitat for openland wildlife consists of cropland, pasture, meadows, and areas that are overgrown with grasses, herbs, and shrubs. These areas produce grain and seed crops, grasses and legumes, and wild herbaceous plants. The wildlife attracted to these areas include Hungarian partridge, pheasant, sharp-tailed grouse, sage grouse, meadowlark, field sparrow, killdeer, cottontail rabbit, and red fox.

Habitat for woodland wildlife consists of areas of hardwoods or conifers or a mixture of these and associated grasses, legumes, and wild herbaceous plants. The wildlife attracted to this habitat include wild

turkey, ruffed grouse, thrushes, woodpeckers, owls, tree squirrels, porcupine, raccoon, deer, elk, and black bear.

Habitat for wetland wildlife consists of open, marshy or swampy, shallow water areas that support water-tolerant plants. The wildlife attracted to this habitat include ducks, geese, herons, bitterns, rails, kingfishers, muskrat, otter, mink, and beaver.

Habitat for rangeland wildlife consists of areas of shrubs and wild herbaceous plants. The wildlife attracted to rangeland include antelope, deer, sage grouse, meadowlark, and lark bunting.

Wildlife in the Missoula County Area

The survey area provides a diversity of habitats for wildlife, including rangeland, coniferous forests, mountaineous areas that range from rolling foothills to glaciated peaks, riparian woodland, dry and irrigated cropland, streams and rivers, ponds, marshes, and reservoirs.

Moose are found in the areas drained by Glacier and Elk Creek in the upper Swan River Valley, in the area drained by Elk Creek southeast of Greenough, and in the northern Sapphire Mountains southeast of Missoula. They graze high-elevation spruce and fir forests in summer and fall and move along drainageways to winter ranges at the lower elevations as snow accumulates on the higher slopes. The moose are primarily browsers and feed on a variety of willows and other deciduous shrubs, especially during the winter. Forbs are an important part of their spring and summer diet.

Hunters consider the Rocky Mountain elk to be Montana's most prized big game animal. Elk are found in all the mountain ranges of the survey area. Elk habitats are classified as either grass or browse ranges based on the availability of winter food. Browse ranges predominate in the survey area. Elk spend their summers and falls at relatively high elevations, where moist, lush forests are interspersed with grassy mountain meadows. They begin to move to lower elevations late in fall, depending upon the amount of snowfall. In forested environments, elk thrive during the shrub stage of plant succession. Elk numbers are lower in areas where coniferous trees grow in old burns and clearcuts and replace browse and herbaceous plants. Elk prefer bunchgrass ranges, but they are adaptable and are also in timbered mountains and canyons.

Both white-tailed deer and mule deer are throughout the survey area. White-tailed deer generally inhabit the lower areas and valleys, stream bottoms, and foothills. Their winter ranges are along the Clark Fork, Bitterroot, Blackfoot, and Clearwater Rivers. Mule deer are throughout most of the survey area but are especially

numerous at the mid and high elevations and along the foothills of major mountain ranges.

A modest population of bighorn sheep are along the Clark Fork River in the western part of the survey area. Mountain goats are in the rugged northern mountains of Missoula County outside the survey area.

Black bear are in a variety of forest habitats that range from mountain meadows to spruce and fir forests. They are most common in the mountain ranges in the survey area. Grizzly bear are known to be in the northern mountains of Missoula County, bordering the Swan River Valley. Except for built-up areas, habitat for bear is throughout the survey area.

Ring-necked pheasants and gray partridge reside in the bottom land in the Bitterroot and Clark Fork River Valleys, south and west of Missoula. These introduced birds are supported by varied land use patterns that include small grain, irrigated and dry cropland, annual forbs, and brushy cover.

Land management practices that are beneficial to pheasants and gray partridge include proper grazing use, protection of woody cover from burning or eradication, and the retention of stubble and waste grain during winter through elimination of fall tillage. Woody plantings, which include shelterbelts, field hedgerows, and plantings in cropland areas for the control of erosion, provide habitat for partridge, pheasants, and a variety of nongame birds. The major areas of bottom land provide habitat for ringneck pheasants. Such habitat includes irrigated and dry cropland, brushy ditchbanks, and brushy drainageways.

Merriams turkeys have been introduced to the survey area. They are commonly found in the foothills and bottom land of the Clark Fork, Bitterroot, and lower Blackfoot River Valleys. A few chukar partridge are in the foothills of the Sapphire Mountains south of Missoula. A small population of Columbian sharp-tailed grouse are in the Blackfoot River Valley in the eastern end of Missoula County.

Three species of forest-dwelling grouse—blue grouse, spruce grouse, and ruffed grouse—are common in the coniferous forests and riparian woodlands. A variety of habitats is important to forest grouse throughout the year.

Blue grouse winter at high elevations. In early spring they move to semi-open areas of timber at lower elevations for breeding and brood rearing. Ruffed grouse inhabit areas with a dense cover of mixed conifers and deciduous trees and shrubs. They are mostly along stream bottoms. Adult ruffed grouse may spend most of their lives in an area less than 2 square miles in size.

In Montana, the habitat for blue grouse is closely associated with the distribution pattern of true firs and

Douglas-fir as well as the soil associations that support these trees. The extent and quality of forest grouse habitat is largely determined by forest management practices, grazing, and fire. The brushy draws, stream bottoms, mixed forests, and grazeable woodlands throughout the survey area provide the major habitat for forest grouse.

Numerous marshes, ponds, and reservoirs throughout the survey area provide habitat for waterfowl during spring and fall migrations. Ducks, geese, and a variety of shore and marsh birds use these bodies of water for resting, nesting, and rearing of young.

Beaver, mink, muskrat, and raccoon are along the principal watercourses. Cottontail rabbits, badger, ground squirrels, coyotes, bobcats, and a variety of small mammals are throughout the survey area.

Populations of game and nongame species can be enhanced through application of conservation practices

that improve habitat. These practices include the development of odd or irregularly shaped areas in and adjacent to farmland, protection of such areas from fire or grazing, and the establishment of woody vegetation that provides winter shelter. Wildlife habitat may also be enhanced through increased application of commonly employed conservation practices, including proper grazing, planned grazing systems, stripcropping, minimum tillage, field windbreaks, and the construction of ponds.

Excellent sport fishing is available in the rivers and streams of Missoula County. The Blackfoot, Swan, Clark Fork, and Bitterroot Rivers, for example, support a variety of game fish, including rainbow, brook, cutthroat, and brown trout. Numerous smaller streams, ponds, and reservoirs throughout the survey area provide abundant angling opportunities for sport fishermen.

Engineering

This section provides information for planning land uses related to urban development and to water management. Soils are rated for various uses, and the most limiting features are identified. Ratings are given for building site development, sanitary facilities, construction materials, and water management. The ratings are based on observed performance of the soils and on the estimated data and test data in the "Soil Properties" section.

Information in this section is intended for land use planning, for evaluating land use alternatives, and for planning site investigations prior to design and construction. The information, however, has limitations. For example, estimates and other data generally apply only to that part of the soil within a depth of 5 or 6 feet. Because of the map scale, small areas of different soils may be included within the mapped areas of a specific soil.

The information is not site specific and does not eliminate the need for onsite investigation of the soils or for testing and analysis by personnel experienced in the design and construction of engineering works.

Government ordinances and regulations that restrict certain land uses or impose specific design criteria were not considered in preparing the information in this section. Local ordinances and regulations should be considered in planning, in site selection, and in design.

Soil properties, site features, and observed performance were considered in determining the ratings in this section. During the fieldwork for this soil survey, determinations were made about grain-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 or 6 feet of the surface, soil wetness, depth to a seasonal high water table, slope, likelihood of flooding, natural soil structure aggregation, and soil density. Data were collected about kinds of clay minerals, mineralogy of the sand and silt fractions, and the kinds of adsorbed cations. Estimates were made for erodibility, permeability, corrosivity, shrink-swell potential, available water capacity, and other behavioral characteristics affecting engineering uses.

This information can be used to evaluate the potential of areas for residential, commercial, industrial,

and recreational uses; make preliminary estimates of construction conditions; evaluate alternative routes for roads, streets, highways, pipelines, and underground cables; evaluate alternative sites for sanitary landfills, septic tank absorption fields, and sewage lagoons; plan detailed onsite investigations of soils and geology; locate potential sources of gravel, sand, earthfill, and topsoil; plan drainage systems, irrigation systems, ponds, terraces, and other structures for soil and water conservation; and predict performance of proposed small structures and pavements by comparing the performance of existing similar structures on the same or similar soils.

The information in the tables, along with the soil maps, the soil descriptions, and other data provided in this survey, can be used to make additional interpretations.

Some of the terms used in this soil survey have a special meaning in soil science and are defined in the "Glossary."

Building Site Development

The table "Building Site Development" shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, local roads and streets, and lawns and landscaping. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increases in construction costs, and possibly increased maintenance are required. Special feasibility studies may be required where the soil limitations are severe.

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for basements, graves, utility lines, open ditches, and other purposes. The ratings are based on soil properties, site features, and observed performance of the soils. The ease of digging,

filling, and compacting is affected by the depth to bedrock, a cemented pan, or a very firm dense layer; stone content; soil texture; and slope. The time of the year that excavations can be made is affected by the depth to a seasonal high water table and the susceptibility of the soil to flooding. The resistance of the excavation walls or banks to sloughing or caving is affected by soil texture and depth to the water table.

Dwellings and small commercial buildings are structures built on shallow foundations on undisturbed soil. The load limit is the same as that for single-family dwellings no higher than three stories. Ratings are made for small commercial buildings without basements, for dwellings with basements, and for dwellings without basements. The ratings are based on soil properties, site features, and observed performance of the soils. A high water table, flooding, shrinking and swelling, and organic layers can cause the movement of footings. A high water table, depth to bedrock or to a cemented pan, large stones, and flooding affect the ease of excavation and construction. Landscaping and grading that require cuts and fills of more than 5 or 6 feet are not considered.

Local roads and streets have an all-weather surface and carry automobile and light truck traffic all year. They have a subgrade of cut or fill soil material; a base of gravel, crushed rock, or stabilized soil material; and a flexible or rigid surface. Cuts and fills generally are limited to less than 6 feet. The ratings are based on soil properties, site features, and observed performance of the soils. Depth to bedrock or to a cemented pan, a high water table, flooding, large stones, and slope affect the ease of excavating and grading. Soil strength (as inferred from the engineering classification of the soil), shrink-swell potential, potential for frost action, and depth to a high water table affect the traffic-supporting capacity.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The ratings are based on soil properties, site features, and observed performance of the soils. Soil reaction, a high water table, depth to bedrock or to a cemented pan, the available water capacity in the upper 40 inches, and the content of salts, sodium, and sulfidic materials affect plant growth. Flooding, wetness, slope, stoniness, and the amount of sand, clay, or organic matter in the surface layer affect trafficability after vegetation is established.

Sanitary Facilities

The table "Sanitary Facilities" shows the degree and the kind of soil limitations that affect septic tank absorption fields, sewage lagoons, and sanitary

landfills. It also shows the suitability of the soils for use as a daily cover for landfill.

Soil properties are important in selecting sites for sanitary facilities and in identifying limiting soil properties and site features to be considered in planning, design, and installation. Soil limitation ratings of *slight*, *moderate*, or *severe* are given for septic tank absorption fields, sewage lagoons, and trench and area sanitary landfills. Soil suitability ratings of *good*, *fair*, and *poor* are given for daily cover for landfill.

A rating of *slight* or *good* indicates that the soils have no limitations or that the limitations can be easily overcome. Good performance and low maintenance can be expected. A rating of *moderate* or *fair* indicates that the limitations should be recognized but generally can be overcome by good management or special design. A rating of *severe* or *poor* indicates that overcoming the limitations is difficult or impractical. Increased maintenance may be required.

Septic tank absorption fields are areas in which subsurface systems of tile or perforated pipe distribute effluent from a septic tank into the natural soil. The centerline of the tile is assumed to be at a depth of 24 inches. Only the part of the soil between depths of 24 and 60 inches is considered in making the ratings. The soil properties and site features considered are those that affect the absorption of the effluent, those that affect the construction and maintenance of the system, and those that may affect public health.

The ratings are based on soil properties, site features, and observed performance of the soils. Permeability, a high water table, depth to bedrock or to a cemented pan, and flooding affect absorption of the effluent. Large stones and bedrock or a cemented pan interfere with installation.

Unsatisfactory performance of septic tank absorption fields, including excessively slow absorption of effluent, surfacing of effluent, and hillside seepage, can affect public health. Ground water can be polluted if highly permeable sand and gravel or fractured bedrock is less than 4 feet below the base of the absorption field, if slope is excessive, or if the water table is near the surface. There must be unsaturated soil material beneath the absorption field to filter the effluent effectively. Many local ordinances require that this material be of a certain thickness.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted, relatively impervious soil material. Aerobic lagoons generally are designed to hold the sewage within a depth of 2 to 5 feet. Relatively impervious soil material for the lagoon floor and sides is desirable to

minimize seepage and contamination of local ground water.

The table "Sanitary Facilities" gives ratings for the natural soil that makes up the lagoon floor. The surface layer and, generally, 1 or 2 feet of soil material below the surface layer are excavated to provide material for the embankments. The ratings are based on soil properties, site features, and observed performance of the soils. Considered in the ratings are slope, permeability, a high water table, depth to bedrock or to a cemented pan, flooding, large stones, and content of organic matter.

Excessive seepage resulting from rapid permeability in the soil or a water table that is high enough to raise the level of sewage in the lagoon causes a lagoon to function unsatisfactorily. Pollution results if seepage is excessive or if floodwater overtops the lagoon. A high content of organic matter is detrimental to proper functioning of the lagoon because it inhibits aerobic activity. Slope, bedrock, and cemented pans can cause construction problems, and large stones can hinder compaction of the lagoon floor.

Trench sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil that is excavated from the trench. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. Soil properties that influence the risk of pollution, the ease of excavation, trafficability, and revegetation are the major considerations in rating the soils.

Area sanitary landfill is an area where solid waste is disposed of by placing refuse in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil that is imported from a source away from the site. A final cover of soil at least 2 feet thick is placed over the completed landfill. Soil properties that influence trafficability, revegetation, and the risk of pollution are the main considerations in rating the soils for area sanitary landfills.

Both types of landfill must be able to bear heavy vehicular traffic. Both types involve a risk of ground-water pollution. The ratings in the table "Sanitary Facilities" are based on soil properties, site features, and observed performance of the soils. Permeability, depth to bedrock or to a cemented pan, a high water table, slope, and flooding affect both types of landfill. Texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium affect trench landfills. Unless otherwise stated, the ratings apply only

deeper trenches, a limitation rated slight or moderate may not be valid. Onsite investigation is needed.

Daily cover for landfill is the soil material that is used to cover compacted solid waste in an area sanitary landfill. The soil material is obtained offsite, transported to the landfill, and spread over the waste. The suitability of a soil for use as cover is based on properties that affect workability and the ease of digging, moving, and spreading the material over the refuse daily during both wet and dry periods.

Soil texture, wetness, coarse fragments, and slope affect the ease of removing and spreading the material during wet and dry periods. Loamy or silty soils that are free of large stones or excess gravel are the best cover for a landfill. Clayey soils are sticky or cloddy and are difficult to spread; sandy soils are subject to soil blowing.

After soil material has been removed, the soil material remaining in the borrow area must be thick enough over bedrock, a cemented pan, or the water table to permit revegetation. The soil material used as final cover for a landfill should be suitable for plants. The surface layer generally has the best workability, more organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

Waste Management

Soil properties are important when organic waste is applied as fertilizer and wastewater is applied in irrigated areas. They also are important when the soil is used as a medium for the treatment and disposal of the organic waste and wastewater. Unfavorable soil properties can result in environmental damage.

The use of organic waste and wastewater as production resources results in energy and resource conservation and minimizes the problems associated with waste disposal. If disposal is the goal, applying a maximum amount of the organic waste or the wastewater to a minimal area holds costs to a minimum and environmental damage is the main hazard. If reuse is the goal, a minimum amount should be applied to a maximum area and environmental damage is unlikely.

Interpretations developed for waste management may include ratings for manure- and food-processing waste, municipal sewage sludge, use of wastewater for irrigation, and treatment of wastewater by slow rate, overland flow, and rapid infiltration processes.

Specific information regarding waste management is available at the local office of the Natural Resources Conservation Service or the Cooperative Extension

Construction Materials

The table "Construction Materials" gives information about the soils as a source of roadfill, sand, gravel, and topsoil. The soils are rated *good*, *fair*, or *poor* as a source of roadfill and topsoil. They are rated as a *probable* or *improbable* source of sand and gravel.

Roadfill is soil material that is excavated in one place and used in road embankments in another place. In the table "Construction Materials," the soils are rated as a source of roadfill for low embankments, generally less than 6 feet high and less exacting in design than higher embankments.

The ratings are for the soil material below the surface layer to a depth of 5 or 6 feet. It is assumed that soil layers will be mixed during excavating and spreading. Many soils have layers of contrasting suitability within their profile. The table showing engineering index properties provides detailed information about each soil layer. This information can help to determine the suitability of each layer for use as roadfill. The performance of soil after it is stabilized with lime or cement is not considered in the ratings.

The ratings are based on soil properties, site features, and observed performance of the soils. The thickness of suitable material is a major consideration. The ease of excavation is affected by large stones, a high water table, and slope. How well the soil performs in place after it has been compacted and drained is determined by its strength (as inferred from the engineering classification of the soil) and shrink-swell potential.

Soils rated *good* contain significant amounts of sand or gravel or both. They have at least 5 feet of suitable material, a low shrink-swell potential, few cobbles and stones, and slopes of 15 percent or less. Depth to the water table is more than 3 feet. Soils rated *fair* are more than 35 percent silt- and clay-sized particles and have a plasticity index of less than 10. They have a moderate shrink-swell potential, slopes of 15 to 25 percent, or many stones. Depth to the water table is 1 to 3 feet. Soils rated *poor* have one or more of the following characteristics: a plasticity index of more than 10, a high shrink-swell potential, many stones, slopes of more than 25 percent, or a water table at a depth of less than 1 foot. They may have layers of suitable material, but the material is less than 3 feet thick.

Sand and *gravel* are natural aggregates suitable for commercial use with a minimum of processing. They are used in many kinds of construction. Specifications for each use vary widely. In the table "Construction Materials," only the probability of finding material in suitable quantity in or below the soil is evaluated. The

suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material.

The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the engineering classification of the soil), the thickness of suitable material, and the content of rock fragments. Kinds of rock, acidity, and stratification are given in the soil series descriptions. Gradation of grain sizes is given in the table on engineering index properties.

A soil rated as a probable source has a layer of clean sand or gravel or a layer of sand or gravel that is up to 12 percent silty fines. This material must be at least 3 feet thick and less than 50 percent, by weight, large stones. All other soils are rated as an improbable source. Coarse fragments of soft bedrock, such as shale and siltstone, are not considered to be sand and gravel.

Topsoil is used to cover an area so that vegetation can be established and maintained. The upper 40 inches of a soil is evaluated for use as topsoil. Also evaluated is the reclamation potential of the borrow area.

Plant growth is affected by toxic material and by such properties as soil reaction, available water capacity, and fertility. The ease of excavating, loading, and spreading is affected by rock fragments, slope, a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, a water table, rock fragments, bedrock, and toxic material.

Soils rated *good* have friable, loamy material to a depth of at least 40 inches. They are free of stones and cobbles, have little or no gravel, and have slopes of less than 8 percent. They are low in content of soluble salts, are naturally fertile or respond well to fertilizer, and are not so wet that excavation is difficult.

Soils rated *fair* are sandy soils, loamy soils that have a relatively high content of clay, soils that have only 20 to 40 inches of suitable material, soils that have an appreciable amount of gravel, stones, or soluble salts, or soils that have slopes of 8 to 15 percent. The soils are not so wet that excavation is difficult.

Soils rated *poor* are very sandy or clayey, have less than 20 inches of suitable material, have a large amount of gravel, stones, or soluble salts, have slopes of more than 15 percent, or have a seasonal high water table at or near the surface.

The surface layer of most soils generally is preferred for topsoil because of its organic matter content. Organic matter greatly increases the absorption and retention of moisture and nutrients for plant growth.

Water Management

The table "Water Management" gives information on the soil properties and site features that affect water management. The degree and kind of soil limitations are given for pond reservoir areas; embankments, dikes, and levees; and aquifer-fed excavated ponds. The limitations are considered *slight* if soil properties and site features generally are favorable for the indicated use and limitations are minor and are easily overcome; *moderate* if soil properties or site features are not favorable for the indicated use and special planning, design, or maintenance is needed to overcome or minimize the limitations; and *severe* if soil properties or site features are so unfavorable or so difficult to overcome that special design, significant increase in construction costs, and possibly increased maintenance are required.

This table also gives for each soil the restrictive features that affect drainage, irrigation, terraces and diversions, and grassed waterways.

Pond reservoir areas hold water behind a dam or embankment. Soils best suited to this use have low seepage potential in the upper 60 inches. The seepage potential is determined by the permeability of the soil and the depth to fractured bedrock or other permeable material. Excessive slope can affect the storage capacity of the reservoir area.

Embankments, dikes, and levees are raised structures of soil material, generally less than 20 feet high, constructed to impound water or to protect land against overflow. In the table "Water Management," the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even more than the height of the embankment can affect performance and safety of the embankment. Generally, deeper onsite investigation is needed to determine these properties.

Soil material in embankments must be resistant to seepage, piping, and erosion and have favorable compaction characteristics. Unfavorable features include less than 5 feet of suitable material and a high content of stones or boulders, organic matter, or salts or sodium. A high water table affects the amount of usable material. It also affects trafficability.

Aquifer-fed excavated ponds are pits or dugouts that extend to a ground-water aquifer or to a depth below a

only by surface runoff and embankment ponds that impound water 3 feet or more above the original surface. Excavated ponds are affected by depth to a permanent water table, permeability of the aquifer, and quality of the water as inferred from the salinity of the soil. Depth to bedrock and the content of large stones affect the ease of excavation.

Drainage is the removal of excess surface and subsurface water from the soil. How easily and effectively the soil is drained depends on the depth to bedrock, to a cemented pan, or to other layers that affect the rate of water movement; permeability; depth to a high water table or depth of standing water if the soil is subject to ponding; slope; susceptibility to flooding; subsidence of organic layers; and the potential for frost action. Excavating and grading and the stability of ditchbanks are affected by depth to bedrock or to a cemented pan, large stones, slope, and the hazard of cutbanks caving. The productivity of the soil after drainage is adversely affected by extreme acidity or by toxic substances in the root zone, such as salts, sodium, or sulfur. Availability of drainage outlets is not considered in the ratings.

Irrigation is the controlled application of water to supplement rainfall and support plant growth. The design and management of an irrigation system are affected by depth to the water table, the need for drainage, flooding, available water capacity, intake rate, permeability, erosion hazard, and slope. The construction of a system is affected by large stones and depth to bedrock or to a cemented pan. The performance of a system is affected by the depth of the root zone, the amount of salts or sodium, and soil reaction.

Terraces and diversions are embankments or a combination of channels and ridges constructed across a slope to control erosion and conserve moisture by intercepting runoff. Slope, wetness, large stones, and depth to bedrock or to a cemented pan affect the construction of terraces and diversions. A restricted rooting depth, a severe hazard of soil blowing or water erosion, an excessively coarse texture, and restricted permeability adversely affect maintenance.

Grassed waterways are natural or constructed channels, generally broad and shallow, that conduct surface water to outlets at a nonerosive velocity. Large stones, wetness, slope, and depth to bedrock or to a cemented pan affect the construction of grassed waterways. A hazard of soil blowing, low available water capacity, restricted rooting depth, toxic substances such as salts or sodium, and restricted permeability adversely affect the growth and

BUILDING SITE DEVELOPMENT

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
1: Alberton-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Slight
2: Ambrant-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
3: Ambrant-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rochester-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Rock outcrop.						
4: Aquic Haploxerolls.						
5: Aquic Udorthents.						
6: Aquolls. Aquepts.						
7: Argixerolls. Haploxerolls.						
8: Argixerolls. Haploxerolls.						
9: Argixerolls. Haploxerolls.						
10: Argixerolls. Haploxerolls.						
11: Auggie-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength, frost action	Moderate: slope

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
12: Bata-----	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: small stones, large stones, droughty
13: Bata-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
14: Beeskove-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
15: Beeskove-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
16: Bigarm-----	Severe: cutbanks cave	Slight	Slight	Slight	Moderate: frost action	Moderate: small stones, large stones, droughty
17: Bigarm-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: small stones, large stones, droughty
18: Bigarm-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
19: Bigarm-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
20: Bigarm-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
21: Biglake-----	Severe: cutbanks cave	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope	Severe: droughty
22: Biglake-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
33: Crow-----	Moderate: too clayey, slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: large stones, slope
34: Desmet-----	Slight	Slight	Slight	Slight	Moderate: frost action	Slight
35: Elkner-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Ovando-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
36: Evaro-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
37: Evaro-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
38: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
39: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
40: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
41: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
42: Glaciercreek----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: small stones, large stones, droughty
43: Glaciercreek variant-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: slope
Glaciercreek----	Severe: cutbanks cave	Moderate: slope, large stones	Moderate: slope, large stones	Severe: slope	Moderate: slope, large stones	Moderate: small stones, large stones, droughty
44: Grantsdale-----	Severe:	Slight	Slight	Slight	Moderate:	Slight

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
45: Grassvalley-----	Moderate: too clayey	Slight	Slight	Slight	Severe: low strength	Slight
46: Grassvalley-----	Moderate: too clayey	Slight	Slight	Moderate: slope	Severe: low strength	Slight
47: Grassvalley-----	Moderate: too clayey, slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: slope
48: Grassvalley-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: low strength, slope	Severe: slope
49: Greenough-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength, frost action	Moderate: large stones, slope
50: Hagstadt-----	Moderate: depth to rock, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Severe: low strength, frost action	Moderate: slope, depth to rock
51: Half Moon-----	Slight	Slight	Slight	Moderate: slope	Moderate: low strength, frost action	Moderate: large stones
52: Hanaker-----	Slight	Slight	Slight	Slight	Severe: low strength	Slight
53: Hollandlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
54: Hollandlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Bata-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
55: Hollandlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Bata-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
56: Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
57: Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
58: Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
59: Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
60: Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
61: Jimlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
62: Jimlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
63: Lantern-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
64: Lantern-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
65: Lantern-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
66: Lolopeak-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
67: Lolopeak-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Rock outcrop.						

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
68: Lubrecht-----	Moderate: depth to rock, too clayey, slope	Moderate: slope	Moderate: depth to rock, slope	Severe: slope	Severe: low strength	Moderate: slope, depth to rock
69: Mitten-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
70: Mitten-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Sharrott-----	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
71: Mitten-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Tevis-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
72: Moiese-----	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: small stones, large stones, droughty
73: Orthents.						
74: Ovando-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Elkner-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
75: Perma-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
76: Perma-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
77: Perma-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
78: Perma variant---	Slight	Slight	Slight	Moderate: slope	Moderate: frost action	Moderate: large stones
79: Perma variant---	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Perma-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
80: Petty-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
81: Petty-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
82: Petty-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
83: Petty-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
84: Petty-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
85: Petty-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
86: Phillcher-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
87: Phillcher-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
88: Pits.						

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
89: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: small stones, slope
90: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: small stones, slope
91: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: small stones, slope
92: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: small stones, slope
Rock outcrop.						
93: Riverwash.						
94: Rock outcrop.						
Rubble land.						
95: Rumblecreek-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
96: Selway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
97: Selway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
98: Selway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
99: Sharrott-----	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock	Severe: depth to rock, slope	Severe: slope, depth to rock
Rock outcrop.						
100: Shooflin-----	Moderate: too clayey, slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength	Moderate: large stones, slope

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
101: Tally variant---	Severe: cutbanks cave	Slight	Slight	Slight	Slight	Moderate: droughty
102: Tevis-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
103: Tevis-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Mitten-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
104: Tevis-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: droughty, slope
Mitten-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Rock outcrop.						
105: Totalake-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Moderate: small stones, large stones, droughty
106: Totalake-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
107: Totalake-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: frost action, large stones	Severe: droughty
108: Trapps-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
109: Trapps-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
110: Turrah-----	Severe: wetness	Severe: wetness	Severe: wetness	Severe: wetness	Severe: low strength, frost action	Moderate: wetness
111: Udifluvents.						
112: Udorthents.						

BUILDING SITE DEVELOPMENT--Continued

Map symbol and soil name	Shallow excavations	Dwellings without basements	Dwellings with basements	Small commercial buildings	Local roads and streets	Lawns and landscaping
112: Glaciercreek----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: large stones	Moderate: small stones, large stones, droughty
113: Upsata-----	Severe: cutbanks cave	Moderate: large stones	Moderate: large stones	Moderate: slope, large stones	Moderate: large stones	Severe: droughty
114: Urban land.						
115: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
116: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
117: Waldbillig-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Moderate: slope, frost action	Moderate: small stones, large stones, droughty
Auggie-----	Moderate: slope	Moderate: slope	Moderate: slope	Severe: slope	Severe: low strength, frost action	Moderate: slope
118: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
119: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
120: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
121: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope
Holloway-----	Severe: cutbanks cave, slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Severe: slope

SANITARY FACILITIES

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
1: Alberton-----	Severe: poor filter	Severe: seepage	Moderate: too sandy	Slight	Fair: too sandy
2: Ambrant-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, too sandy	Severe: seepage, slope	Poor: seepage, too sandy, small stones
3: Ambrant-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, too sandy	Severe: seepage, slope	Poor: seepage, too sandy, small stones
Rochester-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, too sandy	Severe: seepage, slope	Poor: seepage, too sandy, small stones
Rock outcrop.					
4: Aquic Haploxerolls.					
5: Aquic Udorthents.					
6: Aquolls. Aquepts.					
7: Argixerolls. Haploxerolls.					
8: Argixerolls. Haploxerolls.					
9: Argixerolls. Haploxerolls.					
10: Argixerolls. Haploxerolls.					

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
11: Auggie-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
12: Bata-----	Severe: percs slowly	Moderate: seepage, slope	Moderate: too clayey	Slight	Poor: small stones
13: Bata-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
14: Beeskove-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
15: Beeskove-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
Rock outcrop.					
16: Bigarm-----	Slight	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
17: Bigarm-----	Moderate: slope	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: small stones
18: Bigarm-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
19: Bigarm-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
20: Bigarm-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
Rock outcrop.					

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
21: Biglake-----	Severe: poor filter	Severe: seepage, slope	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
22: Biglake-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, too sandy	Severe: seepage, slope	Poor: seepage, too sandy, small stones
23: Bignell-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, small stones, slope
24: Bignell-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, small stones, slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
25: Bignell-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, small stones, slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
26: Borchemists.					
27: Chickaman-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
28: Chickaman-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: slope
29: Coerock-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Rock outcrop.					

