



United States
Department of
Agriculture

In cooperation with the
Montana Agricultural
Experiment Station

Soil Survey of Deer Lodge County Area, Montana



Natural
Resources
Conservation
Service



The original maps and tables have been deleted from this online version. Since the soil survey's publication, more data on soil properties may have been collected, new interpretations developed, or existing interpretive criteria modified. Maps and current data tables can be accessed through the Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>).



How to Use This Soil Survey

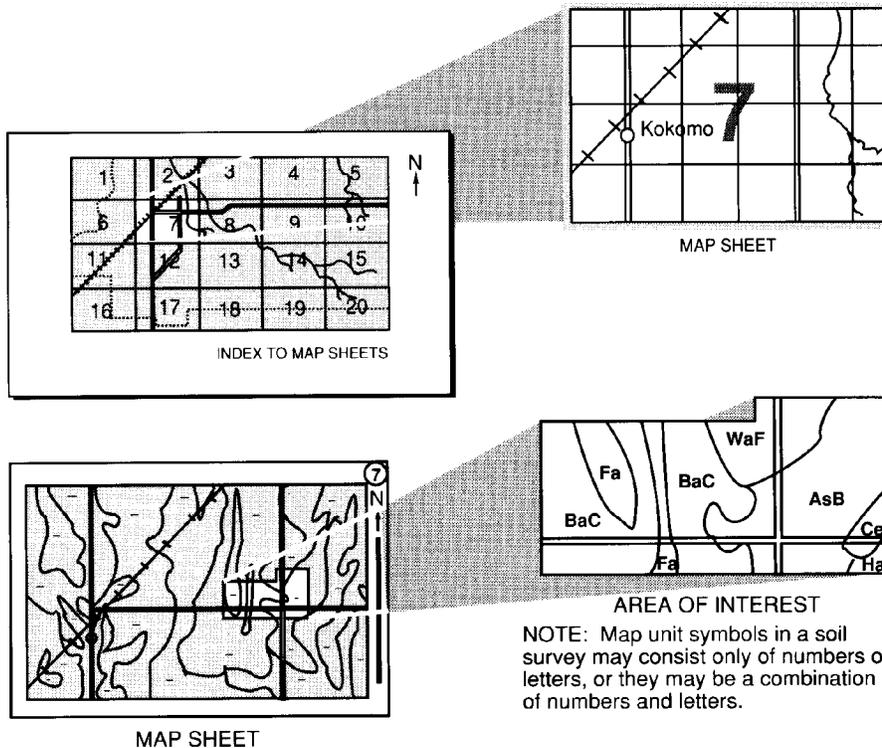
Detailed Soil Maps

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

To find information about your area of interest, you can locate the Section, Township, and Range by zooming in on the **Index to Map Sheets**, or you can go to the Web Soil Survey at (<http://websoilsurvey.nrcs.usda.gov/app/>).

Note the map unit symbols that are in that area. The **Contents** lists the map units by symbol and name and shows the page where each map unit is described.

See the **Contents** for sections of this publication that may address your specific needs.



National Cooperative Soil Survey

This soil survey is a publication of the National Cooperative Soil Survey, a joint effort of the United States Department of Agriculture and other Federal agencies, State agencies including the Agricultural Experiment Stations, and local agencies. The Natural Resources Conservation Service has leadership for the Federal part of the National Cooperative Soil Survey. This survey was made cooperatively by the Natural Resources Conservation Service and the Montana Agricultural Experiment Station. The survey is part of the technical assistance furnished to the Deer Lodge Conservation District.

Major fieldwork for this soil survey was completed in 1996. Soil names and descriptions were approved in 2001. Unless otherwise indicated, statements in this publication refer to conditions in the survey area in 1996. The most current official data are available at <http://websoilsurvey.nrcs.usda.gov/app/>.

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

Nondiscrimination Statement

The United States Department of Agriculture (USDA) prohibits discrimination in all its programs and activities on the basis of race, color, national origin, sex, religion, age, disability, political beliefs, sexual orientation, and marital or family status. (Not all prohibited bases apply to all programs.) Persons with disabilities who require alternative means for communication of program information (Braille, large print, audiotape, etc.) should contact the USDA's TARGET Center at (202) 720-2600 (voice and TDD).