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
30: Coerock----- Rock outcrop.	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
31: Courville-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
32: Courville----- Mitten-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
33: Crow-----	Severe: percs slowly	Severe: slope	Severe: too clayey	Moderate: slope	Poor: too clayey, hard to pack
34: Desmet-----	Moderate: percs slowly	Moderate: seepage	Slight	Slight	Good
35: Elkner----- Ovando-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
36: Evaro-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
37: Evaro-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
38: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
39: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
40: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
41: Felan-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
42: Glaciercreek----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
43: Glaciercreek variant-----	Moderate: slope	Severe: seepage, slope	Severe: seepage	Severe: seepage	Poor: large stones
Glaciercreek----	Severe: poor filter	Severe: seepage, slope	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
44: Grantsdale-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
45: Grassvalley-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
46: Grassvalley-----	Severe: percs slowly	Moderate: slope	Severe: too clayey	Slight	Poor: too clayey
47: Grassvalley-----	Severe: percs slowly	Severe: slope	Severe: too clayey	Moderate: slope	Poor: too clayey
48: Grassvalley-----	Severe: percs slowly, slope	Severe: slope	Severe: slope, too clayey	Severe: slope	Poor: too clayey, slope
49: Greenough-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
50: Hagstadt-----	Severe: depth to rock	Severe: depth to rock, slope	Severe: depth to rock	Severe: depth to rock	Poor: depth to rock
51: Half Moon-----	Severe: percs slowly	Moderate: slope	Moderate: too clayey	Slight	Fair: too clayey
52: Hanaker-----	Severe: percs slowly	Moderate: seepage, slope	Slight	Slight	Poor: small stones
53: Hollandlake-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
54: Hollandlake-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Bata-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
55: Hollandlake-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Bata-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
56: Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
57: Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
58: Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
59: Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
60: Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop.					
61: Jimlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
62: Jimlake-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
63: Lantern-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
64: Lantern-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
65: Lantern-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop.					
66: Lolopeak-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: seepage, small stones, slope
67: Lolopeak-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop.					
68: Lubrecht-----	Severe: depth to rock, percs slowly	Severe: depth to rock, slope	Severe: depth to rock, too clayey	Severe: depth to rock	Poor: depth to rock, too clayey
69: Mitten-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones,

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
70: Mitten-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Sharrott-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
71: Mitten-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Tevis-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
72: Moiese-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
73: Orthents.					
74: Ovando-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Elkner-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: small stones, slope
Rock outcrop.					
75: Perma-----	Moderate: percs slowly, large stones	Severe: seepage	Severe: seepage	Severe: seepage	Poor: small stones
76: Perma-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: small stones, slope
77: Perma-----	Moderate: percs slowly, large stones	Severe: seepage, slope, large stones	Severe: seepage, large stones	Severe: seepage	Poor: small stones

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
78: Perma variant---	Severe: percs slowly	Moderate: slope	Moderate: too clayey, large stones	Slight	Poor: small stones
79: Perma variant---	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Perma-----	Severe: slope	Severe: seepage, slope, large stones	Severe: seepage, slope, large stones	Severe: seepage, slope	Poor: small stones, slope
80: Petty-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
81: Petty-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
82: Petty-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
83: Petty-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
84: Petty-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
85: Petty-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop.					
86: Phillcher-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
87: Phillcher----- Rock outcrop.	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
88: Pits.					
89: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
90: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
91: Repp-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
92: Repp----- Rock outcrop.	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
93: Riverwash.					
94: Rock outcrop. Rubble land.					
95: Rumblecreek-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
96: Selway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
97: Selway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
98: Selway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
99: Sharrott-----	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Severe: depth to rock, slope	Poor: depth to rock, small stones, slope
Rock outcrop.					
100: Shooflin-----	Severe: percs slowly	Severe: slope	Severe: depth to rock, too clayey	Moderate: depth to rock, slope	Poor: too clayey, hard to pack
101: Tally variant---	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy
102: Tevis-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
103: Tevis-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Mitten-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
104: Tevis-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Mitten-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop.					
105: Totelake-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
106: Totelake-----	Severe: poor filter, slope	Severe: seepage, slope	Severe: seepage, slope, too sandy	Severe: seepage, slope	Poor: seepage, too sandy, small stones
107: Totelake-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
108: Trapps-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
109: Trapps-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: seepage, small stones, slope
110: Turrah-----	Severe: wetness, percs slowly	Slight	Severe: wetness, too clayey	Severe: wetness	Poor: too clayey, hard to pack, wetness
111: Udifluvents.					
112: Udorthents.					
Glaciercreek----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy, large stones	Severe: seepage	Poor: seepage, too sandy, small stones
113: Upsata-----	Severe: poor filter	Severe: seepage	Severe: seepage, too sandy	Severe: seepage	Poor: seepage, too sandy, small stones
114: Urban land.					
115: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
116: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
117: Waldbillig-----	Moderate: percs slowly, slope	Severe: slope	Moderate: slope, large stones	Moderate: slope	Poor: small stones
Auggie-----	Severe: percs slowly	Severe: slope	Moderate: slope, too clayey	Moderate: slope	Fair: too clayey, slope
118: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
119: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
120: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
121: Waldbillig-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Holloway-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
122: Whitore-----	Severe: slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope	Poor: small stones, slope
123: Whitore-----	Severe: slope	Severe: slope, large stones	Severe: slope, large stones	Severe: slope	Poor: small stones, slope
124: Wildgen-----	Severe:	Severe:	Severe:	Severe:	Poor:

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
125: Wildgen-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
126: Wildgen-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
127: Wildgen-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
128: Wildgen-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
129: Winfall-----	Severe: slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope
130: Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
131: Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
132: Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope

SANITARY FACILITIES--Continued

Map symbol and soil name	Septic tank absorption fields	Sewage lagoon areas	Trench sanitary landfill	Area sanitary landfill	Daily cover for landfill
133: Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
134: Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Rubble land.					
135: Winkler-----	Severe: slope	Severe: seepage, slope	Severe: seepage, slope	Severe: seepage, slope	Poor: seepage, small stones, slope
Rock outcrop.					
136: Xerofluvents.					
137: Yourame-----	Severe: percs slowly, slope	Severe: slope	Severe: slope	Severe: slope	Poor: small stones, slope

CONSTRUCTION MATERIALS

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
1: Alberton-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
2: Ambrant-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
3: Ambrant-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rochester-----	Poor: slope	Probable	Probable	Poor: too sandy, small stones, area reclaim
Rock outcrop.				
4: Aquic Haploxerolls.				
5: Aquic Udorthents.				
6: Aquolls. Aquepts.				
7: Argixerolls. Haploxerolls.				
8: Argixerolls. Haploxerolls.				
9: Argixerolls. Haploxerolls.				
10: Argixerolls. Haploxerolls.				
11: Auggie-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
12: Bata-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
13: Bata-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Waldbillig----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
14: Beeskove-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
15: Beeskove-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
16: Bigarm-----	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim
17: Bigarm-----	Good	Improbable: small stones	Probable	Poor: small stones, area reclaim
18: Bigarm-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
19: Bigarm-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
20: Bigarm-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
21: Biglake-----	Good	Improbable: small stones	Probable	Poor: too sandy, small stones, area reclaim
22: Biglake-----	Fair: slope	Improbable: small stones	Probable	Poor: too sandy, small stones, area reclaim
23: Bignell-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, area reclaim
24: Bignell-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, area reclaim
Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
25: Bignell-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, small stones, area reclaim
Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
26: Borohemists.				
27: Chickaman-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
28: Chickaman-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: slope
29: Coerock-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
Rock outcrop.				

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
30: Coerock----- Rock outcrop.	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
31: Courville-----	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
32: Courville-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Mitten-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
33: Crow-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
34: Desmet-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: small stones
35: Elkner-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Ovando-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
36: Evaro-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
37: Evaro-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
38: Felan-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
39: Felan-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
40: Felan-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
41: Felan-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
42: Glaciercreek----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
43: Glaciercreek variant-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: area reclaim, small stones
Glaciercreek----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
44: Grantsdale-----	Good	Probable	Probable	Poor: area reclaim
45: Grassvalley-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
46: Grassvalley-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
47: Grassvalley-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
48: Grassvalley-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, slope
49: Greenough-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, area reclaim

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
50: Hagstadt-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Fair: depth to rock, too clayey, small stones
51: Half Moon-----	Fair: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, large stones
52: Hanaker-----	Good	Improbable: excess fines	Improbable: excess fines	Fair: area reclaim
53: Hollandlake----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
54: Hollandlake----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Bata-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
55: Hollandlake----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Bata-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
56: Holloway-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
57: Holloway-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
58: Holloway-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
59: Holloway-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
60: Holloway-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
61: Jimlake-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
62: Jimlake-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
63: Lantern-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
64: Lantern-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
65: Lantern-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
66: Lolopeak-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
67: Lolopeak-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
68: Lubrecht-----	Poor: depth to rock, low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
69: Mitten-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
70: Mitten-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Sharrott-----	Poor: depth to rock, slope	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
71: Mitten-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Tevis-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
72: Moiese-----	Good	Probable	Probable	Poor: too sandy, small stones, area reclaim
73: Orthents.				
74: Ovando-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Elkner-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Rock outcrop.				
75: Perma-----	Fair: large stones	Improbable: small stones	Probable	Poor: small stones, area reclaim

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
76: Perma-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
77: Perma-----	Fair: large stones	Improbable: small stones	Probable	Poor: small stones, area reclaim
78: Perma variant---	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
79: Perma variant---	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Perma-----	Fair: large stones, slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
80: Petty-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
81: Petty-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
82: Petty-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
83: Petty-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
84: Petty-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
85: Petty-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
85: Rock outcrop.				
86: Phillcher-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
87: Phillcher-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
88: Pits.				
89: Repp-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
90: Repp-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
91: Repp-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
92: Repp-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
93: Riverwash.				
94: Rock outcrop. Rubble land.				
95: Rumblecreek----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
96: Selway-----	Fair: slope	Probable	Probable	Poor: small stones,

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
97: Selway-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
98: Selway-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
99: Sharrott-----	Poor: depth to rock	Improbable: excess fines	Improbable: excess fines	Poor: depth to rock, small stones, slope
Rock outcrop.				
100: Shooflin-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Poor: too clayey
101: Tally variant---	Good	Probable	Probable	Fair: small stones, area reclaim, thin layer
102: Tevis-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
103: Tevis-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Mitten-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
104: Tevis-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
Mitten-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
105: Totelake-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
106: Totelake-----	Fair: large stones, slope	Probable	Probable	Poor: too sandy, small stones, area reclaim
107: Totelake-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
108: Trapps-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
109: Trapps-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
110: Turrah-----	Fair: wetness	Improbable: excess fines	Improbable: excess fines	Poor: too clayey, area reclaim
111: Udifluvents.				
112: Udorthents.				
Glaciercreek----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
113: Upsata-----	Fair: large stones	Probable	Probable	Poor: too sandy, small stones, area reclaim
114: Urban land.				
115: Waldbillig-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
116: Waldbillig-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
117: Waldbillig-----	Good	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim
Auggie-----	Poor: low strength	Improbable: excess fines	Improbable: excess fines	Fair: too clayey, small stones, slope
118: Waldbillig-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Holloway-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
119: Waldbillig-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Holloway-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
120: Waldbillig-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Holloway-----	Fair: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
121: Waldbillig-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Holloway-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
122: Whitore-----	Fair: large stones, slope	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
123: Whitore-----	Poor: slope	Improbable: excess fines, large stones	Improbable: excess fines, large stones	Poor: small stones, area reclaim, slope
124: Wildgen-----	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
125: Wildgen-----	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Winkler-----	Fair: large stones, slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
126: Wildgen-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Winkler-----	Poor: slope	Improbable: small stones	Probable	Poor: small stones, area reclaim, slope
127: Wildgen-----	Fair: large stones, slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Winkler-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
128: Wildgen-----	Poor: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope
Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
129: Winfall-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope

CONSTRUCTION MATERIALS--Continued

Map symbol and soil name	Roadfill	Sand	Gravel	Topsoil
130: Winkler-----	Fair: slope	Probable	Probable	Poor: small stones, area reclaim, slope
131: Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
132: Winkler-----	Fair: large stones, slope	Probable	Probable	Poor: small stones, area reclaim, slope
133: Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
134: Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rubble land.				
135: Winkler-----	Poor: slope	Probable	Probable	Poor: small stones, area reclaim, slope
Rock outcrop.				
136: Xerofluvents.				
137: Yourame-----	Fair: slope	Improbable: excess fines	Improbable: excess fines	Poor: small stones, area reclaim, slope

WATER MANAGEMENT

(The information in this report indicates the dominant soil condition but does not eliminate the need for onsite investigation)

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
1: Alberton-----	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Soil blowing	Too sandy, soil blowing	Too arid
2: Ambrant-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
3: Ambrant-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
Rochester-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
Rock outcrop.							
4: Aquic Haploxerolls.							
5: Aquic Udorthents.							
6: Aquolls. Aquepts.							
7: Argixerolls. Haploxerolls.							
8: Argixerolls. Haploxerolls.							
9: Argixerolls. Haploxerolls.							
10: Argixerolls. Haploxerolls.							
11: Auggie-----	Severe: slope	Moderate: thin layer, piping	Severe: no water	Deep to water	Slope, erodes easily	Slope, erodes easily	Slope, erodes easily

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
12: Bata-----	Moderate: seepage, slope	Slight	Severe: no water	Deep to water	Slope, droughty	Favorable	Droughty
13: Bata-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
14: Beeskove-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
15: Beeskove-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Rock outcrop.							
16: Bigarm-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Large stones	Large stones, droughty
17: Bigarm-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
18: Bigarm-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
19: Bigarm-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
20: Bigarm-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
Rock outcrop.							
21: Biglake-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, too sandy	Large stones, slope, droughty
22: Biglake-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, too sandy	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
23: Bignell-----	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, droughty, percs slowly	Slope, large stones, percs slowly	Large stones, slope, droughty
24: Bignell-----	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, droughty, percs slowly	Slope, large stones, percs slowly	Large stones, slope, droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, soil blowing	Large stones, slope, droughty
25: Bignell-----	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, droughty, percs slowly	Slope, large stones, percs slowly	Large stones, slope, droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, soil blowing	Large stones, slope, droughty
26: Borochemists.							
27: Chickaman-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope	Slope
28: Chickaman-----	Severe: slope	Severe: piping	Severe: no water	Deep to water	Slope	Slope	Slope
29: Coerock-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, droughty, depth to rock	Slope, large stones, depth to rock	Large stones, slope, droughty
Rock outcrop.							
30: Coerock-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, droughty, depth to rock	Slope, large stones, depth to rock	Large stones, slope, droughty
Rock outcrop.							
31: Courville-----	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
32: Courville-----	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
32: Mitten-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
33: Crow-----	Severe: slope	Moderate: hard to pack	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Slope, erodes easily, percs slowly	Slope, erodes easily, percs slowly
34: Desmet-----	Moderate: seepage	Severe: piping	Severe: no water	Deep to water	Favorable	Erodes easily	Erodes easily
35: Elkner-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
Ovando-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
36: Evaro-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
37: Evaro-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
38: Felan-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
39: Felan-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
40: Felan-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
41: Felan-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope	Slope	Slope
42: Glaciercreek--	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Large stones, droughty	Large stones, too sandy	Large stones, droughty
43: Glaciercreek variant-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, soil blowing	Slope, soil blowing	Slope
Glaciercreek--	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, too sandy	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
44: Grantsdale----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Rooting depth	Erodes easily, too sandy	Erodes easily, rooting depth
45: Grassvalley---	Slight	Slight	Severe: no water	Deep to water	Percs slowly, erodes easily	Erodes easily, percs slowly	Erodes easily, percs slowly
46: Grassvalley---	Moderate: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Erodes easily, percs slowly	Erodes easily, percs slowly
47: Grassvalley---	Severe: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Slope, erodes easily, percs slowly	Slope, erodes easily, percs slowly
48: Grassvalley---	Severe: slope	Slight	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Slope, erodes easily, percs slowly	Slope, erodes easily, percs slowly
49: Greenough-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope, erodes easily	Slope, erodes easily	Slope, erodes easily
50: Hagstadt-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, depth to rock	Slope, depth to rock	Slope, depth to rock
51: Half Moon-----	Moderate: slope	Severe: piping	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
52: Hanaker-----	Moderate: seepage, slope	Slight	Severe: no water	Deep to water	Slope, erodes easily	Erodes easily	Erodes easily
53: Hollandlake---	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
54: Hollandlake---	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Bata-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
55: Hollandlake---	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Bata-----	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
56: Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
57: Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
58: Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
59: Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
60: Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
Rock outcrop.							
61: Jimlake-----	Severe: slope	Moderate: seepage, piping	Severe: no water	Deep to water	Slope	Slope	Slope
62: Jimlake-----	Severe: slope	Moderate: seepage, piping	Severe: no water	Deep to water	Slope	Slope	Slope
63: Lantern-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
64: Lantern-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
65: Lantern-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
Rock outcrop.							
66: Lolopeak-----	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
67: Lolopeak-----	Severe: seepage, slope	Severe: seepage, large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
Rock outcrop.							

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
68: Lubrecht-----	Severe: slope	Severe: thin layer	Severe: no water	Deep to water	Slope, percs slowly, depth to rock	Slope, depth to rock, erodes easily	Slope, erodes easily, depth to rock
69: Mitten-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
70: Mitten-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
Sharrott-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, droughty, depth to rock	Slope, depth to rock	Slope, droughty, depth to rock
71: Mitten-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
Tevis-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
72: Moiese-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Droughty	Large stones, too sandy	Large stones, droughty
73: Orthents.							
74: Ovando-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
Elkner-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, too sandy, soil blowing	Slope, droughty
Rock outcrop.							
75: Perma-----	Severe: seepage	Moderate: thin layer, seepage, piping	Severe: no water	Deep to water	Large stones, droughty	Large stones	Large stones, droughty
76: Perma-----	Severe: seepage, slope	Moderate: thin layer, seepage, piping	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
77: Perma-----	Severe: seepage	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones	Large stones, droughty
78: Perma variant-	Moderate: slope	Moderate: large stones	Severe: no water	Deep to water	Slope	Large stones	Large stones
79: Perma variant-	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope	Slope, large stones	Large stones, slope
Perma-----	Severe: seepage, slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
80: Petty-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
81: Petty-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
82: Petty-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
83: Petty-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
84: Petty-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
85: Petty-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
Rock outcrop.							
86: Phillcher----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
87: Phillcher----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
Rock outcrop.							

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
88: Pits.							
89: Repp-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
90: Repp-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
91: Repp-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
92: Repp-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Rock outcrop.							
93: Riverwash.							
94: Rock outcrop.							
Rubble land.							
95: Rumblecreek---	Severe: slope	Slight	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
96: Selway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, soil blowing	Slope, droughty
97: Selway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, soil blowing	Slope, droughty
98: Selway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, too sandy	Slope, droughty, rooting depth
99: Sharrott-----	Severe: depth to rock, slope	Severe: thin layer	Severe: no water	Deep to water	Slope, droughty, depth to rock	Slope, depth to rock	Slope, droughty, depth to rock
Rock outcrop.							
100: Shooflin-----	Severe: slope	Severe: hard to pack	Severe: no water	Deep to water	Slope, percs slowly, erodes easily	Slope, erodes easily, percs slowly	Slope, erodes easily, percs slowly

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
101: Tally variant-	Severe: seepage	Severe: seepage, piping	Severe: no water	Deep to water	Droughty, soil blowing	Too sandy, soil blowing	Droughty
102: Tevis-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
103: Tevis-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Mitten-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
104: Tevis-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
Mitten-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
Rock outcrop.							
105: Totelake-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, too sandy	Large stones, droughty
106: Totelake-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones, too sandy	Large stones, slope, droughty
107: Totelake-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, too sandy	Large stones, droughty
108: Trapps-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
109: Trapps-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope	Slope, droughty
110: Turrah-----	Slight	Severe: hard to pack wetness	Severe: slow refill	Percs slowly, frost action	Wetness, percs slowly, rooting depth	Wetness, percs slowly	Wetness, rooting depth, percs slowly
111: Udifluvents.							

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
112: Udorthents.							
Glaciercreek--	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, too sandy	Large stones, droughty
113: Upsata-----	Severe: seepage	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Large stones, too sandy, soil blowing	Large stones, droughty, rooting depth
114: Urban land.							
115: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
116: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
117: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
Auggie-----	Severe: slope	Moderate: piping	Severe: no water	Deep to water	Slope	Slope	Slope
118: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
119: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
120: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
121: Waldbillig----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
Holloway-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, rooting depth	Slope, large stones	Large stones, slope, droughty
122: Whitore-----	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
123: Whitore-----	Severe: slope	Severe: large stones	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
124: Wildgen-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
125: Wildgen-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
126: Wildgen-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
127: Wildgen-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, soil blowing	Large stones, slope, droughty
128: Wildgen-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, soil blowing	Large stones, slope, droughty

WATER MANAGEMENT--Continued

Map symbol and soil name	Limitations for--			Features affecting--			
	Pond reservoir areas	Embankments, dikes, and levees	Aquifer-fed excavated ponds	Drainage	Irrigation	Terraces and diversions	Grassed waterways
129: Winfall-----	Severe: slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty
130: Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, soil blowing	Large stones, slope, droughty
131: Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, soil blowing	Large stones, slope, droughty
132: Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
133: Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
134: Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, droughty, soil blowing	Slope, large stones, soil blowing	Large stones, slope, droughty
Rubble land.							
135: Winkler-----	Severe: seepage, slope	Severe: seepage	Severe: no water	Deep to water	Slope, large stones, droughty	Slope, large stones	Large stones, slope, droughty
Rock outcrop.							
136: Xerofluvents.							
137: Yourame-----	Severe: slope	Moderate: large stones	Severe: no water	Deep to water	Slope, droughty	Slope, large stones	Large stones, slope, droughty

Soil Properties

Data relating to soil properties are collected during the course of the soil survey. The data and the estimates of soil and water features, listed in tables, are explained on the following pages.

Soil properties are determined by field examination of the soils and by laboratory index testing of some benchmark soils. Established standard procedures are followed. During the survey, many shallow borings are made and examined to identify and classify the soils and to delineate them on the soil maps. Samples are taken from some typical profiles and tested in the laboratory to determine grain-size distribution, plasticity, and compaction characteristics.

Estimates of soil properties are based on field examinations, on laboratory tests of samples from the survey area, and on laboratory tests of samples of similar soils in nearby areas. Tests verify field observations, verify properties that cannot be estimated accurately by field observation, and help to characterize key soils.

The estimates of soil properties shown in the tables include the range of grain-size distribution and Atterberg limits, the engineering classification, and the physical and chemical properties of the major layers of each soil. Pertinent soil and water features also are given.

Engineering Index Properties

The table "Engineering Index Properties" gives estimates of the engineering classification and of the range of index properties for the major layers of each soil in the survey area. Most soils have layers of contrasting properties within the upper 5 or 6 feet.

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52

percent sand. If the content of particles coarser than sand is as much as 15 percent, an appropriate modifier is added, for example, "gravelly." Textural terms are defined in the "Glossary."

Classification of the soils is determined according to the system adopted by the American Association of State Highway and Transportation Officials (3) and the Unified soil classification system (4).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to grain-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, SP-SM.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of grain-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

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 oven-dry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and plasticity index (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

The estimates of grain-size distribution, liquid limit, and plasticity index are generally rounded to the nearest 5 percent. Thus, if the ranges of gradation and Atterberg limits extend a marginal amount (1 or 2 percentage points) across classification boundaries, the classification in the marginal zone is omitted in the table.

Physical and Chemical Properties

The tables "Physical Properties of the Soils" and "Chemical Properties of the Soils" show estimates of some characteristics and features that affect soil behavior. These estimates are given for the major layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

The following paragraphs describe the columns in the table "Physical Properties of the Soils."

Depth to the upper and lower boundaries of each layer is indicated. The range in depth and information on other properties of each layer are given in the series descriptions in Part I of this survey.

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The amount and kind of clay greatly affect the fertility and physical condition of the soil. They determine the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, permeability, plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earth-moving operations.

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $\frac{1}{3}$ -bar moisture tension. Weight is determined after drying the soil at 105 degrees C. In the table "Physical Properties of the Soils," the estimated moist bulk density of each major soil horizon is expressed in

grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. A bulk density of more than 1.6 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Permeability refers to the ability of a soil to transmit water or air. The estimates indicate the rate of downward movement of water when the soil is saturated. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Permeability is considered in the design of soil drainage systems 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 major soil layer. The capacity varies, depending on soil properties that affect the retention of water and the depth of the root zone. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Shrink-swell potential is the potential for volume change in a soil with a loss or gain in moisture. Volume change occurs mainly because of the interaction of clay minerals with water and varies with the amount and type of clay minerals in the soil. The size of the load on the soil and the magnitude of the change in soil moisture content influence the amount of swelling of soils in place. Laboratory measurements of swelling of undisturbed clods were made for many soils. For others, swelling was estimated on the basis of the kind and amount of clay minerals in the soil and on measurements of similar soils.

If the shrink-swell potential is rated moderate to very high, shrinking and swelling can cause damage to buildings, roads, and other structures. Special design is often needed.

Shrink-swell potential classes are based on the change in length of an unconfined clod as moisture content is increased from air-dry to field capacity. The classes are *low*, a change of less than 3 percent; *moderate*, 3 to 6 percent; and *high*, more than 6 percent. *Very high*, more than 9 percent, is sometimes used.

Organic matter is the plant and animal residue in the

soil at various stages of decomposition. In the table "Physical Properties of Soils," 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 or increased by returning crop residue to the soil. Organic matter affects the available water capacity, infiltration rate, and tilth. It is a source of nitrogen and other nutrients for crops.

Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) to predict the average rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, very fine sand, sand, and organic matter (up to 4 percent) and on soil structure and permeability. The estimates are modified by the presence of rock fragments. Values of K range from 0.02 to 0.69. The higher the value, the more susceptible the soil is to sheet and rill erosion.

Erosion factor 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 rate of soil erosion by wind or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to soil blowing. Soils are grouped according to the following distinctions:

1. Coarse sands, sands, fine sands, and very fine sands. These soils generally are not suitable for crops. They are extremely erodible, and vegetation is difficult to establish.

2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, and sapric soil material. These soils are very highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4L. Calcareous loams, silt loams, clay loams, and silty clay loams that have more than 5 percent finely divided calcium carbonate. These soils are highly erodible. Crops can be grown if intensive measures to control soil blowing are used.

4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay. These soils are moderately erodible. Crops can be

grown if measures to control soil blowing are used.

5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material. These soils have less than 5 percent finely divided calcium carbonate. They are moderately erodible. Crops can be grown if measures to control soil blowing are used.

6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay. These soils have less than 5 percent finely divided calcium carbonate. They are moderately erodible. Crops can be grown if ordinary measures to control soil blowing are used.

7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material. These soils have less than 5 percent finely divided calcium carbonate. They are very slightly erodible. Crops can be grown if ordinary measures to control soil blowing are used.

8. Soils that are not subject to soil blowing because of coarse fragments on the surface or because of surface wetness.

The following paragraphs describe the columns in the table "Chemical Properties of the Soils."

Clay as a soil separate, or component, consists of mineral soil particles that are less than 0.002 millimeter in diameter. The estimated clay content of each major soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Cation-exchange capacity is 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. Soils having a low cation-exchange capacity hold fewer cations and may require more frequent applications of fertilizer than soils having a high cation-exchange capacity. Soils having a high cation-exchange capacity can retain cations. The ability to retain cations helps to prevent the pollution of ground water.

Soil reaction is a measure of acidity or alkalinity and is expressed as a range in pH values. The range in pH of each major horizon is based on many field tests. For many soils, values have been verified by laboratory analyses. Soil reaction is important in selecting crops and other plants, in evaluating soil amendments for fertility and stabilization, and in determining the risk of corrosion.

Calcium carbonate equivalent is the percent of carbonates, by weight, in the soil. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

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 the soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Water Features

The table "Water Features" gives estimates of several important water features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Hydrologic soil groups are groups of soils that, when saturated, have the same runoff potential under similar storm and ground cover conditions. The soil properties that affect the runoff potential are those that influence the minimum rate of infiltration in a bare soil after prolonged wetting and when the soil is not frozen. These properties include the depth to a seasonal high water table, the intake rate, permeability after prolonged wetting, and the depth to a very slowly permeable layer. The influences of ground cover and slope are treated independently and are not taken into account in hydrologic soil groups.

In the definitions of the hydrologic soil groups, the infiltration rate is the rate at which water enters the soil at the surface and is controlled by surface conditions. The transmission rate is the rate at which water moves through the soil and is controlled by properties of the soil layers.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist chiefly of very 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 of 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 permanent high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Flooding, the temporary covering of the soil surface by flowing water, is caused by overflow from streams or by runoff from adjacent slopes. Shallow water standing or flowing for short periods after rainfall or snowmelt is not considered flooding. Standing water in marshes and swamps or in closed depressions is considered to be ponding.

The table "Water Features" gives the frequency of flooding. Frequency of occurrence is estimated. Frequency generally is expressed as none, rare, occasional, or frequent. *None* means flooding is not probable; *rare* that it is unlikely but is possible under unusual weather conditions (the chance of flooding is nearly 0 percent 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); and *frequent* that it occurs often under normal weather conditions (the chance of flooding is more than 50 percent in any year).

The information on flooding is based on evidence in the soil profile, namely thin strata of gravel, sand, silt, or clay deposited by floodwater; irregular decrease in organic matter content with increasing depth; and little or no horizon development.

Also considered are local information about the extent and level of flooding and the relation of each soil on the landscape to historic floods. Information on the extent of flooding based on soil data is less specific than that provided by detailed engineering surveys that delineate flood-prone areas at specific flood frequency levels.

High water table (seasonal) is a zone of saturation at the highest average depth during the wettest season. It is at least 6 inches thick, persists in the soil for more than a few weeks, and is within 6 feet of the surface. Indicated in the table "Water Features" are the depth to the seasonal high water table, the kind of water table, and the months of the year when the water table usually is highest.

An *apparent* water table is indicated by the level at which water stands in a freshly dug, unlined borehole after adequate time is allowed for adjustments in the surrounding soil.

A *perched* water table is one that is above an

unsaturated zone in the soil. The basis for determining that a water table is perched may be general knowledge of the area. The water table is proven to be perched if the water level in a borehole is observed to fall when the borehole is extended.

Two numbers in the column showing depth to the water table indicate the normal range in depth to a saturated zone. Depth is given to the nearest half foot. The first numeral in the range indicates the highest water level. "More than 6.0" indicates that the water table is below a depth of 6 feet or that it is within a depth of 6 feet for less than a month.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation.

Soil Features

The table "Soil Features" gives estimates of several important soil features used in land use planning that involves engineering considerations. These features are described in the following paragraphs.

Depth to bedrock is given if bedrock is within a depth of 60 inches. The depth is based on many soil borings and on observations during soil mapping. The rock is either soft or hard. If the rock is soft or fractured, excavations can be made with trenching machines, backhoes, or small rippers. If the rock is hard or massive, blasting or special equipment generally is needed for excavation.

Potential 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, permeability, 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 mainly to pavements and other rigid structures.

A *low* potential for frost action indicates that the soil is rarely susceptible to the formation of ice lenses; a *moderate* potential indicates that the soil is susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength; and a *high* potential indicates that the soil is highly susceptible to formation of ice lenses, resulting in frost heave and the subsequent loss of soil strength.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that dissolves or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil.

Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than steel in installations that are entirely within one kind of soil or within one soil layer.

For uncoated steel, the risk of corrosion, expressed as *low*, *moderate*, or *high*, is based on soil drainage class, total acidity, electrical resistivity near field capacity, and electrical conductivity of the saturation extract.

For concrete, the risk of corrosion is also expressed as *low*, *moderate*, or *high*. It is based on soil texture, acidity, and amount of sulfates in the saturation extract.

ENGINEERING INDEX PROPERTIES

(The symbol < means less than; > means more than; and MP means nonplastic)

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
1: Alberton-----	0-9	Very fine sandy loam	ML, CL-ML	A-4	0	0	100	100	85-95	50-65	20-30	NP-10
	9-16	Sandy loam, fine sandy loam	SM, SM-SC	A-4	0	0	100	100	65-80	35-50	20-30	NP-10
	16-30	Sandy loam, fine sandy loam	SM	A-2, A-4	0	0	100	100	60-75	30-45	---	NP
	30-60	Loamy sand, loamy fine sand	SM	A-1, A-2	0	0	85-100	75-100	40-80	15-35	---	NP
2: Ambrant-----	0-4	Gravelly sandy loam	GM, SM	A-1, A-2	0	0-5	55-85	50-75	30-55	15-30	20-25	NP-5
	4-20	Gravelly coarse sandy loam, gravelly loamy coarse sand	SM, GM	A-1, A-2	0	0-5	55-85	50-75	25-60	10-25	20-25	NP-5
	20-39	Gravelly sandy loam, gravelly coarse sandy loam	GM, SM	A-1, A-2	0	0-5	55-85	50-75	30-55	15-30	20-25	NP-5
	39-60	Very gravelly coarse sand, very gravelly loamy sand, very gravelly sand	GP, SP, SP-SM, GP-GM	A-1	0	0	50-65	25-50	10-35	0-10	---	NP
3: Ambrant-----	0-4	Gravelly sandy loam	GM, SM	A-1, A-2	0	0-5	55-85	50-75	30-55	15-30	20-25	NP-5
	4-20	Gravelly coarse sandy loam, gravelly loamy coarse sand	SM, GM	A-1, A-2	0	0-5	55-85	50-75	25-60	10-25	20-25	NP-5
	20-39	Gravelly sandy loam, gravelly coarse sandy loam	GM, SM	A-1, A-2	0	0-5	55-85	50-75	30-55	15-30	20-25	NP-5
	39-60	Very gravelly coarse sand, very gravelly loamy sand, very gravelly sand	GP, SP, SP-SM, GP-GM	A-1	0	0	50-65	25-50	10-35	0-10	---	NP
Rochester-----	0-7	Gravelly sandy loam	SM	A-1, A-2	0	0	60-85	50-75	30-55	15-30	---	NP
	7-12	Gravelly loamy coarse sand, gravelly coarse sand	SP-SM, SM	A-1	0	0	60-85	50-75	25-40	5-20	---	NP
	12-60	Very gravelly loamy coarse sand, very gravelly coarse sand	GP, SP	A-1	0	0	35-60	25-50	15-30	0-5	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
3: Rock outcrop.												
4: Aquic Haploxerolls.												
5: Aquic Udorthents.												
6: Aquolls. Aquepts.												
7: Argixerolls. Haploxerolls.												
8: Argixerolls. Haploxerolls.												
9: Argixerolls. Haploxerolls.												
10: Argixerolls. Haploxerolls.												
11: Auggie-----	0-6	Silt loam	CL-ML, ML	A-4	0	0	95-100	85-100	85-95	85-95	20-30	NP-10
	6-20	Silty clay loam	CL	A-6	0	0	90-100	85-100	85-95	85-95	30-40	10-15
	20-45	Silty clay loam	CL	A-6	0	0	90-100	85-100	85-95	85-90	30-40	10-15
	45-60	Silt loam	ML, CL-ML	A-4	0	0	90-100	85-100	75-95	65-90	20-30	NP-10
12: Bata-----	0-10	Gravelly silt loam	GM, GM-GC, CL-ML, ML	A-4	0	0-10	60-85	55-75	50-70	40-60	20-30	NP-10
	10-22	Very gravelly fine sandy loam, very gravelly sandy loam, gravelly loam	GC, GM-GC, SC, SM-SC	A-2	0	0-15	40-70	30-60	20-50	10-35	25-35	5-15
	22-60	Very gravelly sandy clay loam, very gravelly clay loam	GC	A-2, A-6	0	0-15	35-60	30-50	20-45	15-40	30-40	10-20

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
13: Bata-----	0-9	Gravelly silt loam	GM, GM-GC, CL-ML, ML	A-4	0	0-10	60-85	55-75	50-70	40-60	20-30	NP-10
	9-20	Very gravelly fine sandy loam, very gravelly sandy loam, gravelly loam	GC, GM-GC, SC, SM-SC	A-2	0	0-15	40-70	30-60	20-50	10-35	25-35	5-15
	20-60	Very gravelly sandy clay loam, very gravelly clay loam	GC	A-2, A-6	0	0-15	35-60	30-50	20-45	15-40	30-40	10-20
Waldbillig-----	0-10	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	10-26	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	26-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10
14: Beeskove-----	0-8	Gravelly loam	ML, GM	A-4	0	0	60-80	55-75	45-70	35-60	20-25	NP-5
	8-20	Very gravelly loam, very gravelly sandy loam	GM	A-2, A-1	0	0-15	40-55	35-50	30-45	20-35	20-25	NP-5
	20-27	Very gravelly loam, very gravelly sandy loam, extremely gravelly loam	GM	A-1, A-2	0	0-15	35-60	25-50	20-45	15-30	20-25	NP-5
	27-60	Extremely gravelly loam, extremely gravelly sandy loam	GP-GM, GM	A-1	0	10-15	25-40	15-30	10-25	5-20	20-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
					Pct	Pct						
15: Beeskove-----	0-8	Gravelly loam	ML, GM	A-4	0	0	60-80	55-75	45-70	35-60	20-25	NP-5
	8-20	Very gravelly loam, very gravelly sandy loam	GM	A-2, A-1	0	0-15	40-55	35-50	30-45	20-35	20-25	NP-5
	20-27	Very gravelly loam, very gravelly sandy loam, extremely gravelly loam	GM	A-1, A-2	0	0-15	35-60	25-50	20-45	15-30	20-25	NP-5
	27-60	Extremely gravelly loam, extremely gravelly sandy loam	GP-GM, GM	A-1	0	10-15	25-40	15-30	10-25	5-20	20-25	NP-5
Rock outcrop.												
16: Bigarm-----	0-11	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-10	65-80	55-70	45-60	40-55	20-30	5-10
	11-15	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC	A-2, A-1	0	0-20	40-50	30-50	20-40	15-35	15-25	NP-10
	15-40	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam	GM	A-1, A-2	0	0-20	40-60	30-50	20-40	15-35	15-25	NP-5
	40-60	Extremely gravelly loamy sand, very gravelly sandy loam, very gravelly loam	GM, GP-GM	A-1, A-2	0	10-40	25-55	15-45	10-40	5-30	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
17: Bigarm-----	0-11	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-10	65-80	55-70	45-60	40-55	20-30	5-10
	11-15	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC	A-2, A-1	0	0-20	40-50	30-50	20-40	15-35	15-25	NP-10
	15-40	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam	GM	A-1, A-2	0	0-20	40-60	30-50	20-40	15-35	15-25	NP-5
	40-60	Extremely gravelly loamy sand, very gravelly sandy loam, very gravelly loam	GM, GP-GM	A-1, A-2	0	10-40	25-55	15-45	10-40	5-30	15-25	NP-5
18: Bigarm-----	0-11	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-10	65-80	55-70	45-60	40-55	20-30	5-10
	11-15	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC	A-2, A-1	0	0-20	40-50	30-50	20-40	15-35	15-25	NP-10
	15-40	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam	GM	A-1, A-2	0	0-20	40-60	30-50	20-40	15-35	15-25	NP-5
	40-60	Extremely gravelly loamy sand, very gravelly sandy loam, very gravelly loam	GM, GP-GM	A-1, A-2	0	10-40	25-55	15-45	10-40	5-30	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
19: Bigarm-----	0-11	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-10	65-80	55-70	45-60	40-55	20-30	5-10
	11-15	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC	A-2, A-1	0	0-20	40-50	30-50	20-40	15-35	15-25	NP-10
	15-40	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam	GM	A-1, A-2	0	0-20	40-60	30-50	20-40	15-35	15-25	NP-5
	40-60	Extremely gravelly loamy sand, very gravelly sandy loam, very gravelly loam	GM, GP-GM	A-1, A-2	0	10-40	25-55	15-45	10-40	5-30	15-25	NP-5
20: Bigarm-----	0-11	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-10	65-80	55-70	45-60	40-55	20-30	5-10
	11-15	Very gravelly loam, very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC	A-2, A-1	0	0-20	40-50	30-50	20-40	15-35	15-25	NP-10
	15-40	Very gravelly fine sandy loam, very gravelly loam, very gravelly sandy loam	GM	A-1, A-2	0	0-20	40-60	30-50	20-40	15-35	15-25	NP-5
	40-60	Extremely gravelly loamy sand, very gravelly sandy loam, very gravelly loam	GM, GP-GM	A-1, A-2	0	10-40	25-55	15-45	10-40	5-30	15-25	NP-5
Rock outcrop.												
21: Biglake-----	0-9	Gravelly sandy loam	SM	A-2, A-1	0	0-15	65-85	60-75	35-55	20-30	15-20	NP-5
	9-16	Very gravelly sandy loam	GM, SM	A-1	0	0-25	40-60	35-50	20-35	10-20	---	NP
	16-60	Extremely gravelly loamy sand, extremely gravelly sand	GP, GP-GM	A-1	0	15-25	20-35	15-30	10-20	0-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
22: Biglake-----	0-9	Gravelly sandy loam	SM	A-2, A-1	0	0-15	65-85	60-75	35-55	20-30	15-20	NP-5
	9-16	Very gravelly sandy loam	GM, SM	A-1	0	0-25	40-60	35-50	20-35	10-20	---	NP
	16-60	Extremely gravelly loamy sand, extremely gravelly sand	GP, GP-GM	A-1	0	15-25	20-35	15-30	10-20	0-10	---	NP
23: Bignell-----	0-11	Gravelly loam	SM, GM, SM-SC, GM-GC	A-2, A-4	0	0-10	60-80	55-75	50-70	25-45	15-25	NP-10
	11-15	Very gravelly loam, very gravelly sandy clay loam	GM-GC, GM	A-2, A-1	0	0-10	35-55	30-50	25-45	10-30	15-30	NP-10
	15-60	Very gravelly clay, very gravelly sandy clay, very gravelly clay loam	GC	A-2, A-7, A-6	0	0-25	40-55	35-50	25-45	20-40	30-60	15-40
24: Bignell-----	0-12	Gravelly loam	SM, GM, SM-SC, GM-GC	A-2, A-4	0	0-10	60-80	55-75	50-70	25-45	15-25	NP-10
	12-22	Very gravelly loam, very gravelly sandy clay loam	GM-GC, GM	A-2, A-1	0	0-10	35-55	30-50	25-45	10-30	15-30	NP-10
	22-60	Very gravelly clay, very gravelly sandy clay, very gravelly clay loam	GC	A-2, A-7, A-6	0	0-25	40-55	35-50	25-45	20-40	30-60	15-40
Winkler-----	0-4	Very gravelly sandy loam	GM, SM	A-1	0	0-10	40-60	30-50	20-35	10-20	15-25	NP-5
	4-21	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP-GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	21-40	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
	40-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam	GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-10	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
29: Rock outcrop.												
30: Coerock-----	0-15	Very gravelly silt loam	GM	A-2, A-4, A-1	0	0-15	40-60	30-50	25-50	20-45	30-40	NP-10
	15-18	Very gravelly loam, very gravelly silt loam	GM	A-2, A-4	0	10-25	40-65	35-55	30-50	25-45	30-40	NP-10
	18-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
31: Courville-----	0-10	Gravelly silt loam	ML, SM, GM	A-4	0	0-15	65-85	60-80	50-70	40-60	30-40	NP-5
	10-27	Very gravelly loam, very gravelly silt loam, very gravelly sandy loam	GM, SM	A-4, A-2, A-1	0	15-30	40-70	35-65	30-60	20-50	20-30	NP-5
	27-60	Very gravelly loam, very gravelly silt loam, very gravelly sandy loam	GM-GC	A-2, A-4	0	15-30	40-70	35-65	30-60	20-50	25-30	5-10
32: Courville-----	0-10	Gravelly silt loam	ML, SM, GM	A-4	0	0-15	65-85	60-80	50-70	40-60	30-40	NP-5
	10-27	Very gravelly loam, very gravelly silt loam, very gravelly sandy loam	GM, SM	A-4, A-2, A-1	0	15-30	40-70	35-65	30-60	20-50	20-30	NP-5
	27-60	Very gravelly loam, very gravelly silt loam, very gravelly sandy loam	GM-GC	A-2, A-4	0	15-30	40-70	35-65	30-60	20-50	25-30	5-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
32: Mitten-----	In											
	0-9	Gravelly silt loam	GM, ML	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	9-16	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	10-15	35-65	30-55	20-45	10-30	---	NP
	16-34	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-30	25-40	15-30	10-25	5-15	---	NP
	34-60	Extremely gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-30	20-40	10-30	5-20	5-10	---	NP
33: Crow-----	0-4	Silt loam	CL-ML, ML	A-4	0	0-10	90-100	85-100	75-100	60-90	20-30	NP-10
	4-10	Silty clay loam, clay loam, silt loam	CL	A-6	0	0-10	90-100	85-100	75-100	55-90	25-40	10-20
	10-48	Silty clay, clay	CH, CL	A-7	0	0-10	90-100	85-100	75-95	70-90	40-60	20-40
	48-60	Sandy clay loam, clay loam	SC, CL	A-6	0	0-10	90-100	85-90	55-85	45-70	25-35	10-15
34: Desmet-----	0-7	Loam	CL-ML, ML	A-4	0	0	100	100	95-100	75-85	20-30	NP-10
	7-15	Loam, very fine sandy loam	CL-ML, ML	A-4	0	0	100	100	95-100	70-80	20-30	NP-10
	15-24	Loam, silt loam, very fine sandy loam	CL-ML, ML	A-4	0	0	100	100	95-100	70-95	20-30	NP-10
	24-39	Very fine sandy loam	ML	A-4	0	0	85-100	75-100	65-100	55-75	20-25	NP-5
	39-60	Very fine sandy loam, fine sandy loam	ML, SM	A-4, A-2	0	0	85-100	75-100	60-100	30-65	20-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
35: Elkner-----	0-7	Sandy loam	SM	A-2, A-4	0	0	80-100	75-100	45-70	25-40	20-30	NP-5
	7-20	Gravelly sandy loam, sandy loam, coarse sandy loam	SM	A-1, A-2	0	0-10	75-100	70-100	35-60	20-35	---	NP
	20-36	Coarse sandy loam, gravelly coarse sandy loam	SM	A-1, A-2	0	0-10	75-100	70-100	30-60	20-35	---	NP
	36-60	Gravelly loamy coarse sand	SM	A-1	0	0-15	70-90	60-75	25-50	10-25	---	NP
Ovando-----	0-6	Gravelly sandy loam	SM, GM	A-2, A-1	0	0	60-85	50-75	30-55	15-30	---	NP
	6-25	Very gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM	A-1	0	0	45-60	35-50	15-25	5-15	---	NP
	25-49	Very gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM	A-1	0	0-15	40-60	30-50	15-25	5-15	---	NP
	49-60	Extremely gravelly loamy coarse sand	GP-GM, GP	A-1	0	15-30	25-40	15-30	5-15	0-10	---	NP
36: Evaro-----	0-4	Gravelly loam	ML, SM	A-4	0	0-15	75-80	60-75	50-70	40-60	25-35	NP-10
	4-16	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-2, A-1	0	10-25	20-60	15-50	10-45	5-30	20-30	NP-10
	16-60	Extremely gravelly sandy loam, extremely gravelly loam	GM, GM-GC, GP-GM	A-1, A-2	0	10-25	20-35	15-30	10-25	5-20	20-30	NP-10
37: Evaro-----	0-4	Gravelly loam	ML, SM	A-4	0	0-15	75-80	60-75	50-70	40-60	25-35	NP-10
	4-16	Very gravelly loam, very gravelly sandy loam, extremely gravelly sandy loam	GM, GM-GC, GP-GM	A-2, A-1	0	10-25	20-60	15-50	10-45	5-30	20-30	NP-10
	16-60	Extremely gravelly sandy loam, extremely gravelly loam	GM, GM-GC, GP-GM	A-1, A-2	0	10-25	20-35	15-30	10-25	5-20	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
38: Felan-----	0-8	Gravelly silt loam	ML, GM	A-4	0	0-10	65-80	60-75	50-75	40-65	30-40	NP-5
	8-33	Very gravelly silt loam, very gravelly loam, extremely gravelly silt loam	GM-GC, GM	A-2, A-4, A-1	0	0-15	30-60	20-50	20-45	15-40	20-30	NP-10
	33-60	Very gravelly silt loam, very gravelly loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	0-15	25-55	15-45	15-40	10-35	20-30	NP-10
39: Felan-----	0-8	Gravelly silt loam	ML, GM	A-4	0	0-10	65-80	60-75	50-75	40-65	30-40	NP-5
	8-33	Very gravelly silt loam, very gravelly loam, extremely gravelly silt loam	GM-GC, GM	A-2, A-4, A-1	0	0-15	30-60	20-50	20-45	15-40	20-30	NP-10
	33-60	Very gravelly silt loam, very gravelly loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	0-15	25-55	15-45	15-40	10-35	20-30	NP-10
40: Felan-----	0-12	Gravelly silt loam	ML, GM	A-4	0	0-10	65-80	60-75	50-75	40-65	30-40	NP-5
	12-40	Very gravelly silt loam, very gravelly loam, extremely gravelly silt loam	GM-GC, GM	A-2, A-4, A-1	0	0-15	30-60	20-50	20-45	15-40	20-30	NP-10
	40-60	Very gravelly silt loam, very gravelly loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	0-15	25-55	15-45	15-40	10-35	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
41: Felan-----	0-12	Gravelly silt loam	ML, GM	A-4	0	0-10	65-80	60-75	50-75	40-65	30-40	NP-5
	12-40	Very gravelly silt loam, very gravelly loam, extremely gravelly silt loam	GM-GC, GM	A-2, A-4, A-1	0	0-15	30-60	20-50	20-45	15-40	20-30	NP-10
	40-60	Very gravelly silt loam, very gravelly loam, extremely gravelly loam	GM-GC, GM	A-2, A-1	0	0-15	25-55	15-45	15-40	10-35	20-30	NP-10
42: Glaciercreek----	0-14	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	55-70	40-60	20-25	NP-5
	14-60	Extremely gravelly coarse sand, extremely gravelly loamy sand, extremely cobbly sand	GP, GP-GM	A-1	0	10-45	20-50	10-30	5-20	0-10	---	NP
43: Glaciercreek variant-----	0-9	Fine sandy loam	SM, ML	A-4	0	0	95-100	90-100	65-85	35-55	20-30	NP-5
	9-32	Fine sandy loam	SM	A-4	0	0	95-100	90-100	65-85	35-50	20-30	NP-5
	32-60	Extremely cobbly fine sandy loam, very cobbly fine sandy loam	SM, GM	A-1, A-2	0	30-75	45-70	35-60	25-50	15-35	---	NP
Glaciercreek----	0-14	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	55-70	40-60	20-25	NP-5
	14-60	Extremely gravelly coarse sand, extremely gravelly loamy sand, extremely cobbly sand	GP, GP-GM	A-1	0	10-45	20-50	10-30	5-20	0-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
44: Grantsdale-----	0-9	Loam	CL-ML	A-4	0	0	100	100	90-100	75-85	20-25	5-10
	9-17	Loam, very fine sandy loam, silt loam	CL-ML	A-4	0	0	100	100	90-100	75-85	20-25	5-10
	17-32	Loam, very fine sandy loam, silt loam	CL-ML	A-4	0	0	100	100	90-100	70-85	20-25	5-10
	32-60	Very gravelly loamy sand, very gravelly sand, extremely cobble loamy sand	GP, SP, GP-GM, SP-SM	A-1	0	10-30	35-65	25-55	15-40	0-10	---	NP
45: Grassvalley-----	0-9	Silty clay loam	CL	A-6	0	0	100	100	90-100	80-95	30-40	10-20
	9-21	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	21-28	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	28-60	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	100	95-100	85-95	40-50	15-25
46: Grassvalley-----	0-9	Silty clay loam	CL	A-6	0	0	100	100	90-100	80-95	30-40	10-20
	9-23	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	23-39	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	39-60	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	100	95-100	85-95	40-50	15-25
47: Grassvalley-----	0-7	Silty clay loam	CL	A-6	0	0	100	100	90-100	80-95	30-40	10-20
	7-24	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	24-52	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	52-60	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	100	95-100	85-95	40-50	15-25
48: Grassvalley-----	0-7	Silty clay loam	CL	A-6	0	0	100	100	90-100	80-95	30-40	10-20
	7-24	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	24-52	Clay, silty clay	CL	A-7	0	0	100	100	95-100	75-95	40-50	15-25
	52-60	Silty clay, silty clay loam, clay	CL	A-7	0	0	100	100	95-100	85-95	40-50	15-25

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
49: Greenough-----	0-8	Silt loam	ML, CL-ML	A-4	0	0-10	90-100	85-100	80-100	70-90	20-30	NP-10
	8-22	Silt loam	ML, CL-ML	A-4	0	0-10	90-100	85-100	80-100	70-90	20-30	NP-10
	22-49	Silty clay loam, silt loam	CL	A-6	0	0-10	90-100	85-100	80-100	75-90	30-40	10-20
	49-60	Silt loam, gravelly silt loam, silty clay loam	CL, GC	A-6	0	0-10	60-100	55-100	50-95	40-90	30-40	10-20
50: Hagstadt-----	0-5	Silt loam	CL-ML	A-4	0	0	90-100	85-100	85-100	75-95	20-30	5-10
	5-21	Silty clay loam	CL	A-6	0	0	90-100	90-100	90-100	75-95	30-40	10-20
	21-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
51: Half Moon-----	0-7	Silt loam	ML	A-4	0	0-15	95-100	95-100	90-100	75-90	25-40	NP-10
	7-18	Silty clay loam, silt loam	CL, CL-ML	A-4, A-6	0	0-5	90-100	90-100	90-100	75-95	25-40	5-15
	18-60	Silt loam, silty clay loam	CL-ML	A-4	0	0	100	100	90-100	75-95	25-30	5-10
52: Hanaker-----	0-15	Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-95	20-25	5-10
	15-25	Silty clay loam	CL	A-6	0	0	100	100	95-100	75-95	30-35	10-15
	25-32	Silt loam	CL-ML	A-4	0	0	100	100	95-100	75-95	20-25	5-10
	32-42	Stratified silt loam to very fine sandy loam	CL-ML	A-4	0	0	100	100	95-100	70-85	20-25	5-10
	42-60	Stratified gravelly sandy clay loam to gravelly sandy loam	GM-GC, SM-SC	A-2	0	0-10	55-80	55-75	40-55	20-35	25-30	5-10
53: Hollandlake-----	0-4	Gravelly loam	CL-ML, ML, SM-SC, GM	A-4	0	0	55-80	50-75	45-70	35-60	20-30	NP-10
	4-12	Gravelly loam, gravelly silt loam	CL-ML, SM-SC, GM-GC	A-4	0	0	55-80	50-75	45-70	35-60	20-30	5-10
	12-22	Very gravelly loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0	0-15	40-55	35-50	30-45	25-40	25-35	5-15
	22-60	Very gravelly clay loam, very gravelly sandy clay loam	GC	A-2	0	0-15	40-55	35-50	30-45	20-35	30-40	10-15

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
54: Hollandlake-----	0-4	Gravelly loam	CL-ML, ML, SM-SC, GM	A-4	0	0	55-80	50-75	45-70	35-60	20-30	NP-10
	4-12	Gravelly loam, gravelly silt loam	CL-ML, SM-SC, GM-GC	A-4	0	0	55-80	50-75	45-70	35-60	20-30	5-10
	12-22	Very gravelly loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0	0-15	40-55	35-50	30-45	25-40	25-35	5-15
	22-60	Very gravelly clay loam, very gravelly sandy clay loam	GC	A-2	0	0-15	40-55	35-50	30-45	20-35	30-40	10-15
Bata-----	0-9	Gravelly silt loam	GM, GM-GC, CL-ML, ML	A-4	0	0-10	60-85	55-75	50-70	40-60	20-30	NP-10
	9-20	Very gravelly fine sandy loam, very gravelly sandy loam, gravelly loam	GC, GM-GC, SC, SM-SC	A-2	0	0-15	40-70	30-60	20-50	10-35	25-35	5-15
	20-60	Very gravelly sandy clay loam, very gravelly clay loam	GC	A-2, A-6	0	0-15	35-60	30-50	20-45	15-40	30-40	10-20
55: Hollandlake-----	0-4	Gravelly loam	CL-ML, ML, SM-SC, GM	A-4	0	0	55-80	50-75	45-70	35-60	20-30	NP-10
	4-12	Gravelly loam, gravelly silt loam	CL-ML, SM-SC, GM-GC	A-4	0	0	55-80	50-75	45-70	35-60	20-30	5-10
	12-22	Very gravelly loam, very gravelly clay loam	GC, GM-GC	A-2, A-4, A-6	0	0-15	40-55	35-50	30-45	25-40	25-35	5-15
	22-60	Very gravelly clay loam, very gravelly sandy clay loam	GC	A-2	0	0-15	40-55	35-50	30-45	20-35	30-40	10-15