To file a complaint of discrimination, write USDA, Director, Office of Civil Rights, Room 326-W, Whitten Building, 1400 Independence Avenue, SW, Washington, DC 20250-9410, or call (202) 720-5964 (voice and TDD). USDA is an equal opportunity provider and employer.

Cover: In the foreground, the soils are Beaverell cobbly loam. Shawmut extremely bouldery loam is on the terminal moraine. The Deer Lodge Mountains and Mount Powell are in the background.

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

Contents

How to Use This Soil Survey	i
Alphabetical Index to Map Units	xix
Summary of Tables	xxxii
Foreword	xxxiii
General Nature of the Survey Area	2
History and Development	2
Physiography, Drainage, and Geology	3
Mineral Resources	9
Ground-water Resources	10
Geothermal Resources	11
Seismicity	11
Climate	11
How This Survey Was Made	13
Formation of the Soils	19
Factors of Soil Formation	19
Parent Material	19
Climate	20
Topography	20
Living Organisms	20
Time	21
Classification of the Soils	23
Soil Series and Their Morphology	24
Adel Series	24
Aeric Fluvaquents	25
Ambrant Series	26
Anaconda Series	28
Aquic Cumulic Haplustolls	29
Arents	31
Aridic Ustifluvents	32
Aridic Ustorthents	33
Aridic Ustorthents, clayey substratum	35
Arlen Series	36
Bata Series	37
Bearmouth Series	38
Beaverell Series	40
Bendoh Series	42
Bignell Series	44
Blossberg Series	45
Braziel Series	47
Bridger Series	48
Burrfoot Series	50
Bushong Series	51
Caramon Series	53
Carten Series	55
Caseypeak Series	57

Cetrack Series	58
Clasoil Series	60
Comad Series	62
Con Series	63
Copenhaver Series	65
Coslaw Series	66
Cowood Series	67
Crackerville Series	68
Cujob Series	69
Danaher Series	71
Danielvil Series	73
Danvers Series	74
Daras Series	76
Donald Series	78
Dougcliff Series	80
Dunkleber Series	81
Eine Series	82
Elkner Series	84
Ellena Series	85
Elliston Series	87
Elve Series	88
Eremis Series	90
Evaro Series	91
Eyebow Series	93
Figaro Series	94
Finn Series	96
Fluvaquentic Endoaquolls	98
Foolhen Series	99
Gregson Series	101
Hackney Series	102
Hanson Series	103
Helmville Series	105
Holloway Series	107
Illiano Series	108
Judco Series	109
Julius Series	111
Karloff Series	113
Kilgore Series	115
Kleinschmidt Series	116
Lap Series	118
Levengood Series	119
Liart Series	121
Libeg Series	123
Litag Series	124
Loberg Series	126
Lolon Series	128
Lowland Series	129
Macabre Series	131
Maciver Series	132
Mannixlee Series	134
Marcott Series	135
Martinsdale Series	137
Maurice Series	138
Mishakal Series	139

Mohaggin Series	141
Mollet Series	142
Monad Series	144
Mooseflat Series	145
Nana Series	147
Nivean Series	149
Pax Series	150
Perma Series	151
Phillcher Series	153
Poronto Series	154
Pozega Series	156
Quigg Series	158
Quigley Series	160
Redchief Series	162
Redfern Series	163
Relyea Series	165
Rochester Series	167
Roy Series	168
Rumsey Series	170
Saypo Series	171
Shawmut Series	173
Shook Series	175
Silverchief Series	176
Sixbeacon Series	178
Staad Series	179
Sula Series	181
Tepecreek Series	182
Tetonview Series	184
Tewfel Series	185
Tibkey Series	186
Tibson Series	188
Tolbert Series	189
Trapps Series	190
Truchot Series	192
Turrah Series	193
Varney Series	195
Vitroff Series	196
Waldbillig Series	198
Wetsand Series	199
Whitecow Series	201
Whitore Series	202
Wilspring Series	204
Wimper Series	205
Windham Series	207
Winkler Series	208
Winspect Series	210
Work Series	211
Worock Series	213
Yreka Series	215
Zelda Series	216
Detailed Soil Map Units	231
2A—Dougcliff mucky peat, 0 to 2 percent slopes	232
3B—Foolhen loam, 0 to 4 percent slopes	233
3C—Foolhen loam, 4 to 8 percent slopes	233