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit Pct	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
55: Bata-----	0-9	Gravelly silt loam	GM, GM-GC, CL-ML, ML	A-4	0	0-10	60-85	55-75	50-70	40-60	20-30	NP-10
	9-20	Very gravelly fine sandy loam, very gravelly sandy loam, gravelly loam	GC, GM-GC, SC, SM-SC	A-2	0	0-15	40-70	30-60	20-50	10-35	25-35	5-15
	20-60	Very gravelly sandy clay loam, very gravelly clay loam	GC	A-2, A-6	0	0-15	35-60	30-50	20-45	15-40	30-40	10-20
56: Holloway-----	0-10	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	10-17	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	17-52	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	52-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
57: Holloway-----	0-10	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	10-17	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	17-52	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	52-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5
58: Holloway-----	0-11	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	11-21	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	21-45	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	45-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
61: Jimlake-----	0-7	Gravelly silt loam	ML, GM	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	7-14	Gravelly silt loam, gravelly loam	ML, GM	A-4	0	0-10	60-80	55-75	45-70	35-60	25-35	NP-10
	14-38	Very gravelly silt loam, very gravelly loam	GM, GM-GC	A-2, A-4, A-1	0	0-15	35-55	30-50	25-45	20-40	20-30	NP-10
	38-60	Very gravelly silt loam, very gravelly loam	GM, GM-GC	A-2, A-4, A-1	0	0-15	35-55	30-50	25-45	20-40	20-30	NP-10
62: Jimlake-----	0-7	Gravelly silt loam	ML, GM	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	7-14	Gravelly silt loam, gravelly loam	ML, GM	A-4	0	0-10	60-80	55-75	45-70	35-60	25-35	NP-10
	14-38	Very gravelly silt loam, very gravelly loam	GM, GM-GC	A-2, A-4, A-1	0	0-15	35-55	30-50	25-45	20-40	20-30	NP-10
	38-60	Very gravelly silt loam, very gravelly loam	GM, GM-GC	A-2, A-4, A-1	0	0-15	35-55	30-50	25-45	20-40	20-30	NP-10
63: Lantern-----	0-14	Gravelly sandy loam	SM	A-1, A-2	0	0	60-85	50-75	30-55	20-35	15-25	NP-5
	14-26	Gravelly sandy loam, very gravelly sandy loam	SM, GM	A-1, A-2	0	0-15	40-85	30-75	25-55	10-35	15-25	NP-5
	26-39	Very gravelly sandy loam, very gravelly fine sandy loam	GM	A-1	0	0-25	45-60	35-50	30-40	15-25	15-25	NP-5
	39-60	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loamy sand	GP-GM	A-1	0	0-30	30-50	15-30	10-25	5-10	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
64: Lantern-----	0-14	Gravelly sandy loam	SM	A-1, A-2	0	0	60-85	50-75	30-55	20-35	15-25	NP-5
	14-26	Gravelly sandy loam, very gravelly sandy loam	SM, GM	A-1, A-2	0	0-15	40-85	30-75	25-55	10-35	15-25	NP-5
	26-39	Very gravelly sandy loam, very gravelly fine sandy loam	GM	A-1	0	0-25	45-60	35-50	30-40	15-25	15-25	NP-5
	39-60	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loamy sand	GP-GM	A-1	0	0-30	30-50	15-30	10-25	5-10	15-25	NP-5
65: Lantern-----	0-14	Gravelly sandy loam	SM	A-1, A-2	0	0	60-85	50-75	30-55	20-35	15-25	NP-5
	14-26	Gravelly sandy loam, very gravelly sandy loam	SM, GM	A-1, A-2	0	0-15	40-85	30-75	25-55	10-35	15-25	NP-5
	26-39	Very gravelly sandy loam, very gravelly fine sandy loam	GM	A-1	0	0-25	45-60	35-50	30-40	15-25	15-25	NP-5
	39-60	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loamy sand	GP-GM	A-1	0	0-30	30-50	15-30	10-25	5-10	15-25	NP-5
Rock outcrop.												
66: Lolopeak-----	0-9	Bouldery loam	ML, GM, SM	A-4	0	10-15	65-95	60-85	50-80	35-65	30-40	NP-5
	9-27	Extremely stony loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM	A-1	0	25-50	25-50	15-35	10-20	5-10	---	NP
	27-60	Extremely stony loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM	A-1	0	25-50	25-50	15-35	10-20	5-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
67: Lolopeak-----	0-9	Bouldery loam	ML, GM, SM	A-4	0	10-15	65-95	60-85	50-80	35-65	30-40	NP-5
	9-27	Extremely stony loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM	A-1	0	25-50	25-50	15-35	10-20	5-10	---	NP
	27-60	Extremely stony loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM	A-1	0	25-50	25-50	15-35	10-20	5-10	---	NP
Rock outcrop.												
68: Lubrecht-----	0-8	Silt loam	ML, CL-ML	A-4	0	0	80-100	75-100	70-100	60-90	20-30	NP-10
	8-11	Silty clay loam	CL	A-6	0	0	100	100	90-100	80-100	25-40	10-20
	11-30	Silty clay	CL	A-6, A-7	0	0	100	100	95-100	85-100	30-50	15-30
	30-36	Gravelly silty clay loam	CL, GC	A-6	0	0-10	60-85	55-75	50-70	45-65	25-40	10-20
	36-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
69: Mitten-----	0-9	Gravelly silt loam	GM, ML	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	9-16	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	10-15	35-65	30-55	20-45	10-30	---	NP
	16-34	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-30	25-40	15-30	10-25	5-15	---	NP
	34-60	Extremely gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-30	20-40	10-30	5-20	5-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plasticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
					Pct	Pct					Pct	
70: Mitten-----	0-9	Gravelly silt loam	GM, ML	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	9-16	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	10-15	35-65	30-55	20-45	10-30	---	NP
	16-34	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-30	25-40	15-30	10-25	5-15	---	NP
	34-60	Extremely gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-30	20-40	10-30	5-20	5-10	---	NP
Sharrott-----	0-7	Gravelly loam	GM-GC, CL-ML, SM-SC	A-4	0	0-15	65-80	60-75	45-65	35-55	20-30	5-10
	7-14	Very gravelly loam	GM-GC	A-1, A-2	0	0-15	35-60	30-50	20-40	15-35	20-30	5-10
	14-16	Extremely gravelly loam	GM-GC, GP-GC	A-1, A-2	0	0-15	20-35	10-25	5-20	5-15	20-30	5-10
	16-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
71: Mitten-----	0-9	Gravelly silt loam	GM, ML	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	9-16	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	10-15	35-65	30-55	20-45	10-30	---	NP
	16-34	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-30	25-40	15-30	10-25	5-15	---	NP
	34-60	Extremely gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-30	20-40	10-30	5-20	5-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
71: Tevis-----	0-3	Gravelly loam	GM, GM-GC, ML, CL-ML	A-4	0	0	55-80	50-75	45-70	35-60	15-25	NP-10
	3-14	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	0-15	40-60	30-50	20-40	10-30	---	NP
	14-22	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP
	22-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP
72: Moiese-----	0-9	Gravelly loam	GM, GM-GC, SM, SM-SC	A-4	0	0-10	65-80	60-75	50-60	35-45	20-30	NP-10
	9-21	Very gravelly sandy loam	GM, SM	A-1	0	0-25	40-60	35-50	20-35	10-20	20-25	NP-5
	21-60	Very gravelly loamy sand, extremely gravelly sand, very gravelly loamy coarse sand	GP, GP-GM	A-1	0	0-30	30-45	20-35	10-25	0-10	---	NP
73: Orthents.												
74: Ovando-----	0-6	Gravelly sandy loam	SM, GM	A-2, A-1	0	0	60-85	50-75	30-55	15-30	---	NP
	6-25	Very gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM	A-1	0	0	45-60	35-50	15-25	5-15	---	NP
	25-49	Very gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM,	A-1	0	0-15	40-60	30-50	15-25	5-15	---	NP
	49-60	Extremely gravelly loamy	GP-GM, GP	A-1	0	15-30	25-40	15-30	5-15	0-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
74: Elkner-----	In											
	0-7	Sandy loam	SM	A-2, A-4	0	0	80-100	75-100	45-70	25-40	20-30	NP-5
	7-20	Gravelly sandy loam, sandy loam, coarse sandy loam	SM	A-1, A-2	0	0-10	75-100	70-100	35-60	20-35	---	NP
	20-36	Coarse sandy loam, gravelly coarse sandy loam	SM	A-1, A-2	0	0-10	75-100	70-100	30-60	20-35	---	NP
	36-60	Gravelly loamy coarse sand	SM	A-1	0	0-15	70-90	60-75	25-50	10-25	---	NP
Rock outcrop.												
75: Perma-----												
	0-12	Gravelly loam	SM, SM-SC, GM, GM-GC	A-4	0	0-15	65-85	60-75	50-65	35-50	20-30	NP-10
	12-36	Very gravelly sandy loam, very cobbly loam, very cobbly sandy loam	GM-GC, GM, SM-SC, SM	A-2, A-4, A-1	0	10-40	50-70	40-60	30-50	20-40	20-30	NP-10
	36-60	Extremely gravelly loamy sand, extremely cobbly sandy loam, extremely gravelly loam	GM, GP, GP-GM	A-1	0	15-40	20-40	10-30	5-25	0-15	15-25	NP-5
76: Perma-----												
	0-10	Gravelly loam	SM, SM-SC, GM, GM-GC	A-4	0	0-15	65-85	60-75	50-65	35-50	20-30	NP-10
	10-38	Very gravelly sandy loam, very cobbly loam, very cobbly sandy loam	GM-GC, GM, SM-SC, SM	A-2, A-4, A-1	0	10-40	50-70	40-60	30-50	20-40	20-30	NP-10
	38-60	Extremely gravelly loamy sand, extremely cobbly sandy loam, extremely gravelly loam	GM, GP, GP-GM	A-1	0	15-40	20-40	10-30	5-25	0-15	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
77: Perma-----	0-7	Stony loam	SM, SM-SC, ML, CL-ML	A-4	0	15-30	75-95	70-90	65-85	45-75	15-25	NP-10
	7-38	Very gravelly sandy loam, very cobbly loam, very cobbly sandy loam	GM-GC, GM, SM-SC, SM	A-2, A-4, A-1	0	10-40	50-70	40-60	30-50	20-40	20-30	NP-10
	38-60	Extremely gravelly loamy sand, extremely cobbly sandy loam, extremely gravelly loam	GM, GP, GP-GM	A-1	0	15-40	20-40	10-30	5-25	0-15	15-25	NP-5
78: Perma variant---	0-12	Stony silt loam	ML	A-4	0	5-10	90-100	85-100	75-100	60-90	25-35	NP-10
	12-33	Very gravelly clay loam	GC	A-6, A-2	0	5-25	40-60	35-55	30-50	25-45	30-40	10-15
	33-60	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam	GM-GC, GC	A-4, A-6, A-2	0	5-25	40-65	35-55	30-50	20-40	25-35	5-15
79: Perma variant---	0-12	Stony silt loam	ML	A-4	0	5-10	90-100	85-100	75-100	60-90	25-35	NP-10
	12-33	Very gravelly clay loam	GC	A-6, A-2	0	5-25	40-60	35-55	30-50	25-45	30-40	10-15
	33-60	Very gravelly clay loam, very gravelly sandy clay loam, very gravelly loam	GM-GC, GC	A-4, A-6, A-2	0	5-25	40-65	35-55	30-50	20-40	25-35	5-15
Perma-----	0-7	Stony loam	SM, SM-SC, ML, CL-ML	A-4	0	15-30	75-95	70-90	65-85	45-75	15-25	NP-10
	7-38	Very gravelly sandy loam, very cobbly loam, very cobbly sandy loam	GM-GC, GM, SM-SC, SM	A-2, A-4, A-1	0	10-40	50-70	40-60	30-50	20-40	20-30	NP-10
	38-60	Extremely gravelly loamy sand, extremely cobbly sandy loam, extremely	GM, GP, GP-GM	A-1	0	15-40	20-40	10-30	5-25	0-15	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
80: Petty-----	0-12	Gravelly loam	ML, SM, GM	A-4	0	0-10	60-80	55-75	45-70	35-60	30-40	NP-10
	12-24	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-15	45-65	35-55	10-35	5-30	15-25	NP-5
	24-36	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-25	45-65	35-55	15-40	5-30	15-25	NP-5
	36-60	Extremely gravelly coarse sandy loam, very gravelly loamy coarse sand	GM, GP-GM	A-1	0	10-25	35-55	25-45	10-35	5-25	15-25	NP-5
81: Petty-----	0-12	Gravelly loam	ML, SM, GM	A-4	0	0-10	60-80	55-75	45-70	35-60	30-40	NP-10
	12-24	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-15	45-65	35-55	10-35	5-30	15-25	NP-5
	24-36	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-25	45-65	35-55	15-40	5-30	15-25	NP-5
	36-60	Extremely gravelly coarse sandy loam, very gravelly loamy coarse sand	GM, GP-GM	A-1	0	10-25	35-55	25-45	10-35	5-25	15-25	NP-5
82: Petty-----	0-8	Bouldery loam	SM, GM, ML	A-4	0	10-15	65-90	60-85	50-80	35-65	30-40	NP-10
	8-18	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-15	45-65	35-55	10-35	5-30	15-25	NP-5
	18-32	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-25	45-65	35-55	15-40	5-30	15-25	NP-5
	32-60	Extremely gravelly coarse sandy loam, very gravelly loamy coarse sand	GM, GP-GM	A-1	0	10-25	35-55	25-45	10-35	5-25	15-25	NP-5
83: Petty-----	0-9	Gravelly loam	ML, SM, GM	A-4	0	0-10	60-80	55-75	45-70	35-60	30-40	NP-10
	9-31	Very gravelly coarse sandy loam	GM, SM, GP-GM, SP-SM	A-1, A-2	0	10-15	45-65	35-55	10-35	5-30	15-25	NP-5
	31-60	Extremely gravelly coarse sandy loam, very gravelly loamy coarse sand	GM, GP-GM	A-1	0	10-25	35-55	25-45	10-35	5-25	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
95: Rumblecreek-----	0-8	Gravelly loam	SM, CL-ML, GM, SM-SC	A-2, A-4	0	0	60-85	50-75	45-70	30-60	20-30	NP-10
	8-20	Gravelly loam	GM-GC, GM, CL-ML, SM-SC	A-2, A-4	0	0	60-85	50-75	45-70	30-60	20-30	NP-10
	20-32	Very gravelly clay loam, very gravelly loam, very gravelly sandy clay loam	GC, GM-GC	A-2	0	0-15	35-60	30-50	25-45	20-35	25-40	5-15
	32-60	Very gravelly clay loam, very gravelly sandy clay loam	GC, GM-GC	A-2, A-4, A-6	0	0-15	35-60	30-50	25-45	20-40	25-40	5-15
96: Selway-----	0-18	Gravelly sandy loam	SM, GM	A-1, A-2	0	0	55-85	50-75	30-55	15-30	15-25	NP-5
	18-51	Very gravelly coarse sandy loam, extremely gravelly coarse sandy loam	GM, GP-GM, SM, SP-SM	A-1	0	0	25-60	15-50	5-30	5-20	15-25	NP-5
	51-60	Very gravelly loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-25	5-15	---	NP
97: Selway-----	0-18	Gravelly sandy loam	SM, GM	A-1, A-2	0	0	55-85	50-75	30-55	15-30	15-25	NP-5
	18-51	Very gravelly coarse sandy loam, extremely gravelly coarse sandy loam	GM, GP-GM, SM, SP-SM	A-1	0	0	25-60	15-50	5-30	5-20	15-25	NP-5
	51-60	Very gravelly loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-25	5-15	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
98: Selway-----	0-5	Bouldery sandy loam	SM	A-1, A-2	0	5-10	60-90	55-80	30-55	15-30	15-25	NP-5
	5-34	Very gravelly coarse sandy loam, extremely gravelly coarse sandy loam	GM, GP-GM, SM, SP-SM	A-1	0	0	25-60	15-50	5-30	5-20	15-25	NP-5
	34-60	Very gravelly loamy coarse sand, extremely gravelly loamy coarse sand	GP-GM, GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-25	5-15	---	NP
99: Sharrott-----	0-4	Gravelly loam	GM-GC, CL-ML, SM-SC	A-4	0	0-15	65-80	60-75	45-65	35-55	20-30	5-10
	4-13	Very gravelly loam	GM-GC	A-1, A-2	0	0-15	35-60	30-50	20-40	15-35	20-30	5-10
	13-15	Extremely gravelly loam	GM-GC, GP-GC	A-1, A-2	0	0-15	20-35	10-25	5-20	5-15	20-30	5-10
	15-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
Rock outcrop.												
100: Shooflin-----	0-12	Silt loam	ML, CL-ML	A-4	0	0-15	95-100	90-100	75-100	60-90	20-30	NP-10
	12-51	Clay	CH	A-7	0	0-10	95-100	95-100	85-100	70-95	55-80	30-50
	51-60	Unweathered bedrock	---	---	---	---	---	---	---	---	---	---
101: Tally variant---	0-10	Sandy loam	SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	10-20	Sandy loam	SM	A-2, A-4	0	0	100	100	60-70	30-40	20-25	NP-5
	20-30	Loamy sand, sand	SM	A-2	0	0	100	100	50-70	10-25	---	NP
	30-60	Sand, gravelly sand	SM, SP-SM	A-1, A-3, A-2	0	0	60-100	50-100	25-60	5-15	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	<u>In</u>				<u>Pct</u>	<u>Pct</u>					<u>Pct</u>	
102: Tevis-----	0-3	Gravelly loam	GM, GM-GC, ML, CL-ML	A-4	0	0	55-80	50-75	45-70	35-60	15-25	NP-10
	3-14	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	0-15	40-60	30-50	20-40	10-30	---	NP
	14-22	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP
	22-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP
103: Tevis-----	0-3	Gravelly loam	GM, GM-GC, ML, CL-ML	A-4	0	0	55-80	50-75	45-70	35-60	15-25	NP-10
	3-14	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	0-15	40-60	30-50	20-40	10-30	---	NP
	14-22	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP
	22-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
103: Mitten-----	0-9	Gravelly silt loam	GM, ML	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	9-16	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	10-15	35-65	30-55	20-45	10-30	---	NP
	16-34	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-30	25-40	15-30	10-25	5-15	---	NP
	34-60	Extremely gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-30	20-40	10-30	5-20	5-10	---	NP
104: Tevis-----	0-3	Gravelly loam	GM, GM-GC, ML, CL-ML	A-4	0	0	55-80	50-75	45-70	35-60	15-25	NP-10
	3-14	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	0-15	40-60	30-50	20-40	10-30	---	NP
	14-22	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP
	22-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam, extremely gravelly loam	GM, GP-GM, GP	A-1	0	0-15	20-35	10-25	5-20	0-15	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
104: Mitten-----	0-9	Gravelly silt loam	GM, ML	A-4	0	0-10	60-80	55-75	50-70	40-65	30-40	NP-10
	9-16	Very gravelly sandy loam, very gravelly fine sandy loam, very gravelly loam	GM	A-1, A-2	0	10-15	35-65	30-55	20-45	10-30	---	NP
	16-34	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-30	25-40	15-30	10-25	5-15	---	NP
	34-60	Extremely gravelly sandy loam, extremely gravelly coarse sandy loam, extremely gravelly loam	GP-GM	A-1	0	15-30	20-40	10-30	5-20	5-10	---	NP
Rock outcrop.												
105: Totelake-----	0-7	Gravelly loam	ML, SM, GM	A-4	0	0-15	65-85	60-75	50-70	35-55	20-25	NP-5
	7-22	Very gravelly sandy loam	GM, SM	A-1	0	0-25	45-60	35-50	20-35	10-20	---	NP
	22-60	Extremely gravelly loamy sand, extremely gravelly sand	GP-GM, GP	A-1	0	25-40	25-40	15-30	10-25	0-10	---	NP
106: Totelake-----	0-7	Gravelly loam	ML, SM, GM	A-4	0	0-15	65-85	60-75	50-70	35-55	20-25	NP-5
	7-22	Very gravelly sandy loam	GM, SM	A-1	0	0-25	45-60	35-50	20-35	10-20	---	NP
	22-60	Extremely gravelly loamy sand, extremely gravelly sand	GP-GM, GP	A-1	0	25-40	25-40	15-30	10-25	0-10	---	NP

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
112: Glaciercreek----	0-14	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	55-70	40-60	20-25	NP-5
	14-60	Extremely gravelly coarse sand, extremely gravelly loamy sand, extremely cobble sand	GP, GP-GM	A-1	0	10-45	20-50	10-30	5-20	0-10	---	NP
113: Upsata-----	0-6	Gravelly fine sandy loam	SM, GM	A-4, A-2, A-1	0	0-10	60-85	55-75	40-65	20-40	30-40	NP-10
	6-14	Gravelly fine sandy loam	SM, GM	A-4, A-2, A-1	0	0-10	60-85	55-75	40-65	20-40	30-40	NP-10
	14-60	Extremely gravelly loamy coarse sand, extremely gravelly loamy sand, extremely gravelly sand	GP	A-1	0	25-40	20-50	10-35	5-25	0-5	---	NP
114: Urban land.												
115: Waldbillig-----	0-10	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	10-26	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	26-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10
116: Waldbillig-----	0-10	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	10-26	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	26-60	Very gravelly fine sandy loam, very gravelly sandy loam, very	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
117: Waldbillig-----	0-10	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	10-26	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	26-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10
Auggie-----	0-6	Silt loam	CL-ML, ML	A-4	0	0	95-100	85-100	85-95	85-95	20-30	NP-10
	6-20	Silty clay loam	CL	A-6	0	0	90-100	85-100	85-95	85-95	30-40	10-15
	20-60	Silty clay loam	CL	A-6	0	0	90-100	85-100	85-95	85-90	30-40	10-15
118: Waldbillig-----	0-10	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	10-26	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	26-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10
Holloway-----	0-10	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	10-17	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	17-52	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	52-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
119: Waldbillig-----	0-10	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	10-26	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	26-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10
Holloway-----	0-10	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	10-17	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	17-52	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	52-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5
120: Waldbillig-----	0-11	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	11-25	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	25-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
120: Holloway-----	0-11	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	11-21	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	21-45	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	45-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5
121: Waldbillig-----	0-11	Gravelly silt loam	ML, GM	A-4	0	0-15	65-80	60-75	50-65	40-55	25-35	NP-10
	11-25	Very gravelly fine sandy loam, very gravelly sandy loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-15	40-65	30-55	20-40	10-25	20-30	NP-10
	25-60	Very gravelly fine sandy loam, very gravelly sandy loam, very gravelly loam	GM, GM-GC, SM, SM-SC	A-2, A-1	0	10-30	45-65	35-55	25-40	15-30	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
121: Holloway-----	0-11	Gravelly silt loam	ML, GM	A-4	0	5-15	65-80	60-75	55-70	40-65	30-40	NP-10
	11-21	Extremely gravelly fine sandy loam, very gravelly loam, extremely gravelly sandy loam	GM	A-1	0	0-25	25-50	20-40	15-35	10-25	15-25	NP-5
	21-45	Extremely gravelly fine sandy loam, extremely gravelly sandy loam, extremely gravelly loam	GP-GM, GM	A-1	0	10-25	20-35	15-30	10-25	5-20	15-25	NP-5
	45-60	Extremely gravelly sandy loam, extremely gravelly loamy sand	GP-GM	A-1	0	10-30	15-35	10-30	10-20	5-10	15-25	NP-5
122: Whitore-----	0-8	Gravelly clay loam	GC, CL	A-6	0	0-10	60-80	55-75	50-75	40-60	30-40	10-15
	8-60	Very cobbly clay loam, extremely cobbly loam, very channery clay loam	GM-GC, GC	A-4, A-6, A-2	0	25-55	35-70	30-65	25-65	20-50	25-35	5-15
123: Whitore-----	0-8	Gravelly clay loam	GC, CL	A-6	0	0-10	60-80	55-75	50-75	40-60	30-40	10-15
	8-60	Very cobbly clay loam, extremely cobbly loam, very channery clay loam	GM-GC, GC	A-4, A-6, A-2	0	25-55	35-70	30-65	25-65	20-50	25-35	5-15
124: Wildgen-----	0-6	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-15	65-75	60-70	50-65	35-55	25-30	5-10
	6-19	Very gravelly loam, gravelly loam	CL-ML, GM-GC	A-4, A-2	0	0-25	50-75	45-70	40-65	25-55	25-30	5-10
	19-60	Very gravelly loam, very gravelly sandy loam, very cobbly sandy loam	GM, GM-GC	A-2, A-4, A-1	0	10-40	45-60	40-55	25-50	10-40	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
125: Wildgen-----	0-6	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-15	65-75	60-70	50-65	35-55	25-30	5-10
	6-19	Very gravelly loam, gravelly loam	CL-ML, GM-GC	A-4, A-2	0	0-25	50-75	45-70	40-65	25-55	25-30	5-10
	19-60	Very gravelly loam, very gravelly sandy loam, very cobble sandy loam	GM, GM-GC	A-2, A-4, A-1	0	10-40	45-60	40-55	25-50	10-40	20-30	NP-10
Winkler-----	0-4	Gravelly loam	GM, ML	A-4	0	0-5	60-80	55-75	50-70	35-55	15-25	NP-5
	4-21	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP-GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	21-60	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
126: Wildgen-----	0-6	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-15	65-75	60-70	50-65	35-55	25-30	5-10
	6-19	Very gravelly loam, gravelly loam	CL-ML, GM-GC	A-4, A-2	0	0-25	50-75	45-70	40-65	25-55	25-30	5-10
	19-60	Very gravelly loam, very gravelly sandy loam, very cobble sandy loam	GM, GM-GC	A-2, A-4, A-1	0	10-40	45-60	40-55	25-50	10-40	20-30	NP-10
Winkler-----	0-4	Gravelly loam	GM, ML	A-4	0	0-5	60-80	55-75	50-70	35-55	15-25	NP-5
	4-21	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP-GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	21-60	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
127: Wildgen-----	0-3	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-15	65-75	60-70	50-65	35-55	25-30	5-10
	3-19	Very gravelly loam, gravelly loam	CL-ML, GM-GC	A-4, A-2	0	0-25	50-75	45-70	40-65	25-55	25-30	5-10
	19-60	Very gravelly loam, very gravelly sandy loam, very cobble sandy loam	GM, GM-GC	A-2, A-4, A-1	0	10-40	45-60	40-55	25-50	10-40	20-30	NP-10
Winkler-----	0-3	Very gravelly sandy loam	GM, SM	A-1	0	0-10	40-60	30-50	20-35	10-20	15-25	NP-5
	3-25	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP-GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	25-42	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
	42-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam	GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-10	15-25	NP-5
128: Wildgen-----	0-3	Gravelly loam	CL-ML, GM-GC, SM-SC	A-4	0	0-15	65-75	60-70	50-65	35-55	25-30	5-10
	3-19	Very gravelly loam, gravelly loam	CL-ML, GM-GC	A-4, A-2	0	0-25	50-75	45-70	40-65	25-55	25-30	5-10
	19-60	Very gravelly loam, very gravelly sandy loam, very cobble sandy loam	GM, GM-GC	A-2, A-4, A-1	0	10-40	45-60	40-55	25-50	10-40	20-30	NP-10

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
128: Winkler-----	0-3	Very gravelly sandy loam	GM, SM	A-1	0	0-10	40-60	30-50	20-35	10-20	15-25	NP-5
	3-25	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP-GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	25-42	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
	42-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam	GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-10	15-25	NP-5
129: Winfall-----	0-18	Gravelly loam	GM, GM-GC, ML, CL-ML	A-2, A-4	0	0-5	55-85	50-80	45-75	30-60	20-30	NP-10
	18-60	Very gravelly loam, very gravelly sandy loam, very gravelly fine sandy loam	GM, GM-GC	A-1, A-2	0	0-25	45-60	35-50	25-40	15-30	20-30	NP-10
130: Winkler-----	0-8	Very gravelly sandy loam	GM, SM	A-1	0	0-10	40-60	30-50	20-35	10-20	15-25	NP-5
	8-25	Very gravelly sandy loam, extremely gravelly sandy loam, very gravelly loam	GM, GP-GM, SM, SP-SM	A-1	0	0-15	25-60	15-50	10-35	5-20	15-25	NP-5
	25-42	Extremely gravelly sandy loam, extremely gravelly loam	GM, GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-20	15-25	NP-5
	42-60	Extremely gravelly sandy loam, extremely gravelly fine sandy loam	GP-GM	A-1	0	15-40	20-40	10-30	10-25	5-10	15-25	NP-5

ENGINEERING INDEX PROPERTIES--Continued

Map symbol and soil name	Depth	USDA texture	Classification		Rock fragments		Percentage passing sieve number--				Liquid limit	Plas- ticity index
			Unified	AASHTO	>10	3-10	4	10	40	200		
					inches	inches						
	In				Pct	Pct					Pct	
137: Yourame-----	0-4	Gravelly loam	ML, SM, GM	A-4	0	0-5	60-80	55-75	45-70	35-60	15-25	NP-5
	4-21	Gravelly loam, gravelly sandy loam	GM, SM	A-2, A-4	0	0-15	65-85	60-75	50-65	30-50	15-25	NP-5
	21-48	Very gravelly clay loam, very gravelly sandy clay loam, very cobble clay loam	GM-GC, GC	A-2, A-4	0	10-30	40-60	35-55	30-50	20-40	25-40	5-15
	48-60	Very gravelly clay loam, very gravelly loam, very cobble loam	GM-GC, GC	A-2, A-4	0	10-30	40-60	35-55	30-50	20-40	25-35	5-15