6B—Elliston loam, 0 to 2 percent slopes	234
8B—Danielvil loam, 2 to 4 percent slopes	234
15A—Dunkleber mucky peat, 0 to 2 percent slopes	235
16B—Maciver loam, 2 to 4 percent slopes	235
20A—Dougcliff mucky peat, 0 to 2 percent slopes, moderately impacted	236
20B—Eyerbow gravelly loam, 2 to 4 percent slopes	237
20C—Eyerbow gravelly loam, 4 to 8 percent slopes	237
21C—Maurice loam, 2 to 8 percent slopes	238
21D—Maurice cobbly loam, 8 to 15 percent slopes	238
21E—Maurice cobbly loam, 15 to 35 percent slopes	239
22E—Lolon gravelly loam, 4 to 25 percent slopes, bouldery	239
24B—Con loam, 0 to 4 percent slopes	240
24C—Con loam, 4 to 8 percent slopes	241
24D—Con loam, 8 to 15 percent slopes	241
25B—Staad silty clay loam, 0 to 4 percent slopes	242
25D—Staad silty clay loam, 8 to 15 percent slopes	242
26C—Bearmouth gravelly loam, 2 to 8 percent slopes	243
30C—Quigg loam, 2 to 8 percent slopes	243
30D—Quigg loam, 8 to 15 percent slopes	244
30E—Quigg loam, 15 to 35 percent slopes	245
31B—Varney clay loam, 0 to 4 percent slopes, moderately impacted	245
31C—Varney clay loam, 4 to 8 percent slopes	246
31D—Varney clay loam, 8 to 15 percent slopes	246
32E—Sula-Shook complex, 15 to 35 percent slopes	247
32F—Sula-Shook complex, 35 to 60 percent slopes	248
34B—Cetrack loam, 0 to 4 percent slopes	249
35B—Anaconda sandy loam, 0 to 4 percent slopes	249
35C—Anaconda sandy loam, 4 to 8 percent slopes	250
35D—Anaconda sandy loam, 8 to 15 percent slopes	251
36B—Varney-Con loams, 0 to 4 percent slopes	251
36C—Varney-Con loams, 4 to 8 percent slopes	252
36D—Varney-Con loams, 8 to 15 percent slopes	253
36E—Varney-Con loams, 15 to 35 percent slopes, moderately impacted	254
36F—Varney-Con loams, 35 to 60 percent slopes	255
37C—Adel loam, 2 to 8 percent slopes	256
39E—Winspect gravelly loam, 15 to 35 percent slopes	256
41C—Perma gravelly loam, 4 to 8 percent slopes	257
41D—Perma gravelly loam, 8 to 15 percent slopes	257
41F—Perma gravelly loam, 35 to 60 percent slopes	258
45B—Redchief cobbly loam, 2 to 4 percent slopes	259
45C—Redchief cobbly loam, 4 to 8 percent slopes	259
45D—Redchief cobbly loam, 8 to 15 percent slopes	260
45E—Redchief cobbly loam, 15 to 35 percent slopes	260
45F—Redchief cobbly loam, 35 to 60 percent slopes	261
46B—Roy gravelly loam, 2 to 4 percent slopes	262
46C—Roy gravelly loam, 4 to 8 percent slopes	262
46D—Roy gravelly loam, 8 to 15 percent slopes	263
46E—Roy gravelly loam, 15 to 35 percent slopes	263
46F—Roy gravelly loam, 35 to 60 percent slopes	264
47C—Bridger cobbly loam, 2 to 8 percent slopes	265
47D—Bridger cobbly loam, 8 to 15 percent slopes	265
47E—Bridger cobbly loam, 15 to 35 percent slopes	266
48C—Mollet loam, 2 to 8 percent slopes	266
48D—Mollet loam, 8 to 15 percent slopes	267