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
11: Auggie-----	0-6	10-20	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-5.0	0.37	0.37	5	5
	6-20	27-35	1.30-1.50	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.32	---		
	20-45	27-35	1.30-1.50	0.20-0.60	0.16-0.20	Moderate	0.5-1.0	0.32	---		
	45-60	10-20	1.30-1.50	0.60-2.00	0.16-0.20	Low	0.0-0.5	0.37	---		
12: Bata-----	0-10	10-20	0.80-0.95	0.60-2.00	0.11-0.13	Low	5.0-10	0.20	0.37	5	5
	10-22	12-25	1.15-1.40	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.15	---		
	22-60	20-35	1.35-1.60	0.20-0.60	0.07-0.09	Moderate	0.0-0.5	0.17	---		
13: Bata-----	0-9	10-20	0.80-0.95	0.60-2.00	0.11-0.13	Low	5.0-10	0.20	0.37	5	5
	9-20	12-25	1.15-1.40	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.15	---		
	20-60	20-35	1.35-1.60	0.20-0.60	0.07-0.09	Moderate	0.0-0.5	0.17	---		
Waldbillig-----	0-10	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-26	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	26-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
14: Beeskove-----	0-8	7-15	1.25-1.45	0.60-2.00	0.12-0.15	Low	0.5-2.0	0.20	0.37	5	5
	8-20	5-15	1.35-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	---		
	20-27	5-15	1.35-1.60	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.10	---		
	27-60	5-15	1.45-1.65	0.60-2.00	0.05-0.06	Low	0.0-0.5	0.05	---		
15: Beeskove-----	0-8	7-15	1.25-1.45	0.60-2.00	0.12-0.15	Low	0.5-2.0	0.20	0.37	5	5
	8-20	5-15	1.35-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	---		
	20-27	5-15	1.35-1.60	0.60-2.00	0.07-0.08	Low	0.5-1.0	0.10	---		
	27-60	5-15	1.45-1.65	0.60-2.00	0.05-0.06	Low	0.0-0.5	0.05	---		
Rock outcrop.											
16: Bigarm-----	0-11	7-18	1.15-1.35	0.60-2.00	0.13-0.16	Low	2.0-4.0	0.15	0.37	5	5
	11-15	5-18	1.30-1.50	2.00-6.00	0.08-0.09	Low	1.0-2.0	0.15	---		
	15-40	5-18	1.30-1.55	2.00-6.00	0.08-0.09	Low	0.5-1.0	0.15	---		
	40-60	5-18	1.35-1.60	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.10	---		
17: Bigarm-----	0-11	7-18	1.15-1.35	0.60-2.00	0.13-0.16	Low	2.0-4.0	0.15	0.37	5	5
	11-15	5-18	1.30-1.50	2.00-6.00	0.08-0.09	Low	1.0-2.0	0.15	---		
	15-40	5-18	1.30-1.55	2.00-6.00	0.08-0.09	Low	0.5-1.0	0.15	---		
	40-60	5-18	1.35-1.60	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.10	---		
18: Bigarm-----	0-11	7-18	1.15-1.35	0.60-2.00	0.13-0.16	Low	2.0-4.0	0.15	0.37	5	5
	11-15	5-18	1.30-1.50	2.00-6.00	0.08-0.09	Low	1.0-2.0	0.15	---		
	15-40	5-18	1.30-1.55	2.00-6.00	0.08-0.09	Low	0.5-1.0	0.15	---		
	40-60	5-18	1.35-1.60	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.10	---		
19: Bigarm-----	0-11	7-18	1.15-1.35	0.60-2.00	0.13-0.16	Low	2.0-4.0	0.15	0.37	5	5
	11-15	5-18	1.30-1.50	2.00-6.00	0.08-0.09	Low	1.0-2.0	0.15	---		
	15-40	5-18	1.30-1.55	2.00-6.00	0.08-0.09	Low	0.5-1.0	0.15	---		
	40-60	5-18	1.35-1.60	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.10	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
30: Coerock-----	0-15	7-15	0.65-0.85	0.60-2.00	0.10-0.12	Low	1.0-4.0	0.10	0.37	1	5
	15-18	7-15	0.65-0.85	0.60-2.00	0.09-0.11	Low	1.0-2.0	0.20	---		
	18-60	---	---	---	---	---	---	---	---		
Rock outcrop.											
31: Courville-----	0-10	7-15	0.85-1.00	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-27	5-18	1.30-1.55	0.60-2.00	0.09-0.11	Low	0.5-2.0	0.10	---		
	27-60	10-25	1.30-1.55	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
32: Courville-----	0-10	7-15	0.85-1.00	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-27	5-18	1.30-1.55	0.60-2.00	0.09-0.11	Low	0.5-2.0	0.10	---		
	27-60	10-25	1.30-1.55	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
Mitten-----	0-9	5-10	0.65-0.95	0.60-2.00	0.14-0.17	Low	2.0-4.0	0.15	0.37	5	5
	9-16	5-10	1.35-1.60	2.00-6.00	0.06-0.08	Low	1.0-2.0	0.10	---		
	16-34	5-10	1.35-1.60	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	34-60	5-10	1.40-1.65	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
33: Crow-----	0-4	10-20	1.25-1.65	0.20-0.60	0.18-0.21	Low	2.0-5.0	0.37	0.37	5	5
	4-10	20-40	1.25-1.65	0.20-0.60	0.15-0.18	Moderate	1.0-3.0	0.37	---		
	10-48	40-60	1.25-1.45	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	---		
	48-60	20-35	1.45-1.65	0.20-0.60	0.12-0.15	Moderate	0.0-0.5	0.32	---		
34: Desmet-----	0-7	10-18	1.10-1.30	0.60-2.00	0.16-0.18	Low	2.0-4.0	0.32	0.32	5	5
	7-15	10-18	1.25-1.50	0.60-2.00	0.15-0.17	Low	1.0-2.0	0.37	---		
	15-24	10-18	1.25-1.50	0.60-2.00	0.15-0.17	Low	0.5-1.0	0.37	---		
	24-39	10-18	1.30-1.50	0.60-2.00	0.14-0.17	Low	0.5-1.0	0.37	---		
	39-60	10-18	1.30-1.50	0.60-2.00	0.13-0.15	Low	0.0-0.5	0.32	---		
35: Elkner-----	0-7	5-10	1.20-1.40	2.00-6.00	0.13-0.15	Low	3.0-5.0	0.15	0.20	3	3
	7-20	5-10	1.35-1.60	2.00-6.00	0.10-0.12	Low	1.0-2.0	0.10	---		
	20-36	5-10	1.40-1.65	2.00-6.00	0.07-0.08	Low	0.5-1.0	0.05	---		
	36-60	0-5	1.40-1.65	6.00-20.00	0.04-0.05	Low	0.0-0.5	0.02	---		
Ovando-----	0-6	5-10	1.30-1.50	2.00-6.00	0.10-0.12	Low	1.0-3.0	0.02	0.20	5	3
	6-25	0-5	1.50-1.65	6.00-20.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	25-49	0-5	1.50-1.65	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	---		
	49-60	0-5	1.55-1.75	6.00-20.00	0.01-0.02	Low	0.0-0.5	0.02	---		
36: Evaro-----	0-4	7-15	0.75-0.95	2.00-6.00	0.12-0.15	Low	2.0-4.0	0.17	0.37	5	5
	4-16	5-15	1.40-1.60	2.00-6.00	0.06-0.07	Low	0.5-1.0	0.15	---		
	16-60	5-18	1.45-1.65	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.05	---		
37: Evaro-----	0-4	7-15	0.75-0.95	2.00-6.00	0.12-0.15	Low	2.0-4.0	0.17	0.37	5	5
	4-16	5-15	1.40-1.60	2.00-6.00	0.06-0.07	Low	0.5-1.0	0.15	---		
	16-60	5-18	1.45-1.65	2.00-6.00	0.05-0.06	Low	0.0-0.5	0.05	---		
38: Felan-----	0-8	10-20	0.85-0.95	0.60-2.00	0.15-0.17	Low	3.0-6.0	0.15	0.37	5	6
	8-33	10-20	1.25-1.50	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.32	---		
	33-60	10-20	1.30-1.55	0.60-2.00	0.09-0.11	Low	0.0-0.5	0.32	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
39: Felan-----	0-8	10-20	0.85-0.95	0.60-2.00	0.15-0.17	Low	3.0-6.0	0.15	0.37	5	6
	8-33	10-20	1.25-1.50	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.32	---		
	33-60	10-20	1.30-1.55	0.60-2.00	0.09-0.11	Low	0.0-0.5	0.32	---		
40: Felan-----	0-12	10-20	0.85-0.95	0.60-2.00	0.15-0.17	Low	3.0-6.0	0.15	0.37	3	6
	12-40	10-20	1.25-1.50	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.32	---		
	40-60	10-20	1.30-1.55	0.60-2.00	0.09-0.11	Low	0.0-0.5	0.32	---		
41: Felan-----	0-12	10-20	0.85-0.95	0.60-2.00	0.15-0.17	Low	3.0-6.0	0.15	0.37	3	6
	12-40	10-20	1.25-1.50	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.32	---		
	40-60	10-20	1.30-1.55	0.60-2.00	0.09-0.11	Low	0.0-0.5	0.32	---		
42: Glaciercreek----	0-14	5-15	0.85-1.00	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.17	0.37	2	5
	14-60	0-10	1.50-1.65	>20.00	0.01-0.02	Low	0.0-0.5	0.02	---		
43: Glaciercreek variant-----	0-9	5-15	1.25-1.45	2.00-6.00	0.14-0.17	Low	1.0-3.0	0.20	0.20	4	3
	9-32	5-15	1.35-1.60	2.00-6.00	0.13-0.16	Low	0.5-1.0	0.20	---		
	32-60	5-15	1.45-1.65	2.00-6.00	0.04-0.06	Low	0.0-0.5	0.10	---		
Glaciercreek----	0-14	5-15	0.85-1.00	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.17	0.37	2	5
	14-60	0-10	1.50-1.65	>20.00	0.01-0.02	Low	0.0-0.5	0.02	---		
44: Grantsdale-----	0-9	10-18	1.05-1.30	0.60-2.00	0.16-0.20	Low	3.0-5.0	0.28	0.28	3	5
	9-17	10-18	1.25-1.50	0.60-2.00	0.15-0.19	Low	1.0-3.0	0.37	---		
	17-32	10-18	1.25-1.50	0.60-2.00	0.13-0.16	Low	0.5-1.0	0.37	---		
	32-60	5-10	1.55-1.75	6.00-20.00	0.03-0.04	Low	0.0-0.5	0.05	---		
45: Grassvalley-----	0-9	30-40	1.15-1.35	0.06-0.20	0.16-0.20	Moderate	1.0-3.0	0.43	0.43	5	7
	9-21	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	1.0-2.0	0.37	---		
	21-28	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	0.5-1.0	0.37	---		
	28-60	35-60	1.30-1.55	0.00-0.06	0.14-0.16	Moderate	0.0-0.5	0.37	---		
46: Grassvalley-----	0-9	30-40	1.15-1.35	0.06-0.20	0.16-0.20	Moderate	1.0-3.0	0.43	0.43	5	7
	9-23	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	1.0-2.0	0.37	---		
	23-39	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	0.5-1.0	0.37	---		
	39-60	35-60	1.30-1.55	0.00-0.06	0.14-0.16	Moderate	0.0-0.5	0.37	---		
47: Grassvalley-----	0-7	30-40	1.15-1.35	0.06-0.20	0.16-0.20	Moderate	1.0-3.0	0.43	0.43	5	7
	7-24	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	1.0-2.0	0.37	---		
	24-52	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	0.5-1.0	0.37	---		
	52-60	35-60	1.30-1.55	0.00-0.06	0.14-0.16	Moderate	0.0-0.5	0.37	---		
48: Grassvalley-----	0-7	30-40	1.15-1.35	0.06-0.20	0.16-0.20	Moderate	1.0-3.0	0.43	0.43	5	7
	7-24	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	1.0-2.0	0.37	---		
	24-52	40-60	1.25-1.50	0.00-0.06	0.14-0.16	Moderate	0.5-1.0	0.37	---		
	52-60	35-60	1.30-1.55	0.00-0.06	0.14-0.16	Moderate	0.0-0.5	0.37	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
49: Greenough-----	0-8	5-20	1.20-1.45	0.60-2.00	0.18-0.22	Low	0.5-2.0	0.37	0.37	5	5
	8-22	5-20	1.30-1.50	0.60-2.00	0.18-0.22	Low	0.5-1.0	0.37	---		
	22-49	18-32	1.30-1.50	0.20-0.60	0.16-0.20	Moderate	0.0-0.5	0.32	---		
	49-60	18-32	1.30-1.55	0.20-0.60	0.14-0.18	Moderate	0.0-0.5	0.28	---		
50: Hagstadt-----	0-5	20-27	1.10-1.30	0.60-2.00	0.16-0.20	Low	2.0-5.0	0.32	0.32	3	6
	5-21	27-35	1.30-1.50	0.20-0.60	0.10-0.12	Moderate	0.5-2.0	0.32	---		
	21-60	---	---	---	---	---	---	---	---		
51: Half Moon-----	0-7	15-25	1.15-1.35	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.37	0.37	5	6
	7-18	25-35	1.30-1.50	0.20-0.60	0.16-0.20	Moderate	0.5-1.0	0.32	---		
	18-60	20-30	1.30-1.50	0.20-0.60	0.16-0.20	Low	0.0-0.5	0.37	---		
52: Hanaker-----	0-15	10-20	1.15-1.35	0.60-2.00	0.18-0.22	Low	1.0-3.0	0.37	0.37	5	4
	15-25	27-35	1.15-1.35	0.20-0.60	0.18-0.20	Moderate	1.0-2.0	0.32	---		
	25-32	18-27	1.30-1.50	0.20-0.60	0.18-0.20	Low	0.5-1.0	0.37	---		
	32-42	10-20	1.30-1.50	0.60-2.00	0.17-0.19	Low	0.0-0.5	0.32	---		
	42-60	15-27	1.40-1.65	0.60-2.00	0.10-0.12	Low	0.0-0.5	0.17	---		
53: Hollandlake-----	0-4	10-18	1.20-1.40	0.60-2.00	0.12-0.15	Low	1.0-3.0	0.20	0.37	5	5
	4-12	15-27	1.30-1.55	0.60-2.00	0.12-0.15	Low	0.5-1.0	0.20	---		
	12-22	20-30	1.40-1.60	0.20-0.60	0.07-0.09	Moderate	0.5-1.0	0.15	---		
	22-60	25-35	1.40-1.65	0.20-0.60	0.07-0.08	Moderate	0.0-0.5	0.10	---		
54: Hollandlake-----	0-4	10-18	1.20-1.40	0.60-2.00	0.12-0.15	Low	1.0-3.0	0.20	0.37	5	5
	4-12	15-27	1.30-1.55	0.60-2.00	0.12-0.15	Low	0.5-1.0	0.20	---		
	12-22	20-30	1.40-1.60	0.20-0.60	0.07-0.09	Moderate	0.5-1.0	0.15	---		
	22-60	25-35	1.40-1.65	0.20-0.60	0.07-0.08	Moderate	0.0-0.5	0.10	---		
Bata-----	0-9	10-20	0.80-0.95	0.60-2.00	0.11-0.13	Low	5.0-10	0.20	0.37	5	5
	9-20	12-25	1.15-1.40	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.15	---		
	20-60	20-35	1.35-1.60	0.20-0.60	0.07-0.09	Moderate	0.0-0.5	0.17	---		
55: Hollandlake-----	0-4	10-18	1.20-1.40	0.60-2.00	0.12-0.15	Low	1.0-3.0	0.20	0.37	5	6
	4-12	15-27	1.30-1.55	0.60-2.00	0.12-0.15	Low	0.5-1.0	0.20	---		
	12-22	20-30	1.40-1.60	0.20-0.60	0.07-0.09	Moderate	0.5-1.0	0.15	---		
	22-60	25-35	1.40-1.65	0.20-0.60	0.07-0.08	Moderate	0.0-0.5	0.10	---		
Bata-----	0-9	10-20	0.80-0.95	0.60-2.00	0.11-0.13	Low	5.0-10	0.20	0.37	5	5
	9-20	12-25	1.15-1.40	0.60-2.00	0.07-0.09	Low	0.5-1.0	0.15	---		
	20-60	20-35	1.35-1.60	0.20-0.60	0.07-0.09	Moderate	0.0-0.5	0.17	---		
56: Holloway-----	0-10	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	10-17	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	17-52	5-15	1.30-1.50	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	52-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
57: Holloway-----	0-10	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	10-17	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	17-52	5-15	1.30-1.50	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	52-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
58: Holloway-----	0-11	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	11-21	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	21-45	5-15	1.30-1.55	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	45-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
59: Holloway-----	0-11	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	11-21	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	21-45	5-15	1.30-1.55	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	45-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
60: Holloway-----	0-10	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	10-17	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	17-52	5-15	1.30-1.50	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	52-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
Rock outcrop.											
61: Jimlake-----	0-7	7-15	0.85-0.95	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.17	0.37	5	5
	7-14	10-18	1.20-1.45	0.60-2.00	0.13-0.17	Low	1.0-2.0	0.20	---		
	14-38	13-20	1.35-1.60	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	38-60	10-18	1.35-1.60	0.60-2.00	0.09-0.11	Low	0.0-0.5	0.15	---		
62: Jimlake-----	0-7	7-15	0.85-0.95	0.60-2.00	0.14-0.18	Low	2.0-4.0	0.17	0.37	5	5
	7-14	10-18	1.20-1.45	0.60-2.00	0.13-0.17	Low	1.0-2.0	0.20	---		
	14-38	13-20	1.35-1.60	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	38-60	10-18	1.35-1.60	0.60-2.00	0.09-0.11	Low	0.0-0.5	0.15	---		
63: Lantern-----	0-14	5-15	1.25-1.45	2.00-6.00	0.10-0.12	Low	1.0-3.0	0.10	0.20	5	3
	14-26	5-15	1.35-1.60	2.00-6.00	0.09-0.10	Low	0.5-1.0	0.10	---		
	26-39	5-18	1.45-1.70	2.00-6.00	0.09-0.10	Low	0.0-0.5	0.10	---		
	39-60	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
64: Lantern-----	0-14	5-15	1.25-1.45	2.00-6.00	0.10-0.12	Low	1.0-3.0	0.10	0.20	5	3
	14-26	5-15	1.35-1.60	2.00-6.00	0.09-0.10	Low	0.5-1.0	0.10	---		
	26-39	5-18	1.45-1.70	2.00-6.00	0.09-0.10	Low	0.0-0.5	0.10	---		
	39-60	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
65: Lantern-----	0-14	5-15	1.25-1.45	2.00-6.00	0.10-0.12	Low	1.0-3.0	0.10	0.20	5	3
	14-26	5-15	1.35-1.60	2.00-6.00	0.09-0.10	Low	0.5-1.0	0.10	---		
	26-39	5-18	1.45-1.70	2.00-6.00	0.09-0.10	Low	0.0-0.5	0.10	---		
	39-60	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
Rock outcrop.											
66: Lolopeak-----	0-9	7-12	0.85-0.95	2.00-6.00	0.12-0.15	Low	3.0-6.0	0.10	0.37	5	8
	9-27	0-5	1.50-1.75	6.00-20.00	0.01-0.02	Low	0.5-1.0	0.05	---		
	27-60	0-5	1.55-1.75	6.00-20.00	0.01-0.02	Low	0.0-0.5	0.05	---		
67: Lolopeak-----	0-9	7-12	0.85-0.95	2.00-6.00	0.12-0.15	Low	3.0-6.0	0.10	0.37	5	8
	9-27	0-5	1.50-1.75	6.00-20.00	0.01-0.02	Low	0.5-1.0	0.05	---		
	27-60	0-5	1.55-1.75	6.00-20.00	0.01-0.02	Low	0.0-0.5	0.05	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
75:											
Perma-----	0-12	7-20	1.30-1.50	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.17	0.37	5	5
	12-36	7-20	1.40-1.60	0.60-2.00	0.08-0.09	Low	1.0-2.0	0.10	---		
	36-60	0-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
76:											
Perma-----	0-10	7-20	1.30-1.50	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.17	0.37	5	5
	10-38	7-20	1.40-1.60	0.60-2.00	0.08-0.09	Low	1.0-2.0	0.10	---		
	38-60	0-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
77:											
Perma-----	0-7	7-20	1.30-1.50	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.17	0.37	5	5
	7-38	7-20	1.40-1.60	0.60-2.00	0.08-0.09	Low	1.0-2.0	0.10	---		
	38-60	0-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
78:											
Perma variant---	0-12	15-25	1.10-1.30	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.17	0.37	5	6
	12-33	27-35	1.35-1.60	0.20-0.60	0.08-0.10	Moderate	0.5-1.0	0.10	---		
	33-60	15-30	1.40-1.65	0.20-0.60	0.08-0.10	Moderate	0.0-0.5	0.10	---		
79:											
Perma variant---	0-12	15-25	1.10-1.30	0.60-2.00	0.16-0.20	Low	2.0-4.0	0.17	0.37	5	6
	12-33	27-35	1.35-1.60	0.20-0.60	0.08-0.10	Moderate	0.5-1.0	0.10	---		
	33-60	15-30	1.40-1.65	0.20-0.60	0.08-0.10	Moderate	0.0-0.5	0.10	---		
Perma-----	0-7	7-20	1.30-1.50	0.60-2.00	0.12-0.14	Low	2.0-4.0	0.17	0.37	5	5
	7-38	7-20	1.40-1.60	0.60-2.00	0.08-0.09	Low	1.0-2.0	0.10	---		
	38-60	0-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
80:											
Petty-----	0-12	7-15	0.85-0.95	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.15	0.37	5	5
	12-24	5-15	1.45-1.65	2.00-6.00	0.05-0.06	Low	0.5-2.0	0.10	---		
	24-36	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.10	---		
	36-60	5-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
81:											
Petty-----	0-12	7-15	0.85-0.95	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.15	0.37	5	5
	12-24	5-15	1.45-1.65	2.00-6.00	0.05-0.06	Low	0.5-2.0	0.10	---		
	24-36	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.10	---		
	36-60	5-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
82:											
Petty-----	0-8	7-15	0.85-0.95	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.15	0.37	5	8
	8-18	5-15	1.45-1.65	2.00-6.00	0.05-0.06	Low	0.5-2.0	0.10	---		
	18-32	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.10	---		
	32-60	5-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
83:											
Petty-----	0-9	7-15	0.85-0.95	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.15	0.37	5	5
	9-31	5-15	1.45-1.65	2.00-6.00	0.05-0.06	Low	0.5-2.0	0.10	---		
	31-60	5-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
84:											
Petty-----	0-9	7-15	0.85-0.95	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.15	0.37	5	8
	9-30	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.10	---		
	30-60	5-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
85:											
Petty-----	0-9	7-15	0.85-0.95	0.60-2.00	0.12-0.15	Low	2.0-4.0	0.15	0.37	5	8
	9-30	5-15	1.45-1.70	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.10	---		
	30-60	5-15	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
85: Rock outcrop.											
86: Phillcher-----	0-10	5-10	0.65-0.95	2.00-6.00	0.18-0.22	Low	1.0-3.0	0.32	0.32	3	5
	10-24	0-10	1.40-1.60	2.00-6.00	0.06-0.08	Low	0.5-1.0	0.10	---		
	24-60	0-10	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
87: Phillcher-----	0-10	5-10	0.65-0.95	2.00-6.00	0.18-0.22	Low	1.0-3.0	0.32	0.32	3	5
	10-24	0-10	1.40-1.60	2.00-6.00	0.06-0.08	Low	0.5-1.0	0.10	---		
	24-60	0-10	1.50-1.70	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.05	---		
Rock outcrop.											
88: Pits.											
89: Repp-----	0-12	10-20	1.20-1.40	0.60-2.00	0.09-0.11	Low	2.0-4.0	0.05	0.37	5	5
	12-24	10-20	1.35-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	---		
	24-60	10-18	1.40-1.65	0.60-2.00	0.04-0.05	Low	0.0-0.5	0.05	---		
90: Repp-----	0-9	10-20	1.20-1.40	0.60-2.00	0.09-0.11	Low	2.0-4.0	0.05	0.37	5	5
	9-24	10-20	1.35-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	---		
	24-60	10-18	1.40-1.65	0.60-2.00	0.04-0.05	Low	0.0-0.5	0.05	---		
91: Repp-----	0-9	10-20	1.20-1.40	0.60-2.00	0.09-0.11	Low	2.0-4.0	0.05	0.37	5	5
	9-24	10-20	1.35-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	---		
	24-60	10-18	1.40-1.65	0.60-2.00	0.04-0.05	Low	0.0-0.5	0.05	---		
92: Repp-----	0-12	10-20	1.20-1.40	0.60-2.00	0.09-0.11	Low	2.0-4.0	0.05	0.37	5	5
	12-24	10-20	1.35-1.60	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.15	---		
	24-60	10-18	1.40-1.65	0.60-2.00	0.04-0.05	Low	0.0-0.5	0.05	---		
Rock outcrop.											
93: Riverwash.											
94: Rock outcrop.											
Rubble land.											
95: Rumblecreek-----	0-8	10-20	1.15-1.35	0.60-2.00	0.12-0.15	Low	2.0-5.0	0.17	0.37	5	5
	8-20	10-20	1.25-1.50	0.60-2.00	0.11-0.14	Low	1.0-2.0	0.20	---		
	20-32	20-35	1.30-1.55	0.20-0.60	0.07-0.08	Low	0.5-1.0	0.10	---		
	32-60	20-35	1.35-1.60	0.20-0.60	0.07-0.08	Low	0.0-0.5	0.10	---		
96: Selway-----	0-18	5-15	1.20-1.45	2.00-6.00	0.09-0.11	Low	1.0-3.0	0.10	0.20	3	3
	18-51	5-15	1.50-1.70	2.00-6.00	0.04-0.05	Low	0.5-1.0	0.05	---		
	51-60	5-10	1.55-1.75	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
105: Totelake-----	0-7	8-15	0.95-1.25	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.17	0.37	3	5
	7-22	5-10	1.30-1.55	2.00-6.00	0.07-0.08	Low	0.5-1.0	0.10	---		
	22-60	0-10	1.40-1.65	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	---		
106: Totelake-----	0-7	8-15	0.95-1.25	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.17	0.37	3	5
	7-22	5-10	1.30-1.55	2.00-6.00	0.07-0.08	Low	0.5-1.0	0.10	---		
	22-60	0-10	1.40-1.65	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	---		
107: Totelake-----	0-4	8-15	1.00-1.35	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.02	0.37	2	8
	4-17	5-10	1.35-1.60	2.00-6.00	0.07-0.08	Low	0.5-1.0	0.10	---		
	17-60	0-10	1.50-1.70	6.00-20.00	0.02-0.03	Low	0.0-0.5	0.05	---		
108: Trapps-----	0-10	10-15	1.10-1.30	0.60-2.00	0.13-0.16	Low	2.0-5.0	0.17	0.37	3	5
	10-24	27-35	1.15-1.35	0.20-0.60	0.08-0.09	Moderate	1.0-2.0	0.15	---		
	24-35	10-15	1.30-1.50	0.60-2.00	0.09-0.10	Low	0.5-1.0	0.10	---		
	35-60	10-15	1.30-1.55	0.60-2.00	0.04-0.05	Low	0.0-0.5	0.05	---		
109: Trapps-----	0-10	10-15	1.10-1.30	0.60-2.00	0.13-0.16	Low	2.0-5.0	0.17	0.37	3	5
	10-24	27-35	1.15-1.35	0.20-0.60	0.08-0.09	Moderate	1.0-2.0	0.15	---		
	24-35	10-15	1.30-1.50	0.60-2.00	0.09-0.10	Low	0.5-1.0	0.10	---		
	35-60	10-15	1.30-1.55	0.60-2.00	0.04-0.05	Low	0.0-0.5	0.05	---		
110: Turrah-----	0-4	27-40	1.10-1.30	0.20-0.60	0.16-0.20	Moderate	3.0-5.0	0.32	0.32	4	4
	4-12	35-60	1.20-1.45	0.06-0.20	0.14-0.17	High	2.0-4.0	0.32	---		
	12-38	35-60	1.25-1.50	0.06-0.20	0.14-0.17	High	0.5-1.0	0.32	---		
	38-60	20-40	1.50-1.75	0.06-0.20	0.07-0.08	Moderate	0.0-0.5	0.15	---		
111: Udifluvents.											
112: Udorthents.											
Glaciercreek----	0-14	5-15	0.85-1.00	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.17	0.37	2	5
	14-60	0-10	1.50-1.65	>20.00	0.01-0.02	Low	0.0-0.5	0.02	---		
113: Upsata-----	0-6	7-15	0.85-0.95	2.00-6.00	0.12-0.15	Low	1.0-4.0	0.10	0.20	2	3
	6-14	3-7	0.85-0.95	2.00-6.00	0.11-0.14	Low	1.0-2.0	0.17	---		
	14-60	0-5	1.60-1.75	>20.00	0.01-0.02	Low	0.0-0.5	0.02	---		
114: Urban land.											
115: Waldbillig-----	0-10	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-26	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	26-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
116: Waldbillig-----	0-10	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-26	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	26-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
117:											
Waldbillig-----	0-10	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-26	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	26-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
Auggie-----	0-6	10-20	1.10-1.30	0.60-2.00	0.18-0.22	Low	2.0-5.0	0.32	0.32	5	5
	6-20	27-35	1.30-1.50	0.20-0.60	0.16-0.20	Moderate	1.0-2.0	0.32	---		
	20-60	27-35	1.30-1.50	0.20-0.60	0.16-0.20	Moderate	0.5-1.0	0.32	---		
118:											
Waldbillig-----	0-10	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-26	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	26-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
Holloway-----	0-10	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	10-17	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	17-52	5-15	1.30-1.50	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	52-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
119:											
Waldbillig-----	0-10	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	10-26	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	26-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
Holloway-----	0-10	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	10-17	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	17-52	5-15	1.30-1.50	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	52-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
120:											
Waldbillig-----	0-11	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	11-25	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	25-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
Holloway-----	0-11	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	11-21	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	21-45	5-15	1.30-1.55	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	45-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
121:											
Waldbillig-----	0-11	5-15	0.65-0.95	0.60-2.00	0.13-0.16	Low	1.0-4.0	0.20	0.37	5	5
	11-25	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.5-1.0	0.10	---		
	25-60	7-18	1.40-1.65	0.60-2.00	0.08-0.10	Low	0.0-0.5	0.10	---		
Holloway-----	0-11	5-15	0.80-0.95	0.60-2.00	0.15-0.18	Low	2.0-4.0	0.15	0.37	3	5
	11-21	5-15	1.30-1.55	2.00-6.00	0.04-0.06	Low	1.0-2.0	0.05	---		
	21-45	5-15	1.30-1.55	2.00-6.00	0.03-0.04	Low	0.5-1.0	0.05	---		
	45-60	5-15	1.40-1.70	2.00-6.00	0.02-0.03	Low	0.0-0.5	0.05	---		
122:											
Whitore-----	0-8	27-35	1.30-1.50	0.60-2.00	0.11-0.13	Moderate	0.5-2.0	0.20	0.32	2	6
	8-60	20-35	1.40-1.65	0.60-2.00	0.06-0.07	Moderate	0.0-0.5	0.10	---		
123:											
Whitore-----	0-8	27-35	1.30-1.50	0.60-2.00	0.11-0.13	Moderate	0.5-2.0	0.20	0.32	2	6
	8-60	20-35	1.40-1.65	0.60-2.00	0.06-0.07	Moderate	0.0-0.5	0.10	---		
124:											
Wildgen-----	0-6	15-25	1.10-1.30	0.60-2.00	0.12-0.15	Low	4.0-6.0	0.15	0.37	5	6
	6-19	15-25	1.35-1.55	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	19-60	10-25	1.40-1.60	0.60-2.00	0.07-0.08	Low	0.0-0.5	0.10	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
125: Wildgen-----	0-6	15-25	1.10-1.30	0.60-2.00	0.12-0.15	Low	4.0-6.0	0.15	0.37	5	6
	6-19	15-25	1.35-1.55	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	19-60	10-25	1.40-1.60	0.60-2.00	0.07-0.08	Low	0.0-0.5	0.10	---		
Winkler-----	0-4	7-15	1.15-1.35	2.00-6.00	0.11-0.14	Low	2.0-4.0	0.15	0.37	5	5
	4-21	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	21-60	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
126: Wildgen-----	0-6	15-25	1.10-1.30	0.60-2.00	0.12-0.15	Low	4.0-6.0	0.15	0.37	5	6
	6-19	15-25	1.35-1.55	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	19-60	10-25	1.40-1.60	0.60-2.00	0.07-0.08	Low	0.0-0.5	0.10	---		
Winkler-----	0-4	7-15	1.15-1.35	2.00-6.00	0.11-0.14	Low	2.0-4.0	0.15	0.37	5	5
	4-21	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	21-60	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
127: Wildgen-----	0-3	15-25	1.10-1.30	0.60-2.00	0.12-0.15	Low	4.0-6.0	0.15	0.37	5	6
	3-19	15-25	1.35-1.55	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	19-60	10-25	1.40-1.60	0.60-2.00	0.07-0.08	Low	0.0-0.5	0.10	---		
Winkler-----	0-3	7-15	1.20-1.40	2.00-6.00	0.07-0.09	Low	2.0-4.0	0.02	0.20	5	3
	3-25	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	25-42	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	42-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
128: Wildgen-----	0-3	15-25	1.10-1.30	0.60-2.00	0.12-0.15	Low	4.0-6.0	0.15	0.37	5	6
	3-19	15-25	1.35-1.55	0.60-2.00	0.09-0.11	Low	0.5-1.0	0.15	---		
	19-60	10-25	1.40-1.60	0.60-2.00	0.07-0.08	Low	0.0-0.5	0.10	---		
Winkler-----	0-3	7-15	1.20-1.40	2.00-6.00	0.07-0.09	Low	2.0-4.0	0.02	0.20	5	3
	3-25	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	25-42	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	42-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
129: Winfall-----	0-18	10-20	1.20-1.40	0.60-2.00	0.12-0.15	Low	0.5-2.0	0.24	0.37	5	5
	18-60	10-20	1.40-1.60	0.60-2.00	0.08-0.09	Low	0.0-0.5	0.15	---		
130: Winkler-----	0-8	7-15	1.20-1.40	2.00-6.00	0.07-0.09	Low	2.0-4.0	0.02	0.20	5	3
	8-25	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	25-42	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	42-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
131: Winkler-----	0-8	7-15	1.20-1.40	2.00-6.00	0.07-0.09	Low	2.0-4.0	0.02	0.20	5	3
	8-25	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	25-42	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	42-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
132: Winkler-----	0-4	7-15	1.15-1.35	2.00-6.00	0.11-0.14	Low	2.0-4.0	0.15	0.37	5	5
	4-21	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	21-40	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	40-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		

PHYSICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Moist bulk density	Permea- bility	Available water capacity	Shrink- swell potential	Organic matter	Erosion factors			Wind erodi- bility group
								K	Kf	T	
	In	Pct	g/cc	In/hr	In/in		Pct				
133: Winkler-----	0-4	7-15	1.15-1.35	2.00-6.00	0.11-0.14	Low	2.0-4.0	0.15	0.37	5	5
	4-21	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	21-40	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	40-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
134: Winkler-----	0-8	7-15	1.20-1.40	2.00-6.00	0.07-0.09	Low	2.0-4.0	0.02	0.20	5	3
	8-30	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	30-47	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	47-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
Rubble land.											
135: Winkler-----	0-4	7-15	1.15-1.35	2.00-6.00	0.11-0.14	Low	2.0-4.0	0.15	0.37	5	5
	4-21	5-15	1.40-1.60	2.00-6.00	0.05-0.06	Low	0.5-1.0	0.05	---		
	21-40	5-15	1.40-1.60	2.00-6.00	0.04-0.05	Low	0.0-0.5	0.05	---		
	40-60	5-15	1.40-1.65	2.00-6.00	0.03-0.04	Low	0.0-0.5	0.02	---		
Rock outcrop.											
136: Xerofluvents.											
137: Yourame-----	0-4	7-15	1.30-1.50	0.60-2.00	0.13-0.16	Low	0.5-2.0	0.24	0.37	5	5
	4-21	7-15	1.35-1.55	0.60-2.00	0.11-0.13	Low	0.5-1.0	0.10	---		
	21-48	20-35	1.45-1.70	0.20-0.60	0.07-0.08	Moderate	0.5-1.0	0.10	---		
	48-60	18-30	1.45-1.70	0.20-0.60	0.08-0.09	Moderate	0.0-0.5	0.10	---		

CHEMICAL PROPERTIES OF THE SOILS

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
1: Alberton-----	0-9	5-18	5.0-10.0	6.6-7.3	---	---
	9-16	5-18	5.0-10.0	6.6-7.3	---	---
	16-30	5-18	5.0-10.0	6.6-7.3	---	---
	30-60	5-10	1.0-5.0	6.6-7.3	---	---
2: Ambrant-----	0-4	5-15	15.0-25.0	5.6-7.3	---	---
	4-20	5-15	5.0-15.0	5.6-7.3	---	---
	20-39	5-18	5.0-10.0	5.6-7.3	---	---
	39-60	0-5	1.0-5.0	5.6-7.3	---	---
3: Ambrant-----	0-4	5-15	15.0-25.0	5.6-7.3	---	---
	4-20	5-15	5.0-15.0	5.6-7.3	---	---
	20-39	5-18	5.0-10.0	5.6-7.3	---	---
	39-60	0-5	1.0-5.0	5.6-7.3	---	---
Rochester-----	0-7	0-10	5.0-10.0	6.6-7.3	---	---
	7-12	0-10	1.0-5.0	6.6-7.3	---	---
	12-60	0-10	1.0-5.0	6.6-7.8	---	---
Rock outcrop.						
4: Aquic Haploxerolls.						
5: Aquic Udorthents.						
6: Aquolls. Aquepts.						
7: Argixerolls. Haploxerolls.						
8: Argixerolls. Haploxerolls.						
9: Argixerolls. Haploxerolls.						
10: Argixerolls. Haploxerolls.						
11: Auggie-----	0-6	10-20	15.0-20.0	5.6-7.3	---	---
	6-20	27-35	20.0-25.0	6.1-7.3	---	---
	20-45	27-35	15.0-20.0	6.1-7.8	---	---
	45-60	10-20	5.0-10.0	6.1-7.8	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
12:						
Bata-----	0-10	10-20	25.0-30.0	5.1-6.5	---	---
	10-22	12-25	10.0-15.0	5.6-6.5	---	---
	22-60	20-35	10.0-15.0	5.6-6.5	---	---
13:						
Bata-----	0-9	10-20	25.0-30.0	5.1-6.5	---	---
	9-20	12-25	10.0-15.0	5.6-6.5	---	---
	20-60	20-35	10.0-15.0	5.6-6.5	---	---
Waldbillig-----	0-10	5-15	25.0-30.0	5.6-6.5	---	---
	10-26	7-18	15.0-20.0	5.6-6.5	---	---
	26-60	7-18	10.0-15.0	6.1-7.3	---	---
14:						
Beeskove-----	0-8	7-15	10.0-15.0	6.6-7.3	---	---
	8-20	5-15	5.0-10.0	6.6-7.3	---	---
	20-27	5-15	5.0-10.0	6.6-7.3	---	---
	27-60	5-15	5.0-10.0	7.9-8.4	10-15	0-2
15:						
Beeskove-----	0-8	7-15	10.0-15.0	6.6-7.3	---	---
	8-20	5-15	5.0-10.0	6.6-7.3	---	---
	20-27	5-15	5.0-10.0	6.6-7.3	---	---
	27-60	5-15	5.0-10.0	7.9-8.4	10-15	0-2
Rock outcrop.						
16:						
Bigarm-----	0-11	7-18	10.0-15.0	6.6-7.3	---	---
	11-15	5-18	5.0-10.0	6.6-7.3	---	---
	15-40	5-18	5.0-10.0	6.6-7.3	---	---
	40-60	5-18	2.0-5.0	6.6-7.3	---	---
17:						
Bigarm-----	0-11	7-18	10.0-15.0	6.6-7.3	---	---
	11-15	5-18	5.0-10.0	6.6-7.3	---	---
	15-40	5-18	5.0-10.0	6.6-7.3	---	---
	40-60	5-18	2.0-5.0	6.6-7.3	---	---
18:						
Bigarm-----	0-11	7-18	10.0-15.0	6.6-7.3	---	---
	11-15	5-18	5.0-10.0	6.6-7.3	---	---
	15-40	5-18	5.0-10.0	6.6-7.3	---	---
	40-60	5-18	2.0-5.0	6.6-7.3	---	---
19:						
Bigarm-----	0-11	7-18	10.0-15.0	6.6-7.3	---	---
	11-15	5-18	5.0-10.0	6.6-7.3	---	---
	15-40	5-18	5.0-10.0	6.6-7.3	---	---
	40-60	5-18	2.0-5.0	6.6-7.3	---	---
20:						
Bigarm-----	0-11	7-18	10.0-15.0	6.6-7.3	---	---
	11-15	5-18	5.0-10.0	6.6-7.3	---	---
	15-40	5-18	5.0-10.0	6.6-7.3	---	---
	40-60	5-18	2.0-5.0	6.6-7.3	---	---
Rock outcrop.						

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
21: Biglake-----	0-9	5-15	5.0-10.0	6.6-7.3	---	---
	9-16	5-10	1.0-5.0	6.6-7.3	---	---
	16-60	0-10	1.0-5.0	6.6-7.3	---	---
22: Biglake-----	0-9	5-15	5.0-10.0	6.6-7.3	---	---
	9-16	5-10	1.0-5.0	6.6-7.3	---	---
	16-60	0-10	1.0-5.0	6.6-7.3	---	---
23: Bignell-----	0-11	10-20	10.0-15.0	5.1-6.0	---	---
	11-15	10-25	10.0-15.0	5.1-6.0	---	---
	15-60	35-60	25.0-30.0	5.1-6.5	---	---
24: Bignell-----	0-12	10-20	10.0-15.0	5.1-6.0	---	---
	12-22	10-25	10.0-15.0	5.1-6.0	---	---
	22-60	35-60	25.0-30.0	5.1-6.5	---	---
Winkler-----	0-4	7-15	10.0-15.0	6.1-7.3	---	---
	4-21	5-15	5.0-10.0	5.6-7.3	---	---
	21-40	5-15	5.0-10.0	5.6-6.5	---	---
	40-60	5-15	5.0-10.0	5.6-6.5	---	---
25: Bignell-----	0-11	10-20	10.0-15.0	5.1-6.0	---	---
	11-15	10-25	10.0-15.0	5.1-6.0	---	---
	15-60	35-60	25.0-30.0	5.1-6.5	---	---
Winkler-----	0-8	7-15	10.0-15.0	6.1-7.3	---	---
	8-25	5-15	5.0-10.0	5.6-7.3	---	---
	25-42	5-15	5.0-10.0	5.6-6.5	---	---
	42-60	5-15	5.0-10.0	5.6-6.5	---	---
26: Borochemists.						
27: Chickaman-----	0-9	5-8	20.0-30.0	6.1-6.5	---	---
	9-30	5-10	5.0-10.0	6.1-6.5	---	---
	30-60	5-10	1.0-5.0	6.1-6.5	---	---
28: Chickaman-----	0-9	5-8	20.0-30.0	6.1-6.5	---	---
	9-30	5-10	5.0-10.0	6.1-6.5	---	---
	30-60	5-10	1.0-5.0	6.1-6.5	---	---
29: Coerock-----	0-15	7-15	20.0-30.0	5.6-6.5	---	---
	15-18	7-15	20.0-30.0	5.6-6.0	---	---
	18-60	---	---	---	---	---
Rock outcrop.						
30: Coerock-----	0-15	7-15	20.0-30.0	5.6-6.5	---	---
	15-18	7-15	20.0-30.0	5.6-6.0	---	---
	18-60	---	---	---	---	---
Rock outcrop.						