48E—Mollet loam, 15 to 35 percent slopes	268
49B—Danvers clay loam, 2 to 4 percent slopes	268
49E—Danvers clay loam, 15 to 35 percent slopes	269
50C—Monad loam, 2 to 8 percent slopes	269
50D—Monad loam, 8 to 15 percent slopes	270
51B—Shawmut gravelly loam, 2 to 4 percent slopes	270
51C—Shawmut gravelly loam, 4 to 8 percent slopes	271
51D—Shawmut gravelly loam, 8 to 15 percent slopes	272
51E—Shawmut gravelly loam, 15 to 35 percent slopes	272
51F—Shawmut gravelly loam, 35 to 60 percent slopes	273
52B—Martinsdale loam, 0 to 4 percent slopes	273
52C—Martinsdale loam, 4 to 8 percent slopes	274
52D—Martinsdale loam, 8 to 15 percent slopes	275
52E—Martinsdale loam, 15 to 35 percent slopes	275
54B—Libeg gravelly loam, 2 to 4 percent slopes	276
54C—Libeg gravelly loam, 4 to 8 percent slopes	276
54D—Libeg gravelly loam, 8 to 15 percent slopes	277
54E—Libeg gravelly loam, 15 to 35 percent slopes	278
54F—Libeg gravelly loam, 35 to 60 percent slopes	278
55D—Maciver gravelly loam, 8 to 15 percent slopes, moderately impacted	279
55E—Maciver gravelly loam, 15 to 35 percent slopes, moderately impacted	279
59D—Tewfel-Hackney complex, 4 to 15 percent slopes	280
59E—Tewfel-Hackney complex, 15 to 35 percent slopes	281
60B—Quigley loam, 2 to 4 percent slopes	282
60C—Quigley loam, 4 to 8 percent slopes	282
60D—Quigley loam, 8 to 15 percent slopes	283
66E—Bata gravelly ashy loam, 15 to 35 percent slopes	284
68D—Phillcher gravelly ashy silt loam, 4 to 15 percent slopes	284
68E—Phillcher gravelly ashy silt loam, 15 to 45 percent slopes	285
75E—Hanson gravelly loam, 15 to 35 percent slopes	285
75F—Hanson gravelly loam, 35 to 60 percent slopes	286
76B—Tibson gravelly loam, 2 to 4 percent slopes	286
76C—Tibson gravelly loam, 4 to 8 percent slopes	287
76D—Tibson gravelly loam, 8 to 15 percent slopes	288
76E—Tibson gravelly loam, 15 to 35 percent slopes	288
76F—Tibson gravelly loam, 35 to 60 percent slopes	289
78D—Rumsey gravelly ashy silt loam, 8 to 15 percent slopes	289
78E—Rumsey gravelly ashy silt loam, 15 to 35 percent slopes	290
81E—Holloway gravelly ashy silt loam, 15 to 35 percent slopes	291
81F—Holloway gravelly ashy silt loam, 35 to 60 percent slopes	291
82D—Elve gravelly loam, 4 to 15 percent slopes	292
82E—Elve gravelly loam, 15 to 35 percent slopes	292
82F—Elve gravelly loam, 35 to 60 percent slopes	293
82G—Elve gravelly loam, 60 to 80 percent slopes	293
84C—Helmville cobbly loam, 2 to 8 percent slopes	294
84D—Helmville cobbly loam, 8 to 15 percent slopes	294
84E—Helmville cobbly loam, 15 to 35 percent slopes	295
84F—Helmville cobbly loam, 35 to 60 percent slopes	296
85D—Loberg gravelly loam, 4 to 15 percent slopes	296
85E—Loberg gravelly loam, 15 to 35 percent slopes	297
85F—Loberg gravelly loam, 35 to 60 percent slopes	297
86D—Winkler gravelly loam, 8 to 15 percent slopes	298
86E—Winkler gravelly loam, 15 to 35 percent slopes	298
86F—Winkler gravelly loam, 35 to 60 percent slopes	299

87D—Danaher loam, 4 to 15 percent slopes	300
87E—Danaher loam, 15 to 35 percent slopes	300
88F—Whitcow gravelly loam, 35 to 60 percent slopes	301
91D—Mohaggin stony ashy very fine sandy loam, 8 to 15 percent slopes	301
91E—Mohaggin stony ashy very fine sandy loam, 15 to 35 percent slopes	302
91F—Mohaggin stony ashy very fine sandy loam, 35 to 60 percent slopes	302
92C—Whitore gravelly loam, 2 to 8 percent slopes	303
92D—Whitore gravelly loam, 8 to 15 percent slopes	304
92E—Whitore gravelly loam, 15 to 35 percent slopes	304
92F—Whitore gravelly loam, 35 to 60 percent slopes	305
95D—Yreka gravelly loam, 8 to 15 percent slopes	305
95E—Yreka gravelly loam, 15 to 35 percent slopes	306
95F—Yreka gravelly loam, 35 to 60 percent slopes	306
96D—Worock gravelly loam, 4 to 15 percent slopes	307
96E—Worock gravelly loam, 15 to 35 percent slopes	307
96F—Worock gravelly loam, 35 to 60 percent slopes	308
97C—Evaro gravelly ashy loam, 4 to 8 percent slopes	309
97D—Evaro gravelly ashy loam, 8 to 15 percent slopes	309
97E—Evaro gravelly ashy loam, 15 to 35 percent slopes	310
97F—Evaro gravelly ashy loam, 35 to 60 percent slopes	310
98F—Trapps gravelly loam, 35 to 60 percent slopes	311
99E—Bignell gravelly clay loam, 15 to 35 percent slopes	311
100—Rubble land-Rock outcrop complex.....	312
102—Pits, gravel	312
103—Dumps, mine	313
104A—Fluvaquentic Endoaquolls-Slickens complex, 0 to 2 percent slopes, severely impacted	313
105A—Slickens-Fluvaquentic Endoaquolls complex, 0 to 2 percent slopes, severely impacted	314
106—Slickens.....	314
107A—Aquic Cumulic Haplustolls-Aridic Ustifluvents-Slickens complex, 0 to 2 percent slopes, severely impacted	315
108A—Slickens-Aridic Ustifluvents-Aquic Cumulic Haplustolls complex, 0 to 2 percent slopes, severely impacted	316
110A—Carten-Wetsand complex, 0 to 2 percent slopes	317
114A—Mooseflat loam, 0 to 2 percent slopes	317
116A—Eine-Nana complex, 0 to 2 percent slopes	318
117A—Zelda-Nana-Foolhen complex, 0 to 2 percent slopes	319
120C—Eyerbow-Donald cobbly loams, 4 to 8 percent slopes.....	320
120D—Eyerbow-Donald cobbly loams, 8 to 15 percent slopes.....	321
120E—Eyerbow-Donald complex, 15 to 35 percent slopes	322
121B—Maurice-Danielvil complex, 2 to 4 percent slopes	323
127D—Julius clay loam, 8 to 15 percent slopes, severely impacted	324
129C—Wimper-Winspect complex, 4 to 8 percent slopes	324
129E—Wimper-Winspect complex, 15 to 35 percent slopes.....	325
131C—Varney cobbly clay loam, 4 to 8 percent slopes.....	326
131D—Varney cobbly clay loam, 8 to 15 percent slopes	327
131E—Varney cobbly clay loam, 15 to 35 percent slopes.....	327
131F—Varney cobbly clay loam, 35 to 50 percent slopes	328
132B—Beaverell cobbly loam, 0 to 4 percent slopes	328
132C—Beaverell cobbly loam, 4 to 8 percent slopes	329
134C—Cetrack loam, 4 to 8 percent slopes, severely impacted	329
136E—Varney-Con complex, 15 to 35 percent slopes	330
136F—Varney-Con complex, 35 to 60 percent slopes	331