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
31: Courville-----	0-10	7-15	25.0-30.0	5.6-6.5	---	---
	10-27	5-18	5.0-10.0	6.1-7.3	---	---
	27-60	10-25	5.0-10.0	6.1-7.3	---	---
32: Courville-----	0-10	7-15	25.0-30.0	5.6-6.5	---	---
	10-27	5-18	5.0-10.0	6.1-7.3	---	---
	27-60	10-25	5.0-10.0	6.1-7.3	---	---
Mitten-----	0-9	5-10	20.0-25.0	5.6-6.5	---	---
	9-16	5-10	5.0-10.0	5.6-6.5	---	---
	16-34	5-10	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-7.3	---	---
33: Crow-----	0-4	10-20	10.0-15.0	5.6-6.5	---	---
	4-10	20-40	10.0-20.0	5.6-6.5	---	---
	10-48	40-60	15.0-20.0	6.1-7.3	---	---
	48-60	20-35	10.0-15.0	6.1-7.8	---	---
34: Desmet-----	0-7	10-18	10.0-15.0	6.6-7.8	---	---
	7-15	10-18	10.0-15.0	7.4-8.4	---	---
	15-24	10-18	5.0-10.0	7.4-8.4	8-15	---
	24-39	10-18	5.0-10.0	7.4-8.4	5-12	0-2
	39-60	10-18	5.0-10.0	7.4-8.4	5-12	0-2
35: Elkner-----	0-7	5-10	10.0-15.0	5.6-6.5	---	---
	7-20	5-10	5.0-10.0	5.6-6.5	---	---
	20-36	5-10	5.0-10.0	5.6-6.5	---	---
	36-60	0-5	1.0-5.0	5.6-6.5	---	---
Ovando-----	0-6	5-10	5.0-10.0	5.6-6.5	---	---
	6-25	0-5	1.0-5.0	5.6-6.5	---	---
	25-49	0-5	1.0-5.0	5.6-6.5	---	---
	49-60	0-5	1.0-5.0	5.6-6.5	---	---
36: Evaro-----	0-4	7-15	10.0-15.0	6.1-6.5	---	---
	4-16	5-15	5.0-10.0	5.6-7.3	---	---
	16-60	5-18	5.0-10.0	5.6-7.3	---	---
37: Evaro-----	0-4	7-15	10.0-15.0	6.1-6.5	---	---
	4-16	5-15	5.0-10.0	5.6-7.3	---	---
	16-60	5-18	5.0-10.0	5.6-7.3	---	---
38: Felan-----	0-8	10-20	25.0-30.0	5.1-6.0	---	---
	8-33	10-20	15.0-20.0	5.1-7.3	---	---
	33-60	10-20	15.0-20.0	6.6-8.4	---	0-2
39: Felan-----	0-8	10-20	25.0-30.0	5.1-6.0	---	---
	8-33	10-20	15.0-20.0	5.1-7.3	---	---
	33-60	10-20	15.0-20.0	6.6-8.4	---	0-2

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
40:						
Felan-----	0-12	10-20	25.0-30.0	5.1-6.0	---	---
	12-40	10-20	15.0-20.0	5.1-7.3	---	---
	40-60	10-20	15.0-20.0	6.6-8.4	---	0-2
41:						
Felan-----	0-12	10-20	25.0-30.0	5.1-6.0	---	---
	12-40	10-20	15.0-20.0	5.1-7.3	---	---
	40-60	10-20	15.0-20.0	6.6-8.4	---	0-2
42:						
Glaciercreek----	0-14	5-15	20.0-25.0	5.6-7.3	---	---
	14-60	0-10	1.0-5.0	5.6-7.3	---	---
43:						
Glaciercreek variant-----	0-9	5-15	20.0-25.0	5.6-7.3	---	---
	9-32	5-15	15.0-20.0	5.6-7.3	---	---
	32-60	5-15	5.0-10.0	5.6-7.3	---	---
Glaciercreek----	0-14	5-15	20.0-25.0	5.6-7.3	---	---
	14-60	0-10	1.0-5.0	5.6-7.3	---	---
44:						
Grantsdale-----	0-9	10-18	15.0-20.0	6.1-7.3	---	---
	9-17	10-18	10.0-15.0	6.1-7.3	---	---
	17-32	10-18	5.0-10.0	7.4-8.4	5-15	---
	32-60	5-10	1.0-5.0	7.4-8.4	5-15	0-2
45:						
Grassvalley-----	0-9	30-40	15.0-20.0	6.6-7.8	---	---
	9-21	40-60	15.0-20.0	6.6-8.4	---	---
	21-28	40-60	15.0-20.0	7.4-8.4	5-15	---
	28-60	35-60	15.0-20.0	7.4-8.4	5-10	0-2
46:						
Grassvalley-----	0-9	30-40	15.0-20.0	6.6-7.8	---	---
	9-23	40-60	15.0-20.0	6.6-8.4	---	---
	23-39	40-60	15.0-20.0	7.4-8.4	5-15	---
	39-60	35-60	15.0-20.0	7.4-8.4	5-10	0-2
47:						
Grassvalley-----	0-7	30-40	15.0-20.0	6.6-7.8	---	---
	7-24	40-60	15.0-20.0	7.4-8.4	---	---
	24-52	40-60	15.0-20.0	6.6-8.4	0-15	---
	52-60	35-60	15.0-20.0	7.4-8.4	5-10	0-2
48:						
Grassvalley-----	0-7	30-40	15.0-20.0	6.6-7.8	---	---
	7-24	40-60	15.0-20.0	7.4-8.4	---	---
	24-52	40-60	15.0-20.0	7.4-8.4	5-15	---
	52-60	35-60	15.0-20.0	7.4-8.4	5-10	0-2
49:						
Greenough-----	0-8	5-20	10.0-15.0	5.6-6.5	---	---
	8-22	5-20	5.0-10.0	6.1-7.3	---	---
	22-49	18-32	10.0-15.0	6.1-7.3	---	---
	49-60	18-32	10.0-15.0	6.1-7.3	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
50: Hagstadt-----	0-5	20-27	15.0-20.0	6.1-7.3	---	---
	5-21	27-35	15.0-20.0	6.1-7.3	---	---
	21-60	---	---	---	---	---
51: Half Moon-----	0-7	15-25	15.0-20.0	4.5-7.3	---	---
	7-18	25-35	15.0-20.0	6.1-7.8	---	---
	18-60	20-30	10.0-15.0	7.4-9.0	5-15	0-4
52: Hanaker-----	0-15	10-20	15.0-20.0	6.6-7.8	---	---
	15-25	27-35	20.0-25.0	7.9-8.4	---	0-2
	25-32	18-27	15.0-20.0	7.9-8.4	5-15	0-4
	32-42	10-20	10.0-15.0	7.9-8.4	5-15	0-4
	42-60	15-27	10.0-15.0	7.9-8.4	5-15	0-4
53: Hollandlake-----	0-4	10-18	10.0-15.0	5.1-6.0	---	---
	4-12	15-27	10.0-15.0	5.1-6.0	---	---
	12-22	20-30	10.0-15.0	5.1-6.0	---	---
	22-60	25-35	10.0-15.0	6.6-7.3	---	---
54: Hollandlake-----	0-4	10-18	10.0-15.0	5.1-6.0	---	---
	4-12	15-27	10.0-15.0	5.1-6.0	---	---
	12-22	20-30	10.0-15.0	5.1-6.0	---	---
	22-60	25-35	10.0-15.0	6.6-7.3	---	---
Bata-----	0-9	10-20	25.0-30.0	5.1-6.5	---	---
	9-20	12-25	10.0-15.0	5.6-6.5	---	---
	20-60	20-35	10.0-15.0	5.6-6.5	---	---
55: Hollandlake-----	0-4	10-18	10.0-15.0	5.1-6.0	---	---
	4-12	15-27	10.0-15.0	5.1-6.0	---	---
	12-22	20-30	10.0-15.0	5.1-6.0	---	---
	22-60	25-35	10.0-15.0	6.6-7.3	---	---
Bata-----	0-9	10-20	25.0-30.0	5.1-6.5	---	---
	9-20	12-25	10.0-15.0	5.6-6.5	---	---
	20-60	20-35	10.0-15.0	5.6-6.5	---	---
56: Holloway-----	0-10	5-15	25.0-30.0	5.1-6.5	---	---
	10-17	5-15	10.0-15.0	5.1-6.5	---	---
	17-52	5-15	5.0-10.0	5.1-6.5	---	---
	52-60	5-15	5.0-10.0	5.1-6.5	---	---
57: Holloway-----	0-10	5-15	25.0-30.0	5.1-6.5	---	---
	10-17	5-15	10.0-15.0	5.1-6.5	---	---
	17-52	5-15	5.0-10.0	5.1-6.5	---	---
	52-60	5-15	5.0-10.0	5.1-6.5	---	---
58: Holloway-----	0-11	5-15	25.0-30.0	5.1-6.5	---	---
	11-21	5-15	10.0-15.0	5.1-6.5	---	---
	21-45	5-15	5.0-10.0	5.1-6.5	---	---
	45-60	5-15	5.0-10.0	5.1-6.5	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
59: Holloway-----	0-11	5-15	25.0-30.0	5.1-6.5	---	---
	11-21	5-15	10.0-15.0	5.1-6.5	---	---
	21-45	5-15	5.0-10.0	5.1-6.5	---	---
	45-60	5-15	5.0-10.0	5.1-6.5	---	---
60: Holloway-----	0-10	5-15	25.0-30.0	5.1-6.5	---	---
	10-17	5-15	10.0-15.0	5.1-6.5	---	---
	17-52	5-15	5.0-10.0	5.1-6.5	---	---
	52-60	5-15	5.0-10.0	5.1-6.5	---	---
Rock outcrop.						
61: Jimlake-----	0-7	7-15	20.0-30.0	5.6-6.5	---	---
	7-14	10-18	10.0-15.0	6.1-7.3	---	---
	14-38	13-20	10.0-15.0	6.1-7.3	---	---
	38-60	10-18	5.0-10.0	6.6-7.8	---	---
62: Jimlake-----	0-7	7-15	20.0-30.0	5.6-6.5	---	---
	7-14	10-18	10.0-15.0	6.1-7.3	---	---
	14-38	13-20	10.0-15.0	6.1-7.3	---	---
	38-60	10-18	5.0-10.0	6.6-7.8	---	---
63: Lantern-----	0-14	5-15	5.0-10.0	6.1-6.5	---	---
	14-26	5-15	5.0-10.0	6.1-6.5	---	---
	26-39	5-18	5.0-10.0	6.1-7.3	---	---
	39-60	5-15	1.0-5.0	6.1-7.3	---	---
64: Lantern-----	0-14	5-15	5.0-10.0	6.1-6.5	---	---
	14-26	5-15	5.0-10.0	6.1-6.5	---	---
	26-39	5-18	5.0-10.0	6.1-7.3	---	---
	39-60	5-15	1.0-5.0	6.1-7.3	---	---
65: Lantern-----	0-14	5-15	5.0-10.0	6.1-6.5	---	---
	14-26	5-15	5.0-10.0	6.1-6.5	---	---
	26-39	5-18	5.0-10.0	6.1-7.3	---	---
	39-60	5-15	1.0-5.0	6.1-7.3	---	---
Rock outcrop.						
66: Lolopeak-----	0-9	7-12	30.0-35.0	5.1-6.0	---	---
	9-27	0-5	0.0-2.0	5.1-6.0	---	---
	27-60	0-5	0.0-2.0	5.1-6.0	---	---
67: Lolopeak-----	0-9	7-12	30.0-35.0	5.1-6.0	---	---
	9-27	0-5	0.0-2.0	5.1-6.0	---	---
	27-60	0-5	0.0-2.0	5.1-6.0	---	---
Rock outcrop.						

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
68: Lubrecht-----	0-8	10-20	15.0-20.0	5.1-6.5	---	---
	8-11	27-40	15.0-20.0	5.6-6.5	---	---
	11-30	40-60	20.0-25.0	5.1-6.5	---	---
	30-36	27-40	10.0-15.0	5.1-6.5	---	---
	36-60	---	---	---	---	---
69: Mitten-----	0-9	5-10	20.0-25.0	5.6-6.5	---	---
	9-16	5-10	5.0-10.0	5.6-6.5	---	---
	16-34	5-10	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-7.3	---	---
70: Mitten-----	0-9	5-10	20.0-25.0	5.6-6.5	---	---
	9-16	5-10	5.0-10.0	5.6-6.5	---	---
	16-34	5-10	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-7.3	---	---
Sharrott-----	0-7	10-15	10.0-15.0	5.6-6.5	---	---
	7-14	10-15	5.0-10.0	5.6-6.5	---	---
	14-16	10-15	5.0-10.0	5.6-6.5	---	---
	16-60	---	---	---	---	---
71: Mitten-----	0-9	5-10	20.0-25.0	5.6-6.5	---	---
	9-16	5-10	5.0-10.0	5.6-6.5	---	---
	16-34	5-10	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-7.3	---	---
Tevis-----	0-3	10-15	5.0-10.0	5.6-7.3	---	---
	3-14	5-10	2.0-5.0	5.6-7.3	---	---
	14-22	5-10	1.0-5.0	5.6-7.3	---	---
	22-60	5-10	1.0-5.0	6.1-7.3	---	---
72: Moiese-----	0-9	10-22	15.0-20.0	6.1-7.3	---	---
	9-21	5-15	5.0-10.0	6.6-7.8	0-1	---
	21-60	0-5	1.0-5.0	6.6-8.4	5-15	0-2
73: Orthents.						
74: Ovando-----	0-6	5-10	5.0-10.0	5.6-6.5	---	---
	6-25	0-5	1.0-5.0	5.6-6.5	---	---
	25-49	0-5	1.0-5.0	5.6-6.5	---	---
	49-60	0-5	1.0-5.0	5.6-6.5	---	---
Elkner-----	0-7	5-10	10.0-15.0	5.6-6.5	---	---
	7-20	5-10	5.0-10.0	5.6-6.5	---	---
	20-36	5-10	5.0-10.0	5.6-6.5	---	---
	36-60	0-5	1.0-5.0	5.6-6.5	---	---
Rock outcrop.						
75: Perma-----	0-12	7-20	10.0-20.0	6.6-7.3	---	---
	12-36	7-20	10.0-15.0	6.6-7.8	---	---
	36-60	0-15	1.0-5.0	6.6-7.8	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
76:						
Perma-----	0-10	7-20	10.0-20.0	6.6-7.3	---	---
	10-38	7-20	10.0-15.0	6.6-7.8	---	---
	38-60	0-15	1.0-5.0	6.6-7.8	---	---
77:						
Perma-----	0-7	7-20	10.0-20.0	6.6-7.3	---	---
	7-38	7-20	10.0-15.0	6.6-7.8	---	---
	38-60	0-15	1.0-5.0	6.6-7.8	---	---
78:						
Perma variant---	0-12	15-25	15.0-20.0	6.1-7.3	---	---
	12-33	27-35	20.0-25.0	6.6-7.8	---	---
	33-60	15-30	15.0-20.0	7.9-8.4	5-15	0-2
79:						
Perma variant---	0-12	15-25	15.0-20.0	6.1-7.3	---	---
	12-33	27-35	20.0-25.0	6.6-7.8	---	---
	33-60	15-30	15.0-20.0	7.9-8.4	---	0-2
Perma-----	0-7	7-20	10.0-20.0	6.6-7.3	---	---
	7-38	7-20	10.0-15.0	6.6-7.8	---	---
	38-60	0-15	1.0-5.0	6.6-7.8	---	---
80:						
Petty-----	0-12	7-15	20.0-30.0	5.6-6.5	---	---
	12-24	5-15	5.0-10.0	5.6-6.5	---	---
	24-36	5-15	5.0-10.0	5.6-6.5	---	---
	36-60	5-15	1.0-5.0	5.6-6.5	---	---
81:						
Petty-----	0-12	7-15	20.0-30.0	5.6-6.5	---	---
	12-24	5-15	5.0-10.0	5.6-6.5	---	---
	24-36	5-15	5.0-10.0	5.6-6.5	---	---
	36-60	5-15	1.0-5.0	5.6-6.5	---	---
82:						
Petty-----	0-8	7-15	20.0-30.0	5.6-6.5	---	---
	8-18	5-15	5.0-10.0	5.6-6.5	---	---
	18-32	5-15	5.0-10.0	5.6-6.5	---	---
	32-60	5-15	1.0-5.0	5.6-6.5	---	---
83:						
Petty-----	0-9	7-15	20.0-30.0	5.6-6.5	---	---
	9-31	5-15	5.0-10.0	5.6-6.5	---	---
	31-60	5-15	1.0-5.0	5.6-6.5	---	---
84:						
Petty-----	0-9	7-15	20.0-30.0	5.6-6.5	---	---
	9-30	5-15	5.0-10.0	5.6-6.5	---	---
	30-60	5-15	1.0-5.0	5.6-6.5	---	---
85:						
Petty-----	0-9	7-15	20.0-30.0	5.6-6.5	---	---
	9-30	5-15	5.0-10.0	5.6-6.5	---	---
	30-60	5-15	1.0-5.0	5.6-6.5	---	---
Rock outcrop.						

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
86: Phillcher-----	0-10	5-10	25.0-30.0	5.6-6.0	---	---
	10-24	0-10	2.0-5.0	5.6-6.0	---	---
	24-60	0-10	1.0-5.0	5.6-6.0	---	---
87: Phillcher-----	0-10	5-10	25.0-30.0	5.6-6.0	---	---
	10-24	0-10	2.0-5.0	5.6-6.0	---	---
	24-60	0-10	1.0-5.0	5.6-6.0	---	---
Rock outcrop.						
88: Pits.						
89: Repp-----	0-12	10-20	10.0-15.0	6.1-7.8	1-5	---
	12-24	10-20	5.0-10.0	7.4-8.4	5-10	0-2
	24-60	10-18	5.0-10.0	7.4-8.4	10-15	0-2
90: Repp-----	0-9	10-20	10.0-15.0	6.1-7.8	1-5	---
	9-24	10-20	5.0-10.0	7.4-8.4	5-10	0-2
	24-60	10-18	5.0-10.0	7.4-8.4	10-15	0-2
91: Repp-----	0-9	10-20	10.0-15.0	6.1-7.8	1-5	---
	9-24	10-20	5.0-10.0	7.4-8.4	5-10	0-2
	24-60	10-18	5.0-10.0	7.4-8.4	10-15	0-2
92: Repp-----	0-12	10-20	10.0-15.0	6.1-7.8	1-5	---
	12-24	10-20	5.0-10.0	7.4-8.4	5-10	0-2
	24-60	10-18	5.0-10.0	7.4-8.4	10-15	0-2
Rock outcrop.						
93: Riverwash.						
94: Rock outcrop.						
Rubble land.						
95: Rumblecreek-----	0-8	10-20	10.0-15.0	5.1-6.0	---	---
	8-20	10-20	10.0-15.0	5.1-6.0	---	---
	20-32	20-35	10.0-15.0	5.6-6.5	---	---
	32-60	20-35	10.0-15.0	5.6-6.5	---	---
96: Selway-----	0-18	5-15	5.0-10.0	6.1-7.3	---	---
	18-51	5-15	5.0-10.0	5.6-6.5	---	---
	51-60	5-10	1.0-5.0	5.6-6.5	---	---
97: Selway-----	0-18	5-15	5.0-10.0	6.1-7.3	---	---
	18-51	5-15	5.0-10.0	5.6-6.5	---	---
	51-60	5-10	1.0-5.0	5.6-6.5	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
98: Selway-----	0-5	5-15	5.0-10.0	6.1-7.3	---	---
	5-34	5-15	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-6.5	---	---
99: Sharrott-----	0-4	10-15	10.0-15.0	5.6-6.5	---	---
	4-13	10-15	5.0-10.0	5.6-6.5	---	---
	13-15	10-15	5.0-10.0	5.6-6.5	---	---
	15-60	---	---	---	---	---
Rock outcrop.						
100: Shooflin-----	0-12	10-20	15.0-20.0	5.1-6.0	---	---
	12-51	60-80	50.0-70.0	4.5-6.0	---	---
	51-60	---	---	---	---	---
101: Tally variant---	0-10	5-15	10.0-15.0	6.1-7.3	---	---
	10-20	5-15	10.0-15.0	6.1-7.3	---	---
	20-30	0-10	5.0-10.0	6.6-7.3	---	---
	30-60	0-5	1.0-5.0	6.6-7.3	---	---
102: Tevis-----	0-3	10-15	5.0-10.0	5.6-7.3	---	---
	3-14	5-10	2.0-5.0	5.6-7.3	---	---
	14-22	5-10	1.0-5.0	5.6-7.3	---	---
	22-60	5-10	1.0-5.0	6.1-7.3	---	---
103: Tevis-----	0-3	10-15	5.0-10.0	5.6-7.3	---	---
	3-14	5-10	2.0-5.0	5.6-7.3	---	---
	14-22	5-10	1.0-5.0	5.6-7.3	---	---
	22-60	5-10	1.0-5.0	6.1-7.3	---	---
Mitten-----	0-9	5-10	20.0-25.0	5.6-6.5	---	---
	9-16	5-10	5.0-10.0	5.6-6.5	---	---
	16-34	5-10	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-7.3	---	---
104: Tevis-----	0-3	10-15	5.0-10.0	5.6-7.3	---	---
	3-14	5-10	2.0-5.0	5.6-7.3	---	---
	14-22	5-10	1.0-5.0	5.6-7.3	---	---
	22-60	5-10	1.0-5.0	6.1-7.3	---	---
Mitten-----	0-9	5-10	20.0-25.0	5.6-6.5	---	---
	9-16	5-10	5.0-10.0	5.6-6.5	---	---
	16-34	5-10	5.0-10.0	5.6-6.5	---	---
	34-60	5-10	1.0-5.0	5.6-7.3	---	---
Rock outcrop.						
105: Totelake-----	0-7	8-15	10.0-15.0	6.6-7.3	---	---
	7-22	5-10	5.0-10.0	6.6-7.3	---	---
	22-60	0-10	1.0-5.0	6.6-7.3	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
106: Totelake-----	0-7	8-15	10.0-15.0	6.6-7.3	---	---
	7-22	5-10	5.0-10.0	6.6-7.3	---	---
	22-60	0-10	1.0-5.0	6.6-7.3	---	---
107: Totelake-----	0-4	8-15	15.0	6.6-7.3	---	---
	4-17	5-10	5.0-10.0	6.6-7.3	---	---
	17-60	0-10	1.0-5.0	6.6-7.3	---	---
108: Trapps-----	0-10	10-15	10.0-15.0	5.6-7.3	---	---
	10-24	27-35	15.0-20.0	6.6-8.4	---	0-2
	24-35	10-15	5.0-10.0	7.9-8.4	15-40	0-2
	35-60	10-15	2.0-5.0	7.9-8.4	10-35	0-2
109: Trapps-----	0-10	10-15	10.0-15.0	5.6-7.3	---	---
	10-24	27-35	15.0-20.0	6.6-8.4	---	0-2
	24-35	10-15	5.0-10.0	7.9-8.4	15-40	0-2
	35-60	10-15	2.0-5.0	7.9-8.4	10-35	0-2
110: Turrah-----	0-4	27-40	20.0-25.0	5.6-7.3	---	---
	4-12	35-60	25.0-30.0	5.6-7.3	---	---
	12-38	35-60	20.0-25.0	6.6-7.8	---	---
	38-60	20-40	15.0-20.0	6.6-7.8	---	---
111: Udifluvents.						
112: Udorthents.						
Glaciercreek----	0-14	5-15	20.0-25.0	5.6-7.3	---	---
	14-60	0-10	1.0-5.0	5.6-7.3	---	---
113: Upsata-----	0-6	7-15	20.0-30.0	5.1-6.5	---	---
	6-14	3-7	15.0-20.0	5.6-6.5	---	---
	14-60	0-5	1.0-5.0	5.1-6.5	---	---
114: Urban land.						
115: Waldbillig-----	0-10	5-15	25.0-30.0	5.6-6.5	---	---
	10-26	7-18	15.0-20.0	5.6-6.5	---	---
	26-60	7-18	10.0-15.0	6.1-7.3	---	---
116: Waldbillig-----	0-10	5-15	25.0-30.0	5.6-6.5	---	---
	10-26	7-18	15.0-20.0	5.6-6.5	---	---
	26-60	7-18	10.0-15.0	6.1-7.3	---	---
117: Waldbillig-----	0-10	5-15	25.0-30.0	5.6-6.5	---	---
	10-26	7-18	15.0-20.0	5.6-6.5	---	---
	26-60	7-18	10.0-15.0	6.1-7.3	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
117:						
Auggie-----	0-6	10-20	15.0-20.0	5.6-7.3	---	---
	6-20	27-35	20.0-25.0	6.1-7.3	---	---
	20-60	27-35	15.0-20.0	6.1-7.8	---	---
118:						
Waldbillig-----	0-10	5-15	25.0-30.0	5.6-6.5	---	---
	10-26	7-18	15.0-20.0	5.6-6.5	---	---
	26-60	7-18	10.0-15.0	6.1-7.3	---	---
Holloway-----	0-10	5-15	25.0-30.0	5.1-6.5	---	---
	10-17	5-15	10.0-15.0	5.1-6.5	---	---
	17-52	5-15	5.0-10.0	5.1-6.5	---	---
	52-60	5-15	5.0-10.0	5.1-6.5	---	---
119:						
Waldbillig-----	0-10	5-15	25.0-30.0	5.6-6.5	---	---
	10-26	7-18	15.0-20.0	5.6-6.5	---	---
	26-60	7-18	10.0-15.0	6.1-7.3	---	---
Holloway-----	0-10	5-15	25.0-30.0	5.1-6.5	---	---
	10-17	5-15	10.0-15.0	5.1-6.5	---	---
	17-52	5-15	5.0-10.0	5.1-6.5	---	---
	52-60	5-15	5.0-10.0	5.1-6.5	---	---
120:						
Waldbillig-----	0-11	5-15	25.0-30.0	5.6-6.5	---	---
	11-25	7-18	15.0-20.0	5.6-6.5	---	---
	25-60	7-18	10.0-15.0	6.1-7.3	---	---
Holloway-----	0-11	5-15	25.0-30.0	5.1-6.5	---	---
	11-21	5-15	10.0-15.0	5.1-6.5	---	---
	21-45	5-15	5.0-10.0	5.1-6.5	---	---
	45-60	5-15	5.0-10.0	5.1-6.5	---	---
121:						
Waldbillig-----	0-11	5-15	25.0-30.0	5.6-6.5	---	---
	11-25	7-18	15.0-20.0	5.6-6.5	---	---
	25-60	7-18	10.0-15.0	6.1-7.3	---	---
Holloway-----	0-11	5-15	25.0-30.0	5.1-6.5	---	---
	11-21	5-15	10.0-15.0	5.1-6.5	---	---
	21-45	5-15	5.0-10.0	5.1-6.5	---	---
	45-60	5-15	5.0-10.0	5.1-6.5	---	---
122:						
Whitore-----	0-8	27-35	15.0-20.0	6.6-7.8	0-5	---
	8-60	20-35	10.0-15.0	7.4-9.0	40-50	0-2
123:						
Whitore-----	0-8	27-35	15.0-20.0	6.6-7.8	0-5	---
	8-60	20-35	10.0-15.0	7.4-9.0	40-50	0-2
124:						
Wildgen-----	0-6	15-25	15.0-20.0	6.1-7.3	---	---
	6-19	15-25	10.0-15.0	6.1-7.3	---	---
	19-60	10-25	5.0-10.0	6.1-7.3	---	---
125:						
Wildgen-----	0-6	15-25	15.0-20.0	6.1-7.3	---	---
	6-19	15-25	10.0-15.0	6.1-7.3	---	---
	19-60	10-25	5.0-10.0	6.1-7.3	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
125:						
Winkler-----	0-4	7-15	10.0-15.0	6.1-7.3	---	---
	4-21	5-15	5.0-10.0	5.6-7.3	---	---
	21-60	5-15	5.0-10.0	5.6-6.5	---	---
126:						
Wildgen-----	0-6	15-25	15.0-20.0	6.1-7.3	---	---
	6-19	15-25	10.0-15.0	6.1-7.3	---	---
	19-60	10-25	5.0-10.0	6.1-7.3	---	---
Winkler-----	0-4	7-15	10.0-15.0	6.1-7.3	---	---
	4-21	5-15	5.0-10.0	5.6-7.3	---	---
	21-60	5-15	5.0-10.0	5.6-6.5	---	---
127:						
Wildgen-----	0-3	15-25	15.0-20.0	6.1-7.3	---	---
	3-19	15-25	10.0-15.0	6.1-7.3	---	---
	19-60	10-25	5.0-10.0	6.1-7.3	---	---
Winkler-----	0-3	7-15	10.0-15.0	6.1-7.3	---	---
	3-25	5-15	5.0-10.0	5.6-7.3	---	---
	25-42	5-15	5.0-10.0	5.6-6.5	---	---
	42-60	5-15	5.0-10.0	5.6-6.5	---	---
128:						
Wildgen-----	0-3	15-25	15.0-20.0	6.1-7.3	---	---
	3-19	15-25	10.0-15.0	6.1-7.3	---	---
	19-60	10-25	5.0-10.0	6.1-7.3	---	---
Winkler-----	0-3	7-15	10.0-15.0	6.1-7.3	---	---
	3-25	5-15	5.0-10.0	5.6-7.3	---	---
	25-42	5-15	5.0-10.0	5.6-6.5	---	---
	42-60	5-15	5.0-10.0	5.6-6.5	---	---
129:						
Winfall-----	0-18	10-20	5.0-10.0	5.1-6.5	---	---
	18-60	10-20	5.0-10.0	5.1-6.5	---	---
130:						
Winkler-----	0-8	7-15	10.0-15.0	6.1-7.3	---	---
	8-25	5-15	5.0-10.0	5.6-7.3	---	---
	25-42	5-15	5.0-10.0	5.6-6.5	---	---
	42-60	5-15	5.0-10.0	5.6-6.5	---	---
131:						
Winkler-----	0-8	7-15	10.0-15.0	6.1-7.3	---	---
	8-25	5-15	5.0-10.0	5.6-7.3	---	---
	25-42	5-15	5.0-10.0	5.6-6.5	---	---
	42-60	5-15	5.0-10.0	5.6-6.5	---	---
132:						
Winkler-----	0-4	7-15	10.0-15.0	6.1-7.3	---	---
	4-21	5-15	5.0-10.0	5.6-7.3	---	---
	21-40	5-15	5.0-10.0	5.6-6.5	---	---
	40-60	5-15	5.0-10.0	5.6-6.5	---	---
133:						
Winkler-----	0-4	7-15	10.0-15.0	6.1-7.3	---	---
	4-21	5-15	5.0-10.0	5.6-7.3	---	---
	21-40	5-15	5.0-10.0	5.6-6.5	---	---
	40-60	5-15	5.0-10.0	5.6-6.5	---	---