137B—Sixbeacon cobbly loam, 0 to 4 percent slopes	332
137C—Sixbeacon cobbly loam, 4 to 8 percent slopes	332
137D—Sixbeacon cobbly loam, 8 to 15 percent slopes	333
145C—Redchief-Mollet complex, 4 to 8 percent slopes	333
145D—Redchief-Mollet complex, 8 to 15 percent slopes	334
145E—Redchief-Mollet complex, 15 to 35 percent slopes	335
148C—Mollet cobbly loam, 2 to 8 percent slopes	336
148D—Mollet cobbly loam, 8 to 15 percent slopes	337
151D—Shawmut cobbly loam, 8 to 15 percent slopes	337
151E—Shawmut cobbly loam, 15 to 35 percent slopes	338
151F—Shawmut cobbly loam, 35 to 60 percent slopes	338
152C—Clasoil sandy loam, 4 to 8 percent slopes	339
152D—Clasoil sandy loam, 8 to 15 percent slopes	340
154E—Libeg cobbly loam, 15 to 35 percent slopes	340
154F—Libeg cobbly loam, 35 to 60 percent slopes	341
176D—Tibson-Levengood gravelly loams, 8 to 15 percent slopes	341
176F—Tibson-Levengood gravelly loams, 35 to 60 percent slopes	342
179E—Ambrant-Rochester complex, 15 to 35 percent slopes	343
179F—Ambrant-Rochester complex, 35 to 60 percent slopes	344
182F—Elve very cobbly loam, 35 to 60 percent slopes	345
185E—Relyea-Helmville complex, 15 to 35 percent slopes	346
192E—Whitore gravelly clay loam, 15 to 35 percent slopes	347
195E—Yreka gravelly loam, cool, 15 to 35 percent slopes	347
198E—Trapps-Yreka stony loams, 8 to 25 percent slopes	348
214A—Foolhen-Mooseflat-Water complex, 0 to 2 percent slopes	349
227E—Julius-Tolbert complex, 15 to 35 percent slopes, moderately impacted	350
230E—Quigg-Libeg complex, 15 to 35 percent slopes	351
232B—Beaverell cobbly loam, 1 to 4 percent slopes, severely impacted	352
232E—Beaverell cobbly loam, 15 to 35 percent slopes, severely impacted	352
235B—Anaconda sandy loam, 0 to 4 percent slopes, severely impacted	353
236B—Varney sandy clay loam, 2 to 4 percent slopes	353
236C—Varney sandy clay loam, 4 to 8 percent slopes	354
236D—Varney sandy clay loam, 8 to 15 percent slopes	354
236E—Varney sandy clay loam, 15 to 35 percent slopes	355
237B—Sixbeacon gravelly loam, 0 to 4 percent slopes	356
237C—Sixbeacon gravelly loam, 4 to 8 percent slopes	356
237D—Sixbeacon gravelly loam, 8 to 15 percent slopes	357
242D—Braziel gravelly loam, 8 to 15 percent slopes	357
242E—Braziel gravelly loam, 15 to 35 percent slopes	358
245D—Redchief-Mollet bouldery loams, 4 to 15 percent slopes	359
246D—Roy gravelly loam, 8 to 15 percent slopes, moderately impacted	360
246E—Roy gravelly loam, 15 to 35 percent slopes, moderately impacted	360
251D—Shawmut stony loam, 0 to 15 percent slopes	361
251E—Shawmut stony loam, 15 to 35 percent slopes	361
254E—Libeg stony loam, 15 to 35 percent slopes	362
254F—Libeg stony loam, 35 to 60 percent slopes	363
275F—Hanson stony loam, 35 to 60 percent slopes	363
276D—Tibson stony loam, 2 to 15 percent slopes	364
280E—Comad-Elkner-Rock outcrop complex, 15 to 35 percent slopes	364
280F—Comad-Elkner-Rock outcrop complex, 35 to 60 percent slopes	365
282D—Elve gravelly loam, 8 to 15 percent slopes, moderately impacted	366
282E—Elve gravelly loam, 15 to 35 percent slopes, moderately impacted	367
282F—Elve gravelly loam, 35 to 60 percent slopes, moderately impacted	367

282G—Elve gravelly loam, 60 to 85 percent slopes, moderately impacted	368
296E—Worock-Elve-Whitore stony loams, 15 to 35 percent slopes	369
300B—Arents, 1 to 4 percent slopes	370
300F—Arents, 30 to 45 percent slopes	370
314A—Kilgore-Foolhen-Mooseflat complex, 0 to 2 percent slopes	371
332B—Beaverell loam, 0 to 4 percent slopes	372
335B—Tetonview-Blossberg-Poronto complex, 0 to 4 percent slopes, rarely flooded	373
336B—Varney-Anaconda loams, 0 to 4 percent slopes, moderately impacted	374
337B—Sixbeacon fine sandy loam, 1 to 4 percent slopes, severely impacted	375
337C—Sixbeacon fine sandy loam, 4 to 8 percent slopes, severely impacted	375
338C—Perma cobbly loam, 4 to 8 percent slopes	376
339E—Winspect cobbly loam, 15 to 35 percent slopes	376
339F—Winspect cobbly loam, 35 to 60 percent slopes	377
345F—Redchief-Tibson complex, 35 to 60 percent slopes	378
351E—Roy-Shawmut-Danvers complex, 15 to 35 percent slopes	379
351F—Roy-Shawmut-Danvers complex, 35 to 60 percent slopes	380
352C—Martinsdale cobbly loam, 4 to 8 percent slopes	381
352D—Martinsdale cobbly loam, 8 to 15 percent slopes	381
352E—Martinsdale cobbly loam, 15 to 35 percent slopes	382
352F—Martinsdale cobbly loam, 35 to 60 percent slopes	383
354D—Libeg-Redchief complex, 8 to 15 percent slopes	383
354E—Libeg-Redchief complex, 15 to 35 percent slopes	384
376E—Tibson very stony loam, 8 to 25 percent slopes	385
379E—Ambrant-Rochester-Rock outcrop complex, 15 to 35 percent slopes	386
379F—Ambrant-Rochester-Rock outcrop complex, 35 to 60 percent slopes	387
387E—Danaher-Loberg complex, 15 to 35 percent slopes	387
391F—Mohaggin bouldery ashy very fine sandy loam, 35 to 60 percent slopes	388
392E—Whitore cobbly loam, 15 to 35 percent slopes	389
392F—Whitore cobbly loam, 35 to 60 percent slopes	389
400D—Aridic Ustorthents, clayey substratum, 4 to 15 percent slopes	390
414A—Kilgore-Mooseflat-Water complex, 0 to 2 percent slopes	391
430C—Quigg-Mollet complex, 2 to 8 percent slopes	392
430D—Quigg-Mollet complex, 8 to 15 percent slopes	393
430E—Quigg-Mollet complex, 15 to 35 percent slopes	394
432B—Beaverell cobbly loam, 0 to 4 percent slopes, moderately impacted	395
432C—Beaverell cobbly loam, 4 to 8 percent slopes, moderately impacted	395
437E—Adel-Mooseflat complex, 8 to 35 percent slopes	396
438B—Perma cobbly loam, 2 to 4 percent slopes, moderately impacted	397
442E—Braziel-Tolbert complex, 15 to 35 percent slopes	397
442F—Braziel-Tolbert complex, 35 to 60 percent slopes	398
451E—Shawmut very bouldery loam, 8 to 25 percent slopes	399
454D—Libeg-Macabre-Redchief complex, 8 to 15 percent slopes	400
454E—Libeg-Macabre-Redchief complex, 15 to 35 percent slopes	401
454F—Libeg-Macabre-Redchief complex, 35 to 60 percent slopes	402
482E—Elve gravelly loam, dry, 15 to 35 percent slopes	403
482F—Elve gravelly loam, dry, 35 to 60 percent slopes	404
492E—Whitore, dry-Rock outcrop complex, 15 to 35 percent slopes	405
492F—Whitore, dry-Rock outcrop complex, 35 to 60 percent slopes	405
492G—Whitore, dry-Rock outcrop complex, 60 to 80 percent slopes	406