CHEMICAL PROPERTIES OF THE SOILS--Continued

Map symbol and soil name	Depth	Clay	Cation- exchange capacity	Soil reaction	Calcium carbonate equivalent	Salinity
	In	Pct	meq/100g	pH	Pct	mmhos/cm
134:						
Winkler-----	0-8	7-15	10.0-15.0	6.1-7.3	---	---
	8-30	5-15	5.0-10.0	5.6-7.3	---	---
	30-47	5-15	5.0-10.0	5.6-6.5	---	---
	47-60	5-15	5.0-10.0	5.6-6.5	---	---
Rubble land.						
135:						
Winkler-----	0-4	7-15	10.0-15.0	6.1-7.3	---	---
	4-21	5-15	5.0-10.0	5.6-7.3	---	---
	21-40	5-15	5.0-10.0	5.6-6.5	---	---
	40-60	5-15	5.0-10.0	5.6-6.5	---	---
Rock outcrop.						
136:						
Xerofluvents.						
137:						
Yourame-----	0-4	7-15	10.0-15.0	5.6-7.3	---	---
	4-21	7-15	5.0-10.0	5.6-7.3	---	---
	21-48	20-35	20.0-25.0	5.6-7.3	---	---
	48-60	18-30	20.0-25.0	7.9-8.4	5-15	0-2

WATER FEATURES

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			<u>Ft</u>				<u>Ft</u>
1: Alberton-----	B	None	>6.0	---	---	---	---
2: Ambrant-----	B	None	>6.0	---	---	---	---
3: Ambrant-----	B	None	>6.0	---	---	---	---
Rochester-----	A	None	>6.0	---	---	---	---
Rock outcrop.							
4: Aquic Haploxerolls---	---	None	1.7-3.3	Apparent	Apr-Jul	---	---
5: Aquic Udorthents	---	None	1.7-3.3	Apparent	Apr-Jul	---	---
6: Aquolls-----	---	Occasional	0.0-3.0	Apparent	Apr-Jul	---	---
Aquepts-----	---	Occasional	0.0-3.0	Apparent	Apr-Jul	---	---
7: Argixerolls----	---	None	---	---	---	---	---
Haploxerolls----	---	None	---	---	---	---	---
8: Argixerolls----	---	None	---	---	---	---	---
Haploxerolls----	---	None	---	---	---	---	---
9: Argixerolls----	---	None	---	---	---	---	---
Haploxerolls----	---	None	---	---	---	---	---
10: Argixerolls----	---	None	---	---	---	---	---
Haploxerolls----	---	None	---	---	---	---	---
11: Auggie-----	B	None	>6.0	---	---	---	---
12: Bata-----	B	None	>6.0	---	---	---	---
13: Bata-----	B	None	>6.0	---	---	---	---
Waldbillig-----	B	None	>6.0	---	---	---	---
14: Beeskove-----	B	None	>6.0	---	---	---	---
15: Beeskove-----	B	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				Maximum ponding depth
			Water table depth	Kind of water table	Months	Ponding duration	
			Ft				Ft
15: Rock outcrop.							
16: Bigarm-----	B	None	>6.0	---	---	---	---
17: Bigarm-----	B	None	>6.0	---	---	---	---
18: Bigarm-----	B	None	>6.0	---	---	---	---
19: Bigarm-----	B	None	>6.0	---	---	---	---
20: Bigarm-----	B	None	>6.0	---	---	---	---
Rock outcrop.							
21: Biglake-----	A	None	>6.0	---	---	---	---
22: Biglake-----	A	None	>6.0	---	---	---	---
23: Bignell-----	C	None	>6.0	---	---	---	---
24: Bignell-----	C	None	>6.0	---	---	---	---
Winkler-----	B	None	>6.0	---	---	---	---
25: Bignell-----	C	None	>6.0	---	---	---	---
Winkler-----	B	None	>6.0	---	---	---	---
26: Borohemists----	---	None	---	Apparent	Jan-Dec	Long	1.0
27: Chickaman-----	B	None	>6.0	---	---	---	---
28: Chickaman-----	B	None	>6.0	---	---	---	---
29: Coerock-----	D	None	>6.0	---	---	---	---
Rock outcrop.							
30: Coerock-----	D	None	>6.0	---	---	---	---
Rock outcrop.							
31: Courville-----	B	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			<u>Ft</u>				<u>Ft</u>
32: Courville-----	B	None	>6.0	---	---	---	---
Mitten-----	B	None	>6.0	---	---	---	---
33: Crow-----	C	None	>6.0	---	---	---	---
34: Desmet-----	B	None	>6.0	---	---	---	---
35: Elkner-----	B	None	>6.0	---	---	---	---
Ovando-----	A	None	>6.0	---	---	---	---
36: Evaro-----	B	None	>6.0	---	---	---	---
37: Evaro-----	B	None	>6.0	---	---	---	---
38: Felan-----	B	None	>6.0	---	---	---	---
39: Felan-----	B	None	>6.0	---	---	---	---
40: Felan-----	B	None	>6.0	---	---	---	---
41: Felan-----	B	None	>6.0	---	---	---	---
42: Glaciercreek----	A	None	>6.0	---	---	---	---
43: Glaciercreek variant-----	B	None	>6.0	---	---	---	---
Glaciercreek----	A	None	>6.0	---	---	---	---
44: Grantsdale-----	B	None	>6.0	---	---	---	---
45: Grassvalley-----	D	None	>6.0	---	---	---	---
46: Grassvalley-----	D	None	>6.0	---	---	---	---
47: Grassvalley-----	D	None	>6.0	---	---	---	---
48: Grassvalley-----	D	None	>6.0	---	---	---	---
49: Greenough-----	B	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			<u>Ft</u>				<u>Ft</u>
50: Hagstadt-----	C	None	>6.0	---	---	---	---
51: Half Moon-----	B	None	>6.0	---	---	---	---
52: Hanaker-----	C	None	>6.0	---	---	---	---
53: Hollandlake-----	B	None	>6.0	---	---	---	---
54: Hollandlake-----	B	None	>6.0	---	---	---	---
Bata-----	B	None	>6.0	---	---	---	---
55: Hollandlake-----	B	None	>6.0	---	---	---	---
Bata-----	B	None	>6.0	---	---	---	---
56: Holloway-----	B	None	>6.0	---	---	---	---
57: Holloway-----	B	None	>6.0	---	---	---	---
58: Holloway-----	B	None	>6.0	---	---	---	---
59: Holloway-----	B	None	>6.0	---	---	---	---
60: Holloway-----	B	None	>6.0	---	---	---	---
Rock outcrop.							
61: Jimlake-----	B	None	>6.0	---	---	---	---
62: Jimlake-----	B	None	>6.0	---	---	---	---
63: Lantern-----	B	None	>6.0	---	---	---	---
64: Lantern-----	B	None	>6.0	---	---	---	---
65: Lantern-----	B	None	>6.0	---	---	---	---
Rock outcrop.							
66: Lolopeak-----	A	None	>6.0	---	---	---	---
67: Lolopeak-----	A	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				Maximum ponding depth
			Water table depth	Kind of water table	Months	Ponding duration	
			<u>Ft</u>				<u>Ft</u>
67: Rock outcrop.							
68: Lubrecht-----	C	None	>6.0	---	---	---	---
69: Mitten-----	B	None	>6.0	---	---	---	---
70: Mitten-----	B	None	>6.0	---	---	---	---
Sharrott-----	D	None	>6.0	---	---	---	---
71: Mitten-----	B	None	>6.0	---	---	---	---
Tevis-----	B	None	>6.0	---	---	---	---
72: Moiese-----	B	None	>6.0	---	---	---	---
73: Orthents-----	---	None	---	---	---	---	---
74: Ovando-----	A	None	>6.0	---	---	---	---
Elkner-----	B	None	>6.0	---	---	---	---
Rock outcrop.							
75: Perma-----	B	None	>6.0	---	---	---	---
76: Perma-----	B	None	>6.0	---	---	---	---
77: Perma-----	B	None	>6.0	---	---	---	---
78: Perma variant---	B	None	>6.0	---	---	---	---
79: Perma variant---	B	None	>6.0	---	---	---	---
Perma-----	B	None	>6.0	---	---	---	---
80: Petty-----	B	None	>6.0	---	---	---	---
81: Petty-----	B	None	>6.0	---	---	---	---
82: Petty-----	B	None	>6.0	---	---	---	---
83: Petty-----	B	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			<u>Ft</u>				<u>Ft</u>
84: Petty-----	B	None	>6.0	---	---	---	---
85: Petty----- Rock outcrop.	B	None	>6.0	---	---	---	---
86: Phillcher-----	B	None	>6.0	---	---	---	---
87: Phillcher----- Rock outcrop.	B	None	>6.0	---	---	---	---
88: Pits.							
89: Repp-----	B	None	>6.0	---	---	---	---
90: Repp-----	B	None	>6.0	---	---	---	---
91: Repp-----	B	None	>6.0	---	---	---	---
92: Repp----- Rock outcrop.	B	None	>6.0	---	---	---	---
93: Riverwash-----	---	Frequent	---	---	---	---	---
94: Rock outcrop. Rubble land.							
95: Rumblecreek-----	B	None	>6.0	---	---	---	---
96: Selway-----	B	None	>6.0	---	---	---	---
97: Selway-----	B	None	>6.0	---	---	---	---
98: Selway-----	B	None	>6.0	---	---	---	---
99: Sharrott----- Rock outcrop.	D	None	>6.0	---	---	---	---
100: Shooflin-----	D	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			Ft				Ft
101: Tally variant---	B	None	>6.0	---	---	---	---
102: Tevis-----	B	None	>6.0	---	---	---	---
103: Tevis-----	B	None	>6.0	---	---	---	---
Mitten-----	B	None	>6.0	---	---	---	---
104: Tevis-----	B	None	>6.0	---	---	---	---
Mitten-----	B	None	>6.0	---	---	---	---
Rock outcrop.							
105: Totelake-----	B	None	>6.0	---	---	---	---
106: Totelake-----	B	None	>6.0	---	---	---	---
107: Totelake-----	B	None	>6.0	---	---	---	---
108: Trapps-----	B	None	>6.0	---	---	---	---
109: Trapps-----	B	None	>6.0	---	---	---	---
110: Turrah-----	C	None	1.0-2.0	Apparent	May-Jul	---	---
111: Udfluvents-----	---	Frequent	3.0-5.0	Apparent	Apr-Jul	---	---
112: Udorthents-----	---	None	---	---	---	---	---
Glaciercreek----	A	None	>6.0	---	---	---	---
113: Upsata-----	B	None	>6.0	---	---	---	---
114: Urban land.							
115: Waldbillig-----	B	None	>6.0	---	---	---	---
116: Waldbillig-----	B	None	>6.0	---	---	---	---
117: Waldbillig-----	B	None	>6.0	---	---	---	---
Auggie-----	B	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			<u>Ft</u>				<u>Ft</u>
118: Waldbillig-----	B	None	>6.0	---	---	---	---
Holloway-----	B	None	>6.0	---	---	---	---
119: Waldbillig-----	B	None	>6.0	---	---	---	---
Holloway-----	B	None	>6.0	---	---	---	---
120: Waldbillig-----	B	None	>6.0	---	---	---	---
Holloway-----	B	None	>6.0	---	---	---	---
121: Waldbillig-----	B	None	>6.0	---	---	---	---
Holloway-----	B	None	>6.0	---	---	---	---
122: Whitore-----	B	None	>6.0	---	---	---	---
123: Whitore-----	B	None	>6.0	---	---	---	---
124: Wildgen-----	B	None	>6.0	---	---	---	---
125: Wildgen-----	B	None	>6.0	---	---	---	---
Winkler-----	B	None	>6.0	---	---	---	---
126: Wildgen-----	B	None	>6.0	---	---	---	---
Winkler-----	B	None	>6.0	---	---	---	---
127: Wildgen-----	B	None	>6.0	---	---	---	---
Winkler-----	B	None	>6.0	---	---	---	---
128: Wildgen-----	B	None	>6.0	---	---	---	---
Winkler-----	B	None	>6.0	---	---	---	---
129: Winfall-----	B	None	>6.0	---	---	---	---
130: Winkler-----	B	None	>6.0	---	---	---	---
131: Winkler-----	B	None	>6.0	---	---	---	---
132: Winkler-----	B	None	>6.0	---	---	---	---

WATER FEATURES--Continued

Map symbol and soil name	Hydro- logic group	Frequency of flooding	High water table and ponding				
			Water table depth	Kind of water table	Months	Ponding duration	Maximum ponding depth
			<u>Ft</u>				<u>Ft</u>
133: Winkler-----	B	None	>6.0	---	---	---	---
134: Winkler----- Rubble land.	B	None	>6.0	---	---	---	---
135: Winkler----- Rock outcrop.	B	None	>6.0	---	---	---	---
136: Xerofluvents----	---	Frequent	---	---	---	---	---
137: Yourame-----	B	None	>6.0	---	---	---	---

SOIL FEATURES

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
1: Alberton-----	>60	---	Moderate	Moderate	Low
2: Ambrant-----	>60	---	Moderate	Moderate	Moderate
3: Ambrant-----	>60	---	Moderate	Moderate	Moderate
Rochester-----	>60	---	Low	Moderate	Low
Rock outcrop.					
4: Aquic Haploxerolls---	>60	---	---	---	---
5: Aquic Udorthents	>60	---	---	---	---
6: Aquolls-----	>60	---	---	---	---
Aquepts-----	>60	---	---	---	---
7: Argixerolls-----	>60	---	---	---	---
Haploxerolls-----	>60	---	---	---	---
8: Argixerolls-----	>60	---	---	---	---
Haploxerolls-----	>60	---	---	---	---
9: Argixerolls-----	>60	---	---	---	---
Haploxerolls-----	>60	---	---	---	---
10: Argixerolls-----	>60	---	---	---	---
Haploxerolls-----	>60	---	---	---	---
11: Auggie-----	>60	---	High	Moderate	Moderate
12: Bata-----	>60	---	Moderate	Moderate	Moderate
13: Bata-----	>60	---	Moderate	Moderate	Moderate
Waldbillig-----	>60	---	Moderate	Moderate	Moderate
14: Beeskove-----	>60	---	Moderate	High	Low
15: Beeskove-----	>60	---	Moderate	High	Low

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
15: Rock outcrop.					
16: Bigarm-----	>60	---	Moderate	Moderate	Low
17: Bigarm-----	>60	---	Moderate	Moderate	Low
18: Bigarm-----	>60	---	Moderate	Moderate	Low
19: Bigarm-----	>60	---	Moderate	Moderate	Low
20: Bigarm-----	>60	---	Moderate	Moderate	Low
Rock outcrop.					
21: Biglake-----	>60	---	Low	Moderate	Low
22: Biglake-----	>60	---	Low	Moderate	Low
23: Bignell-----	>60	---	Moderate	Moderate	Moderate
24: Bignell-----	>60	---	Moderate	Moderate	Moderate
Winkler-----	>60	---	Moderate	Moderate	Moderate
25: Bignell-----	>60	---	Moderate	Moderate	Moderate
Winkler-----	>60	---	Moderate	Moderate	Moderate
26: Borohemists----	>60	---	---	---	---
27: Chickaman-----	>60	---	High	Moderate	Low
28: Chickaman-----	>60	---	High	Moderate	Low
29: Coerock-----	10-20	Hard	Moderate	Moderate	Moderate
Rock outcrop.					
30: Coerock-----	10-20	Hard	Moderate	Moderate	Moderate
Rock outcrop.					
31: Courville-----	>60	---	Moderate	Moderate	Moderate

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
32: Courville-----	>60	---	Moderate	Moderate	Moderate
Mitten-----	>60	---	Moderate	Moderate	Moderate
33: Crow-----	>60	---	Moderate	Moderate	Moderate
34: Desmet-----	>60	---	Moderate	High	Low
35: Elkner-----	>60	---	Moderate	Moderate	Moderate
Ovando-----	>60	---	Low	Moderate	Moderate
36: Evaro-----	>60	---	Moderate	Moderate	Moderate
37: Evaro-----	>60	---	Moderate	Moderate	Moderate
38: Felan-----	>60	---	Moderate	High	Moderate
39: Felan-----	>60	---	Moderate	High	Moderate
40: Felan-----	>60	---	Moderate	High	Moderate
41: Felan-----	>60	---	Moderate	High	Moderate
42: Glaciercreek----	>60	---	Low	Moderate	Moderate
43: Glaciercreek variant-----	>60	---	Moderate	Moderate	Moderate
Glaciercreek----	>60	---	Low	Moderate	Moderate
44: Grantsdale-----	>60	---	Moderate	High	Low
45: Grassvalley-----	>60	---	Moderate	High	Low
46: Grassvalley-----	>60	---	Moderate	High	Low
47: Grassvalley-----	>60	---	Moderate	High	Low
48: Grassvalley-----	>60	---	Moderate	High	Low
49: Greenough-----	>60	---	High	Moderate	Low

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
50: Hagstadt-----	20-40	Soft	High	Moderate	Low
51: Half Moon-----	>60	---	Moderate	High	High
52: Hanaker-----	>60	---	Moderate	High	Low
53: Hollandlake-----	>60	---	Moderate	Moderate	Moderate
54: Hollandlake-----	>60	---	Moderate	Moderate	Moderate
Bata-----	>60	---	Moderate	Moderate	Moderate
55: Hollandlake-----	>60	---	Moderate	Moderate	Moderate
Bata-----	>60	---	Moderate	Moderate	Moderate
56: Holloway-----	>60	---	Moderate	Moderate	Moderate
57: Holloway-----	>60	---	Moderate	Moderate	Moderate
58: Holloway-----	>60	---	Moderate	Moderate	Moderate
59: Holloway-----	>60	---	Moderate	Moderate	Moderate
60: Holloway-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop.					
61: Jimlake-----	>60	---	Moderate	Moderate	Moderate
62: Jimlake-----	>60	---	Moderate	Moderate	Moderate
63: Lantern-----	>60	---	Moderate	Moderate	Low
64: Lantern-----	>60	---	Moderate	Moderate	Low
65: Lantern-----	>60	---	Moderate	Moderate	Low
Rock outcrop.					
66: Lolopeak-----	>60	---	Moderate	Moderate	Moderate
67: Lolopeak-----	>60	---	Moderate	Moderate	Moderate

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
67: Rock outcrop.					
68: Lubrecht-----	20-40	Soft	Moderate	Moderate	Moderate
69: Mitten-----	>60	---	Moderate	Moderate	Moderate
70: Mitten-----	>60	---	Moderate	Moderate	Moderate
Sharrott-----	10-20	Hard	Moderate	Moderate	Moderate
71: Mitten-----	>60	---	Moderate	Moderate	Moderate
Tevis-----	>60	---	Moderate	Moderate	Moderate
72: Moiese-----	>60	---	Low	High	Low
73: Orthents-----	>60	---	---	---	---
74: Ovando-----	>60	---	Low	Moderate	Moderate
Elkner-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop.					
75: Perma-----	>60	---	Moderate	Moderate	Low
76: Perma-----	>60	---	Moderate	Moderate	Low
77: Perma-----	>60	---	Moderate	Moderate	Low
78: Perma variant---	>60	---	Moderate	High	Low
79: Perma variant---	>60	---	Moderate	High	Low
Perma-----	>60	---	Moderate	Moderate	Low
80: Petty-----	>60	---	Moderate	Moderate	Moderate
81: Petty-----	>60	---	Moderate	Moderate	Moderate
82: Petty-----	>60	---	Moderate	Moderate	Moderate
83: Petty-----	>60	---	Moderate	Moderate	Moderate

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
84: Petty-----	>60	---	Moderate	Moderate	Moderate
85: Petty-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop.					
86: Phillcher-----	>60	---	Moderate	Moderate	Moderate
87: Phillcher-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop.					
88: Pits.					
89: Repp-----	>60	---	Moderate	High	Low
90: Repp-----	>60	---	Moderate	High	Low
91: Repp-----	>60	---	Moderate	High	Low
92: Repp-----	>60	---	Moderate	High	Low
Rock outcrop.					
93: Riverwash.					
94: Rock outcrop.					
Rubble land.					
95: Rumblecreek-----	>60	---	Moderate	Moderate	Moderate
96: Selway-----	>60	---	Moderate	Moderate	Moderate
97: Selway-----	>60	---	Moderate	Moderate	Moderate
98: Selway-----	>60	---	Moderate	Moderate	Moderate
99: Sharrott-----	10-20	Hard	Moderate	Moderate	Moderate
Rock outcrop.					
100: Shooflin-----	40-60	Soft	Moderate	High	High

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
101: Tally variant----	>60	---	Low	Moderate	Low
102: Tevis-----	>60	---	Moderate	Moderate	Moderate
103: Tevis-----	>60	---	Moderate	Moderate	Moderate
Mitten-----	>60	---	Moderate	Moderate	Moderate
104: Tevis-----	>60	---	Moderate	Moderate	Moderate
Mitten-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop.					
105: Totelake-----	>60	---	Moderate	Moderate	Low
106: Totelake-----	>60	---	Moderate	Moderate	Low
107: Totelake-----	>60	---	Moderate	Moderate	Low
108: Trapps-----	>60	---	Moderate	High	Moderate
109: Trapps-----	>60	---	Moderate	High	Moderate
110: Turrah-----	>60	---	High	Moderate	Moderate
111: Udifluvents-----	>60	---	---	---	---
112: Udorthents-----	>60	---	---	---	---
Glaciercreek----	>60	---	Low	Moderate	Moderate
113: Upsata-----	>60	---	Low	Moderate	Moderate
114: Urban land.					
115: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
116: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
117: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
Auggie-----	>60	---	High	Moderate	Moderate

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
118: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
Holloway-----	>60	---	Moderate	Moderate	Moderate
119: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
Holloway-----	>60	---	Moderate	Moderate	Moderate
120: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
Holloway-----	>60	---	Moderate	Moderate	Moderate
121: Waldbillig-----	>60	---	Moderate	Moderate	Moderate
Holloway-----	>60	---	Moderate	Moderate	Moderate
122: Whitore-----	>60	---	Moderate	High	Low
123: Whitore-----	>60	---	Moderate	High	Low
124: Wildgen-----	>60	---	Moderate	Moderate	Low
125: Wildgen-----	>60	---	Moderate	Moderate	Low
Winkler-----	>60	---	Moderate	Moderate	Moderate
126: Wildgen-----	>60	---	Moderate	Moderate	Low
Winkler-----	>60	---	Moderate	Moderate	Moderate
127: Wildgen-----	>60	---	Moderate	Moderate	Low
Winkler-----	>60	---	Moderate	Moderate	Moderate
128: Wildgen-----	>60	---	Moderate	Moderate	Low
Winkler-----	>60	---	Moderate	Moderate	Moderate
129: Winfall-----	>60	---	Moderate	Moderate	Moderate
130: Winkler-----	>60	---	Moderate	Moderate	Moderate
131: Winkler-----	>60	---	Moderate	Moderate	Moderate
132: Winkler-----	>60	---	Moderate	Moderate	Moderate

SOIL FEATURES--Continued

Map symbol and soil name	Bedrock		Potential frost action	Risk of corrosion	
	Depth	Hardness		Uncoated steel	Concrete
	In				
133: Winkler-----	>60	---	Moderate	Moderate	Moderate
134: Winkler-----	>60	---	Moderate	Moderate	Moderate
Rubble land.					
135: Winkler-----	>60	---	Moderate	Moderate	Moderate
Rock outcrop.					
136: Xerofluvents----	>60	---	---	---	---
137: Yourame-----	>60	---	Moderate	High	Moderate

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Glossary

Ablation till. Loose, permeable till deposited during the final downwasting of glacial ice. Lenses of crudely sorted sand and gravel are common.

Aeration, soil. The exchange of air in soil with air from the atmosphere. The air in a well aerated soil is similar to that in the atmosphere; the air in a poorly aerated soil is considerably higher in carbon dioxide and lower in oxygen.

Aggregate, soil. Many fine particles held in a single mass or cluster. Natural soil aggregates, such as granules, blocks, or prisms, are called peds. Clods are aggregates produced by tillage or logging.

Alluvial fan. A body of alluvium, with overflow of water and debris flow deposits, whose surface forms a segment of a cone that radiates downslope from the point where the stream emerges from a narrow valley onto a less sloping surface. Source uplands range in relief and areal extent from mountains to gullied terrains on hill slopes.

Alluvium. Material, such as sand, silt, or clay, deposited on land by streams.

Animal unit month (AUM). The amount of forage required by one mature cow of approximately 1,000 pounds weight, with or without a calf, for 1 month.

Area reclaim (in tables). An area difficult to reclaim after the removal of soil for construction and other uses. Revegetation and erosion control are extremely difficult.

Argillite. Weakly metamorphosed mudstone or shale.

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 3.75
Low	3.75 to 5.0
Moderate	5.0 to 7.5
High	more than 7.5

Avalanche chute. The track or path formed by an avalanche.

Back slope. The geomorphic component that forms the steepest inclined surface and principal element of many hill slopes. Back slopes in profile are commonly steep and linear and descend to a foot slope. In terms of gradational process, back slopes are erosional forms produced mainly by mass wasting and running water.

Badland. Steep or very steep, commonly nonstony, barren land dissected by many intermittent drainage channels. Badland is most common in semiarid and arid regions where streams are entrenched in soft geologic material. Local relief generally ranges from 25 to 500 feet. Runoff potential is very high, and geologic erosion is active.

Basal area. The area of a cross section of a tree, generally referring to the section at breast height and measured outside the bark. It is a measure of stand density, commonly expressed in square feet.

Basal till. Compact glacial till deposited beneath the ice.

Base saturation. The degree to which material having cation-exchange properties is saturated with exchangeable bases (sum of Ca, Mg, Na, K), expressed as a percentage of the total cation-exchange capacity.

Bedding planes. Fine strata, less than 5 millimeters thick, in unconsolidated alluvial, eolian, lacustrine, or marine sediment.

Bedrock. The solid rock that underlies the soil and other unconsolidated material or that is exposed at the surface.

Bedrock-floored plain. An extensive nearly level to gently rolling or moderately sloping area that is underlain by hard bedrock and has a slope of 0 to 8 percent.

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.

- Blowout.** A shallow depression from which all or most of the soil material has been removed by the wind. A blowout has a flat or irregular floor formed by a resistant layer or by an accumulation of pebbles or cobbles. In some blowouts the water table is exposed.
- Board foot.** A unit of measure of the wood in lumber, logs, or trees. The amount of wood in a board one foot wide, one foot long, and one inch thick before finishing.
- Bottom land.** The normal flood plain of a stream, subject to flooding.
- Boulders.** Rock fragments larger than 2 feet (60 centimeters) in diameter.
- Breaks.** The steep or very steep broken land at the border of an upland summit that is dissected by ravines.
- 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 reduce or eliminate competition from woody vegetation and thus to allow understory grasses and forbs to recover or to make conditions favorable for reseeding. Brush management increases forage production and thus reduces the hazard of erosion. It can improve the habitat for some species of wildlife.
- Cable yarding.** A method of moving felled trees to a nearby central area for transport to a processing facility. Most cable yarding systems involve use of a drum, a pole, and wire cables in an arrangement similar to that of a rod and reel used for fishing. To reduce friction and soil disturbance, a felled tree generally is reeled in while one end is lifted or the entire log is suspended.
- Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.
- Caliche.** A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds just beneath the solum, or it is exposed at the surface by erosion.
- California bearing ratio (CBR).** The load-supporting capacity of a soil as compared to that of 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.
- Cation.** An ion carrying a positive charge of electricity. The common soil cations are calcium, potassium, magnesium, sodium, and hydrogen.
- Cation-exchange capacity.** The total amount of exchangeable cations that can be held by the soil, expressed in terms of milliequivalents per 100 grams of soil at neutrality (pH 7.0) or at some other stated pH value. The term, as applied to soils, is synonymous with base-exchange capacity but is more precise in meaning.
- Catsteps.** Very small, irregular terraces on steep hillsides, especially in pasture, formed by the trampling of cattle or the slippage of saturated soil.
- Channeled.** Refers to a drainage area in which natural meandering or repeated branching and convergence of a streambed have created deeply incised cuts, either active or abandoned, in alluvial material.
- Channery soil.** A soil that is, by volume, more than 15 percent thin, flat fragments of sandstone, shale, slate, limestone, or schist as much as 6 inches along the longest axis. A single piece is called a channer.
- Chemical treatment.** Control of unwanted vegetation by use of chemicals.
- Chiseling.** Tillage with an implement having one or more soil-penetrating points that loosen the subsoil and bring clods to the surface. A form of emergency tillage to control soil blowing.
- Cirque.** A semicircular, concave, bowl-like area that has steep faces primarily resulting from erosive activity of a mountain glacier.
- 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.
- Clayey soil.** Silty clay, sandy clay, or clay.
- 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 slowly permeable soil horizon that contains much more clay than the horizons above it. A claypan is commonly hard when dry and plastic or stiff when wet.
- Clearcut.** A method of forest harvesting that removes the entire stand of trees in one cutting. Reproduction is achieved artificially or by natural seeding from adjacent stands.
- Climax plant community.** The plant community on a

given site that will be established if present environmental conditions continue to prevail and the site is properly managed.

Closed depression. A low area completely surrounded by higher ground and having no natural outlet.

Coarse textured soil. Sand or loamy sand.

Cobble (or cobblestone). A rounded or partly rounded fragment of rock 3 to 10 inches (7.6 to 25 centimeters) in diameter.

Cobbly soil material. Material that is 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material is 35 to 60 percent of these rock fragments, and extremely cobbly soil material is more than 60 percent.

Codominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above but comparatively little from the sides.

Colluvium. Soil material, rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.

Commercial forest. Forest land capable of producing 20 cubic feet or more per acre per year at the culmination of mean annual increment.

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. Grains, pellets, or nodules of various sizes, shapes, and colors consisting of concentrated compounds or cemented soil grains. The composition of most concretions is unlike that of the surrounding soil. Calcium carbonate and iron oxide are common compounds in concretions.

Conglomerate. A coarse grained, clastic rock composed of rounded to subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer material. Conglomerate is the consolidated equivalent of gravel.

Conservation cropping system. Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset 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. Any tillage and planting system in which a cover of crop residue is maintained on at least 30 percent of the soil surface after planting in order to reduce the hazard of water erosion; in areas where soil blowing is the primary concern, a system that maintains a cover of at least 1,000 pounds of flat residue of small grain or the equivalent during the critical erosion period.

Consistence, soil. The feel of the soil and the ease with which a lump can be crushed by the fingers. Terms commonly used to describe consistence are:

Loose.—Noncoherent when dry or moist; does not hold together in a mass.

Friable.—When moist, crushes easily under gentle pressure between thumb and forefinger and can be pressed together into a lump.

Firm.—When moist, crushes under moderate pressure between thumb and forefinger, but resistance is distinctly noticeable.

Plastic.—Readily deformed by moderate pressure but can be pressed into a lump; will form a "wire" when rolled between thumb and forefinger.

Sticky.—Adheres to other material and tends to stretch somewhat and pull apart rather than to pull free from other material.

Hard.—When dry, moderately resistant to pressure; can be broken with difficulty between thumb and forefinger.

Soft.—When dry, breaks into powder or individual grains under very slight pressure.

Cemented.—Hard; little affected by moistening.

Consolidated sandstone. Sandstone that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry, are not easily crushed, and cannot be textured by the usual field method.

Consolidated shale. Shale that disperses within a few hours when fragments are placed in water. The fragments are extremely hard or very hard when dry and are not easily crushed.

Contour stripcropping (or contour farming). Growing crops in strips that follow the contour. Strips of grass or close-growing crops are alternated with strips of clean-tilled crops or summer fallow.

Control section. The part of the soil on which classification is based. The thickness varies among different kinds of soil, but for many it is that

part of the soil profile between depths of 10 inches and 40 or 80 inches.

Coprogenous earth (sedimentary peat). Fecal material deposited in water by aquatic organisms.

Corrosion. 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.

Cropping system. Growing crops according to a planned system of rotation and management practices.

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.

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.

Culmination of 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 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.

Deep soil. A soil that is 40 to 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Deferred grazing. Postponing grazing or resting grazing land for a prescribed period.

Depth to rock (in tables). Bedrock is too near the surface for the specified use.

Dip slope. A slope of the land surface, roughly determined by and approximately conforming with the dip of underlying bedded rock.

Diversion (or diversion terrace). A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.

Divided-slope farming. A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce 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 the use of a full stripcropping pattern.

Dominant trees. Trees whose crowns form the general level of the forest canopy and that receive full light from above and from the sides.

Drainage class (natural). Refers to the frequency and duration of periods of saturation or partial saturation during soil formation, as opposed to altered drainage, which is commonly the result of artificial drainage or irrigation but may be caused by the sudden deepening of channels or the blocking of drainage outlets. Seven classes of natural soil drainage are recognized:

Excessively drained.—These soils have very high and high hydraulic conductivity and a low water-holding capacity. They are not suited to crop production unless irrigated.

Somewhat excessively drained.—These soils have high hydraulic conductivity and a low water-holding capacity. Without irrigation, only a narrow range of crops can be grown and yields are low.

Well drained.—These soils have an intermediate water-holding capacity. They retain optimum amounts of moisture, but they are not wet close enough to the surface or long enough during the growing season to adversely affect yields.

Moderately well drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or yields of some field crops are adversely affected unless a drainage system is installed. Moderately well drained soils commonly have a layer with low hydraulic conductivity, a wet layer relatively high in the profile, additions of water by seepage, or some combination of these.

Somewhat poorly drained.—These soils are wet close enough to the surface or long enough that planting or harvesting operations or crop growth is markedly restricted unless a drainage system is installed. Somewhat poorly drained soils commonly have a layer with low hydraulic conductivity, a wet layer high in the profile, additions of water through seepage, or a combination of these.

Poorly drained.—These soils commonly are so wet at or near the surface during a considerable part of the year that field crops cannot be grown under natural conditions. Poorly drained conditions are caused by a saturated zone, a layer with low

hydraulic conductivity, seepage, or a combination of these.

Very poorly drained.—These soils are wet to the surface most of the time. The wetness prevents the growth of important crops (except rice) unless a drainage system is installed.

Drainage, surface. Runoff, or surface flow of water, from an area.

Drainageway. An area of ground at a lower elevation than the surrounding ground and in which water collects and is drained to a closed depression or lake or to a drainageway at a lower elevation. A drainageway may or may not have distinctly incised channels at its upper reaches or throughout its course.

Drumlin. A low, smooth, elongated oval hill, mound, or ridge of compact glacial till. The longer axis is parallel to the path of the glacier and commonly has a blunt nose pointing in the direction from which the ice approached.

Duff. A term used to identify a generally firm organic layer on the surface of mineral soils. It consists of fallen plant material that is in the process of decomposition and includes everything from the litter on the surface to underlying pure humus.

Dune. A mound, ridge, or hill of loose, windblown granular material (generally sand), either bare or covered with vegetation.

Eluviation. The movement of material in true solution or colloidal suspension from one place to another within the soil. Soil horizons that have lost material through eluviation are eluvial; those that have received material are illuvial.

Eolian soil material. Earthy parent material accumulated through wind action; commonly refers to sandy material in dunes or to loess in blankets on the surface.

Ephemeral stream. A stream, or reach of a stream, that flows only in direct response to precipitation. It receives no long-continued supply from melting snow or other source, and its channel is above the water table at all times.

Erosion. The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.

Erosion (geologic). Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.

Erosion (accelerated). Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature,

for example, fire, that exposes the surface.

Erosion pavement. A layer of gravel or stones that remains on the surface after fine particles are removed by sheet or rill erosion.

Escarpment. A relatively continuous and steep slope or cliff breaking the general continuity of more gently sloping land surfaces and resulting from erosion or faulting. The term is more often applied to cliffs resulting from differential erosion.

Esker. A long, narrow, sinuous, steep-sided ridge composed of irregularly stratified sand and gravel that were deposited by a subsurface stream flowing between ice walls or through ice tunnels of a retreating glacier and that were left behind when the ice melted. Eskers range from less than a mile to more than 100 miles in length and from 10 to 100 feet in height.

Even aged. Refers to a stand of trees in which only small differences in age occur between the individuals. A range of 20 years is allowed.

Excess fines (in tables). Excess silt and clay in the soil. The soil does not provide a source of gravel or sand for construction purposes.

Extrusive rock. Igneous rock derived from deep-seated molten matter (magma) emplaced on the earth's surface.

Fallow. Cropland left idle in order to restore productivity through accumulation of moisture. Summer fallow is common in regions of limited rainfall where cereal grain is grown. The soil is tilled for at least one growing season for weed control and decomposition of plant residue.

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 oven-dry 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*.

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. A firebreak also serves as a line from which to work and to facilitate the movement of fire fighters and

equipment. Designated roads also serve as firebreaks.

First bottom. The normal flood plain of a stream, subject to frequent or occasional flooding.

Flaggy soil material. Material that is, by volume, 15 to 35 percent flagstones. Very flaggy soil material is 35 to 60 percent flagstones, and extremely flaggy soil material is more than 60 percent flagstones.

Flagstone. A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.

Flood plain. A nearly level alluvial plain that borders a stream and is subject to inundation under flood-stage conditions unless protected artificially. It is usually a constructional landform built of sediment deposited during overflow and lateral migration of the stream.

Fluvial. Of or pertaining to rivers; produced by river action, as a fluvial plain.

Foothills. A region of relatively low, rounded hills at the base of a mountain range.

Foot slope. The geomorphic component that forms the inner, gently inclined surface at the base of a hill slope. The surface profile is dominantly concave. In terms of gradational processes, a foot slope is a transition zone between an upslope site of erosion (back slope) and a downslope site of deposition (toe slope).

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.

Frost action (in tables). Freezing and thawing of soil moisture. Frost action can damage roads, buildings and other structures, and plant roots.

Genesis, soil. The mode of origin of the soil. Refers especially to the processes or soil-forming factors responsible for the formation of the solum, or true soil, from the unconsolidated parent material.

Giant ripple mark. The undulating surface sculpture produced in noncoherent granular materials by currents of water and by the agitation of water in

wave action during the draining of large glacial lakes, such as Glacial Lake Missoula.

Glacial drift (geology). Pulverized and other rock material transported by glacial ice and then deposited. Also, the sorted and unsorted material deposited by streams flowing from glaciers.

Glacial outwash (geology). Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.

Glacial till (geology). Unsorted, nonstratified glacial drift consisting of clay, silt, sand, and boulders transported and deposited by glacial ice.

Glaciated uplands. Land areas that were previously covered by continental or alpine glaciers and that are at a higher elevation than the flood plain.

Glaciofluvial deposits (geology). Material moved by glaciers and subsequently sorted and deposited by streams flowing from the melting ice. The deposits are stratified and occur as kames, eskers, deltas, and outwash plains.

Glaciolacustrine deposits. Material ranging from fine clay to sand derived from glaciers and deposited in glacial lakes mainly by glacial meltwater. Many deposits are interbedded or laminated.

Gleyed soil. Soil that formed under poor drainage, resulting in the reduction of iron and other elements in the profile and in gray colors and mottles.

Grassed waterway. A natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. Conducts surface water away from cropland.

Gravel. Rounded or angular fragments of rock as much as 3 inches (2 millimeters to 7.6 centimeters) in diameter. An individual piece is a pebble.

Gravelly soil material. Material that is 15 to 50 percent, by volume, rounded or angular rock fragments, not prominently flattened, as much as 3 inches (7.6 centimeters) in diameter.

Green manure crop (agronomy). A soil-improving crop grown to be plowed under in an early stage of maturity or soon after maturity.

Ground water (geology). Water filling all the unblocked pores of the material below the water table.

Gully. A miniature valley with steep sides cut by running water and through which water ordinarily runs only after rainfall. The distinction between a gully and a rill is one of depth. A gully generally is an obstacle to farm machinery and is too deep to be obliterated by ordinary tillage; a rill is of lesser depth and can be smoothed over by ordinary tillage. A gullied map unit is one that has numerous gullies.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Hard bedrock. Bedrock that cannot be excavated except by blasting or by the use of special equipment that is not commonly used in construction.

Hardpan. A hardened or cemented soil horizon, or layer. The soil material is sandy, loamy, or clayey and is cemented by iron oxide, silica, calcium carbonate, or other substance.

Head out. To form a flower head.

Heavy metal. Inorganic substances that are solid at ordinary temperatures and are not soluble in water. They form oxides and hydroxides that are basic. Examples are copper, iron, cadmium, zinc, manganese, lead, and arsenic.

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 natural elevation of the land surface, rising as much as 1,000 feet above surrounding lowlands, commonly of limited summit area and having a well defined outline; hillsides generally have slopes of more than 8 percent. The distinction between a hill and a mountain is arbitrary and is dependent on local usage.

Horizon, soil. A layer of soil, approximately parallel to the surface, having distinct characteristics produced by soil-forming processes. In the identification of soil horizons, an uppercase letter represents the major horizons. Numbers or lowercase letters that follow represent subdivisions of the major horizons. The major horizons of mineral soil are as follows:

O horizon.—An organic layer of fresh and decaying plant residue.

A horizon.—The mineral horizon at or near the surface in which an accumulation of humified organic matter is mixed with the mineral material. Also, a plowed surface horizon, most of which was originally part of a B horizon.

B horizon.—The mineral horizon below an A horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these;

(2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

E horizon.—The mineral horizon in which the main feature is loss of silicate clay, iron, aluminum, or some combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material.

The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, the number 2 precedes the letter C.

Cr horizon.—Sedimentary beds of consolidated sandstone and semiconsolidated and consolidated shale. Generally, roots can penetrate this horizon only along fracture planes.

R layer.—Hard, consolidated bedrock beneath the soil. The bedrock commonly underlies a C horizon but can be directly below an A or a B horizon.

Humus. The well decomposed, more or less stable part of the organic matter in mineral soils.

Hydrologic soil groups. Refers to soils grouped according to their runoff-producing characteristics. The chief consideration is the inherent capacity of soil bare of vegetation to permit infiltration. The slope and the kind of plant cover are not considered but are separate factors in predicting runoff. Soils are assigned to four groups. In group A are soils having a high infiltration rate when thoroughly wet and having a low runoff potential. They are mainly deep, well drained, and sandy or gravelly. In group D, at the other extreme, are soils having a very slow infiltration rate and thus a high runoff potential. They have a claypan or clay layer at or near the surface, have a permanent high water table, or are shallow over nearly impervious bedrock or other material. A soil is assigned to two hydrologic groups if part of the acreage is artificially drained and part is undrained.

Igneous rock. Rock formed by solidification from a molten or partially molten state. Major varieties include plutonic and volcanic rock. Examples are andesite, basalt, and granite.

Illuviation. The movement of soil material from one horizon to another in the soil profile. Generally, material is removed from an upper horizon and deposited in a lower horizon.

Impervious soil. A soil through which water, air, or roots penetrate slowly or not at all. No soil is absolutely impervious to air and water all the time.

Increasers. Species in the climax vegetation that

increase in amount as the more desirable plants are reduced by close grazing. Increases commonly are the shorter plants and are less palatable to livestock.

Infiltration. The downward entry of water into the immediate surface of soil or other material, as contrasted with percolation, which is movement of water through soil layers or material.

Infiltration capacity. The maximum rate at which water can infiltrate into a soil under a given set of conditions.

Infiltration rate. The rate at which water penetrates the surface of the soil at any given instant, usually expressed in inches per hour. The rate can be limited by the infiltration capacity of the soil or the rate at which water is applied at the surface.

Intake rate. The average rate of water entering the soil under irrigation. Most soils have a fast initial rate; the rate decreases with application time. Therefore, intake rate for design purposes is not a constant but is a variable depending on the net irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

Less than 0.2	very low
0.2 to 0.4	low
0.4 to 0.75	moderately low
0.75 to 1.25	moderate
1.25 to 1.75	moderately high
1.75 to 2.5	high
More than 2.5	very high

Intermittent stream. A stream, or reach of a stream, that flows for prolonged periods only when it receives ground-water discharge or long, continued contributions from melting snow or other surface and shallow subsurface sources.

Invaders. On range, plants that encroach into an area and grow after the climax vegetation has been reduced by grazing. Generally, plants invade following disturbance of the surface.

Irrigation. Application of water to soils to assist in production of crops. Methods of irrigation are:
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 moundlike hill of glacial drift, composed chiefly of stratified sand and gravel.

Kame terrace. A terracelike ridge consisting of stratified sand and gravel that were deposited by a meltwater stream flowing between a melting glacier and a higher valley wall or lateral moraine and that remained after the disappearance of the ice. It is commonly pitted with kettles and has an irregular ice-contact slope.

Lacustrine deposit (geology). Material deposited in lake water and exposed when the water level is lowered or the elevation of the land is raised.

Lake plain. A surface marking the floor of an extinct lake, filled in by well sorted, stratified sediments.

Landslide. The rapid downhill movement of a mass of soil and loose rock, generally when wet or saturated. The speed and distance of movement, as well as the amount of soil and rock material, vary greatly.

Large stones (in tables). Rock fragments 3 inches (7.6 centimeters) or more across. Large stones adversely affect the specified use of the soil.

Lateral moraine. A ridgelike moraine carried on and deposited at the side margin of a valley glacier. It is composed chiefly of rock fragments derived from the valley walls by glacial abrasion and plucking or by mass wasting.

Leaching. The removal of soluble material from soil or other material by percolating water.

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.

Loamy soil. Coarse sandy loam, sandy loam, fine sandy loam, very fine sandy loam, loam, silt loam, silt, clay loam, sandy clay loam, or silty clay loam.

Loess. Fine grained material, dominantly of silt-sized particles, deposited by the wind.

- Low-residue crops.** Crops such as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.
- Low strength.** The soil is not strong enough to support loads.
- Marl.** An earthy, unconsolidated deposit consisting chiefly of calcium carbonate mixed with clay in approximately equal amounts.
- Mean annual increment (MAI).** The average annual increase in volume of a tree during the entire life of the tree.
- 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.
- Merchantable trees.** Trees that are of sufficient size to be economically processed into wood products.
- Metamorphic rock.** Rock of any origin altered in mineralogical composition, chemical composition, or structure by heat, pressure, and movement. Nearly all such rocks are crystalline.
- Microhigh.** An area that is 2 to 12 inches higher than the adjacent microlow.
- Microlow.** An area that is 2 to 12 inches lower than the adjacent microhigh.
- Mineral soil.** Soil that is mainly mineral material and low in organic material. Its bulk density is more than that of organic soil.
- Minimum tillage.** Only the tillage essential to crop production and prevention of soil damage.
- Miscellaneous area.** An area that has little or no natural soil and supports little or no vegetation.
- Moderately coarse textured soil.** Coarse sandy loam, sandy loam, or fine sandy loam.
- Moderately deep soil.** A soil that is 20 to 40 inches deep over bedrock or to other material that restricts the penetration of plant roots.
- Moderately fine textured soil.** Clay loam, sandy clay loam, or silty clay loam.
- Moraine.** An accumulation of glacial drift in a topographic landform of its own, resulting chiefly from the direct action of glacial ice. Some types are 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. Mottling generally indicates poor aeration and impeded drainage. Descriptive terms are as follows: abundance—*few*, *common*, and *many*; size—*fine*, *medium*, and *coarse*; and contrast—*faint*, *distinct*, and *prominent*. The size measurements are of the diameter along the greatest dimension. *Fine* indicates less than 5 millimeters (about 0.2 inch); *medium*, from 5 to 15 millimeters (about 0.2 to 0.6 inch); and *coarse*, more than 15 millimeters (about 0.6 inch).
- Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of limited summit area and generally having steep sides (slopes greater than 25 percent) and considerable bare-rock surface. A mountain can occur as a single, isolated mass or in a group forming a chain or range. Mountains are primarily formed by deep-seated earth movements or volcanic action and secondarily by differential erosion.
- Muck.** Dark, finely divided, well decomposed organic soil material. (See Sapric soil material.)
- Mudstone.** Sedimentary rock formed by induration of silt and clay in approximately equal amounts.
- Munsell notation.** A designation of color by degrees of 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 between 6.6 and 7.3. (See Reaction, soil.)
- Nutrient, plant.** Any element taken in by a plant essential to its growth. Plant nutrients are mainly nitrogen, phosphorus, potassium, calcium, magnesium, sulfur, iron, manganese, copper, boron, and zinc obtained from the soil and carbon, hydrogen, and oxygen obtained from the air and water.
- Observed rooting depth.** Depth to which roots have been observed to penetrate.
- Organic matter.** Plant and animal residue in the soil in various stages of decomposition.
- Outwash plain.** An extensive area of glaciofluvial material that was deposited by meltwater streams.
- Overstory.** The trees in a forest that form the upper crown cover.
- Oxbow.** The horseshoe-shaped channel of a former meander, remaining after the stream formed a cutoff across a narrow meander neck.
- Pan.** A compact, dense layer in a soil that impedes the movement of water and the growth of roots. For example, *hardpan*, *fragipan*, *claypan*, *plowpan*, and *traffic pan*.
- Parent material.** The unconsolidated organic and mineral material in which soil forms.
- Peat.** Unconsolidated material, largely undecomposed

organic matter, that has accumulated under excess moisture. (See Fibric soil material.)

Ped. An individual natural soil aggregate, such as a granule, a prism, or a block.

Pedon. The smallest volume that can be called "a soil."

A pedon is three dimensional and large enough to permit study of all horizons. Its area ranges from about 10 to 100 square feet (1 square meter to 10 square meters), depending on the variability of the soil.

Percolation. The downward movement of water through the soil.

Percs slowly (in tables). The slow movement of water through the soil, adversely affecting the specified use.

Permeability. The quality of the soil that enables water to move downward through the profile.

Permeability is measured as the number of inches per hour that water moves downward through the saturated soil. Terms describing permeability are:

Very slow	less than 0.06 inch
Slow	0.06 to 0.2 inch
Moderately slow	0.2 to 0.6 inch
Moderate	0.6 inch to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

Phase, soil. A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and thickness.

pH value. A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)

Piping (in tables). Formation of subsurface tunnels or pipelike cavities by water moving through the soil.

Plasticity index. The numerical difference between the liquid limit and the plastic limit; the range of moisture content within which the soil remains plastic.

Plastic limit. The moisture content at which a soil changes from semisolid to plastic.

Playa. The generally dry and nearly level lake plain that occupies the lowest parts of closed depressional areas, such as those on intermontane basin floors. Temporary flooding occurs primarily in response to precipitation and runoff.

Plowpan. A compacted layer formed in the soil directly below the plowed layer.

Ponding. Standing water on soils in closed depressions. The water can be removed only by percolation or evapotranspiration.

Poor filter (in tables). Because of rapid permeability or an impermeable layer near the surface, the soil may not adequately filter effluent from a waste disposal system.

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.

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. The application of fire to land under such conditions of weather, soil moisture, and time of day as presumably will result in the intensity of heat and spread required to accomplish specific forest management, wildlife, grazing, or fire hazard reduction purposes.

Productivity, soil. The capability of a soil for producing a specified plant or sequence of plants under specific management.

Profile, soil. A vertical section of the soil extending through all its horizons and into the parent material.

Proper grazing use. Grazing at an intensity that maintains enough cover to protect the soil and maintain or improve the quantity and quality of the desirable vegetation. This 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.

Quartzite, metamorphic. Rock consisting mainly of quartz that formed through recrystallization of quartz-rich sandstone or chert.

Quartzite, sedimentary. Very hard but unmetamorphosed sandstone consisting chiefly of quartz grains.

Range condition. The present composition of the plant community on a range site in relation to the potential natural plant community for that site. Range condition is expressed as excellent, good, fair, or poor on the basis of how much the present plant community has departed from the potential.

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Range site. An area of rangeland where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. A range site is the product of all the environmental factors

responsible for its development. It is typified by an association of species that differ from those on other range sites in kind or proportion of species or total production.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed in pH values. A soil that tests to pH 7.0 is described as precisely neutral in reaction because it is neither acid nor alkaline. The degrees of acidity or alkalinity, expressed as pH values, are:

Extremely acid	less than 4.5
Very strongly acid	4.5 to 5.0
Strongly acid.....	5.1 to 5.5
Medium acid.....	5.6 to 6.0
Slightly acid.....	6.1 to 6.5
Neutral	6.6 to 7.3
Mildly alkaline.....	7.4 to 7.8
Moderately alkaline.....	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Red beds. Sedimentary strata mainly red in color and composed largely of sandstone and shale.

Regeneration. The new growth of a natural plant community, developing from seed.

Regolith. The unconsolidated mantle of weathered rock and soil material on the earth's surface; the loose earth material above the solid rock.

Relict stream terrace. One of a series of platforms in or adjacent to a stream valley that formed prior to the current stream system.

Relief. The elevations or inequalities of a land surface, considered collectively.

Residuum (residual soil material). Unconsolidated, weathered or partly weathered mineral material that accumulated as consolidated rock disintegrated in place.

Rill. A steep-sided channel resulting from accelerated erosion. A rill is generally a few inches deep and not wide enough to be an obstacle to farm machinery.

Riser. The relatively short, steeply sloping area below a terrace tread that grades to a lower terrace tread or base level.

Riverwash. Unstable areas of sandy, silty, clayey, or gravelly sediments. These areas are flooded, washed, and reworked by rivers so frequently that they support little or no vegetation.

Road cut. A sloping surface produced by mechanical means during road construction. It is commonly on the uphill side of the road.

Rock fragments. Rock or mineral fragments having a

diameter of 2 millimeters or more; for example, pebbles, cobbles, stones, and boulders.

Rock outcrop. Exposures of bare bedrock other than lava flows and rock-lined pits.

Rooting depth (in tables). Shallow root zone. The soil is shallow over a layer that greatly restricts roots.

Root zone. The part of the soil that can be penetrated by plant roots.

Rubble land. Areas that have more than 90 percent of the surface covered by stones or boulders. Voids contain no soil material and virtually no vegetation other than lichens. The areas commonly are at the base of mountain slopes, but some are on mountain slopes as deposits of cobbles, stones, and boulders left by Pleistocene glaciation or by periglacial phenomena.

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 the growth of plants. A saline soil does not contain excess exchangeable sodium.

Salinity. The electrical conductivity of a saline soil. It is expressed, in millimhos per centimeter, as follows:

Nonsaline	0 to 4
Slightly saline	4 to 8
Moderately saline.....	8 to 16
Strongly saline.....	more than 16

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.

Sandy soil. Sand or loamy sand.

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.

Sawlogs. Logs of suitable size and quality for the production of lumber.

Scarification. The act of abrading, scratching, loosening, crushing, or modifying the surface to increase water absorption or to provide a more tillable soil.

Scribner's log rule. A method of estimating the number of board feet that can be cut from a log of a given diameter and length.

Sedimentary plain. An extensive nearly level to gently

rolling or moderately sloping area that is underlain by sedimentary bedrock and that has a slope of 0 to 8 percent.

Sedimentary rock. Rock made up of particles deposited from suspension in water. The chief kinds of sedimentary rock are conglomerate, formed from gravel; sandstone, formed from sand; shale, formed from clay; and limestone, formed from soft masses of calcium carbonate. There are many intermediate types. Some wind-deposited sand is consolidated into sandstone.

Sedimentary uplands. Land areas of bedrock formed from water- or wind-deposited sediments. They are higher on the landscape than the flood plain.

Seepage (in tables). The movement of water through the soil. Seepage adversely affects the specified use.

Semiconsolidated sedimentary beds. Soft geologic sediments that disperse when fragments are placed in water. The fragments are hard or very hard when dry. Determining the texture by the usual field method is difficult.

Sequum. A sequence consisting of an illuvial horizon and the overlying eluvial horizon. (See Eluviation.)

Series, soil. A group of soils that have profiles that are almost alike, except for differences in texture of the surface layer or of the underlying material. All the soils of a series have horizons that are similar in composition, thickness, and arrangement.

Shale. Sedimentary rock formed by the hardening of a clay deposit.

Shallow soil. A soil that is 10 to 20 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Sheet erosion. The removal of a fairly uniform layer of soil material from the land surface by the action of rainfall and surface runoff.

Shelterwood system. A forest management system requiring the removal of a stand in a series of cuts so that regeneration occurs under a partial canopy. After regeneration, a final cut removes the shelterwood and allows the stand to develop in the open as an even-aged stand. The system is well suited to sites where shelter is needed for regeneration, and it can aid regeneration of the more intolerant tree species in a stand.

Shoulder. The uppermost inclined surface at the top of a hillside. It is the transition zone from the back slope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.

Silica. A combination of silicon and oxygen. The mineral form is called quartz.

Silt. As a soil separate, individual mineral particles that

range in diameter from the upper limit of clay (0.002 millimeter) to the lower limit of very fine sand (0.05 millimeter). As a soil textural class, soil that is 80 percent or more silt and less than 12 percent clay.

Siltstone. Sedimentary rock made up of dominantly silt-sized particles.

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.

Sinkhole. A depression in the landscape where limestone has been dissolved.

Site class. A grouping of site indexes into five to seven production capability levels. Each level can be represented by a site curve.

Site curve (50-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for the range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 50 years old or are 50 years old at breast height.

Site curve (100-year). A set of related curves on a graph that shows the average height of dominant or dominant and codominant trees for a range of ages on soils that differ in productivity. Each level is represented by a curve. The basis of the curves is the height of dominant or dominant and codominant trees that are 100 years old or are 100 years old at breast height.

Site index. A designation of the quality of a forest site based on the height of the dominant stand at an arbitrarily chosen age. For example, if the average height attained by dominant or dominant and codominant trees in a fully stocked stand at the age of 50 years is 75 feet, the site index is 75.

Skid trails. Pathways along which logs are dragged to a common site for loading onto a logging truck.

Slash. The branches, bark, treetops, reject logs, and broken or uprooted trees left on the ground after logging.

Slickens. Accumulations of fine-textured material, such as material separated in placer-mine and ore-mill operations. Slickens from ore mills commonly consist of freshly ground rock that has undergone chemical treatment during the milling process.

Slickensides. Polished and grooved surfaces produced by one mass sliding past another. In soils, slickensides may occur at the bases of slip surfaces on the steeper slopes; on faces of blocks,

prisms, and columns; and in swelling clayey soils, where there is marked change in moisture content.

Slick spot. A small area of soil having a puddled, crusted, or smooth surface and an excess of exchangeable sodium. The soil generally is loamy or clayey, is slippery when wet, and is low in productivity.

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. In this survey the following slope classes are recognized:

Nearly level.....	0 to 2 percent
Gently sloping	2 to 4 percent
Moderately sloping	4 to 8 percent
Strongly sloping.....	8 to 15 percent
Moderately steep	15 to 25 percent
Steep.....	25 to 45 percent
Very steep.....	more than 45 percent

Slope (in tables). Slope is great enough that special practices are required to ensure satisfactory performance of the soil for a specific use.

Slow refill (in tables). The slow filling of ponds, resulting from restricted permeability in the soil.

Small stones (in tables). Rock fragments less than 3 inches (7.6 centimeters) in diameter. Small stones adversely affect the specified use of the soil.

Sodic (alkali) soil. A soil having so high a degree of alkalinity (pH 8.5 or higher) or so high a percentage of exchangeable sodium (15 percent or more of the total exchangeable bases), or both, that plant growth is restricted.

Sodicity. The degree to which a soil is affected by exchangeable sodium. Sodicity is expressed as a sodium 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

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 over periods of time.

Soil separates. Mineral particles less than 2 millimeters in equivalent diameter and ranging between specified size limits. The names and sizes, 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 underlying material. The living roots and plant and animal activities are largely confined to the solum.

Species. A single, distinct kind of plant or animal having certain distinguishing characteristics.

Stone line. A concentration of coarse fragments in a soil. Generally, it is indicative of an old weathered surface. In a cross section, the line may be one fragment or more thick. It generally overlies material that weathered in place and is overlain by recent sediment of variable thickness.

Stones. Rock fragments 10 to 24 inches (25 to 60 centimeters) in diameter if rounded or 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 surface cut formed by the erosion of hard or semiconsolidated bedrock and thinly mantled with stream deposits.

Stream channel. The hollow bed where a natural stream of surface water flows or may flow; the deepest or central part of the bed, formed by the main current and covered more or less continuously by water.

Stream terrace. One of a series of platforms in a stream valley, flanking and more or less parallel to the stream channel. It originally formed near the level of the stream and is the dissected remnants of an abandoned flood plain, streambed, or valley floor that were produced during a former stage of erosion or deposition.

Stripcropping. Growing crops in a systematic arrangement of strips or bands that provide vegetative barriers to soil blowing 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 grain* (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 soil blowing and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.
- Subsoil.** Technically, the B horizon; roughly, the part of the solum below plow depth.
- Subsoiling.** Tilling a soil below normal plow depth, ordinarily to shatter or loosen a layer that is restrictive to roots.
- Substratum.** The part of the soil below the solum.
- Subsurface layer.** Technically, the E horizon. Generally refers to a leached horizon lighter in color and lower in content of organic matter than the overlying surface layer.
- Summer fallow.** The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.
- Summit.** A general term for the top, or highest level, of an upland feature, such as a hill or mountain. It commonly refers to a higher area that has a gentle slope and is flanked by steeper slopes.
- 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."
- Tailwater.** The water directly downstream of a structure.
- Talus.** Rock fragments of any size or shape, commonly coarse and angular, derived from and lying at the base of a cliff or very steep rock slope. The accumulated mass of such loose, broken rock formed chiefly by falling, rolling, or sliding.
- Terminal moraine.** A belt of thick glacial drift that generally marks the termination of important glacial advances. It commonly is a massive arcuate ridge or complex of ridges underlain by till and other types of drift.
- Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field is generally built so that the field can be farmed. A terrace

intended mainly for drainage has a deep channel that is maintained in permanent sod.

- Terrace** (geologic). An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.
- Texture, soil.** The relative proportions of sand, silt, and clay particles in a mass of soil. The basic textural classes, in order of increasing proportion of fine particles, are *sand*, *loamy sand*, *sandy loam*, *loam*, *silt loam*, *silt*, *sandy clay loam*, *clay loam*, *silty clay loam*, *sandy clay*, *silty clay*, and *clay*. The sand, loamy sand, and sandy loam classes may be further divided by specifying "coarse," "fine," or "very fine."
- Thin layer** (in tables). A layer of otherwise suitable soil material that is too thin for the specified use.
- Till plain.** An extensive nearly level to gently rolling or moderately sloping area that is underlain by or consists of till and that has a slope of 0 to 8 percent.
- Tilth, soil.** The physical condition of the soil as related to tillage, seedbed preparation, seedling emergence, and root penetration.
- Toe slope.** The outermost inclined surface at the base of a hill. Toe slopes are commonly gentle and linear in profile.
- 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.
- Trafficability.** The degree to which a soil is capable of supporting vehicular traffic across a wide range in soil moisture conditions.
- Tread.** The relatively flat terrace surface that was cut or built by stream or wave action.
- Tuff.** A compacted deposit that is 50 percent or more volcanic ash and dust.
- Understory.** Any plants in a forest community that grow to a height of less than 5 feet.
- Upland** (geology). Land at a higher elevation, in general, than the alluvial plain or stream terrace; land above the lowlands along streams.
- Valley.** An elongated depressional area primarily developed by stream action.
- Valley fill.** In glaciated regions, material deposited in stream valleys by glacial meltwater. In nonglaciated regions, alluvium deposited by heavily loaded streams.
- 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.

Very deep soil. A soil that is more than 60 inches deep over bedrock or to other material that restricts the penetration of plant roots.

Very shallow soil. A soil that is less than 10 inches deep over bedrock or to other material that restricts the penetration of plant roots.

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.

Waterspreading. Diverting runoff from natural channels by means of a system of dams, dikes, or ditches

and spreading it over relatively flat surfaces.

Weathering. All physical and chemical changes produced in rocks or other deposits at or near the earth's surface by atmospheric agents. These changes result in disintegration and decomposition of the material.

Well graded. Refers to soil material consisting of coarse grained particles that are well distributed over a wide range in size or diameter. Such soil normally can be easily increased in density and bearing properties by compaction. Contrasts with poorly graded soil.

Wilting point (or permanent wilting point). The moisture content of soil, on an 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 action of uprooting and tipping over trees by the wind.

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