497C—Waldbillig gravelly ashy loam, 2 to 8 percent slopes	407
497E—Waldbillig gravelly ashy loam, 8 to 25 percent slopes	407
509B—Gregson fine sandy loam, 0 to 4 percent slopes, moderately impacted.....	408
514A—Mooseflat-Foolhen complex, 0 to 2 percent slopes	408
533B—Pozega silty clay loam, 0 to 4 percent slopes	409
535B—Saypo loam, cool, 0 to 4 percent slopes	410
537B—Truchot gravelly loam, 0 to 4 percent slopes	410
544B—Gregson loam, 0 to 4 percent slopes	411
545B—Saypo loam, 0 to 4 percent slopes.....	412
547B—Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes	412
549B—Marcott silty clay loam, 0 to 4 percent slopes, moderately impacted	413
551F—Shawmut extremely bouldery loam, 8 to 50 percent slopes	413
552C—Clasoil-Crackerville complex, 4 to 8 percent slopes	414
552D—Clasoil-Crackerville complex, 8 to 15 percent slopes	415
552E—Clasoil-Crackerville complex, 15 to 35 percent slopes	416
552F—Clasoil-Crackerville complex, 35 to 60 percent slopes	417
554E—Redchief-Macabre-Libeg complex, 15 to 35 percent slopes	418
554F—Redchief-Macabre-Libeg complex, 35 to 60 percent slopes	419
557B—Kleinschmidt gravelly loam, 0 to 4 percent slopes	420
562B—Carten loam, 0 to 4 percent slopes	421
576B—Finn gravelly loam, dry, 0 to 4 percent slopes	421
580D—Comad-Elkner complex, 8 to 15 percent slopes	422
580E—Comad-Elkner complex, 15 to 35 percent slopes	423
580F—Comad-Elkner complex, 35 to 60 percent slopes	424
582D—Elve-Rock outcrop complex, 8 to 15 percent slopes	424
592E—Whitore gravelly loam, cold, 15 to 35 percent slopes	425
592F—Whitore gravelly loam, cold, 35 to 60 percent slopes	426
592G—Whitore gravelly loam, cold, 60 to 80 percent slopes	426
596E—Worock-Loberg complex, 15 to 35 percent slopes.....	427
597D—Evaro gravelly ashy loam, cold, 8 to 15 percent slopes	428
597E—Evaro gravelly ashy loam, cold, 15 to 35 percent slopes	428
597F—Evaro gravelly ashy loam, cold, 35 to 60 percent slopes	429
599D—Silverchief-Trapps complex, 8 to 15 percent slopes	429
600A—Aeric Fluvaquents, 0 to 2 percent slopes	430
632B—Bushong loam, 0 to 4 percent slopes	431
634B—Blossberg loam, 0 to 4 percent slopes	431
635B—Tetonview loam, 0 to 4 percent slopes	432
637B—Poronto loam, 0 to 4 percent slopes	433
645A—Mannixlee clay loam, 0 to 2 percent slopes, moderately impacted	433
646B—Danvers-Roy complex, 2 to 4 percent slopes, moderately impacted	434
649B—Turrah silty clay loam, 0 to 4 percent slopes	435
676B—Finn loam, 0 to 4 percent slopes	435
680E—Comad-Rubble land complex, 15 to 35 percent slopes	436
680F—Comad-Rubble land complex, 35 to 60 percent slopes	437
680G—Rock outcrop-Comad complex, 45 to 80 percent slopes	437
682E—Elve bouldery sandy loam, 4 to 25 percent slopes	438
682F—Elve bouldery sandy loam, 25 to 50 percent slopes	438
686A—Dougcliff mucky peat, loamy substratum, 0 to 2 percent slopes	439
696E—Worock gravelly loam, dry, 15 to 35 percent slopes	440
696F—Worock gravelly loam, dry, 35 to 60 percent slopes	440
697E—Waldbillig-Mooseflat complex, 4 to 25 percent slopes	441
714E—Mooseflat-Mohaggin complex, 4 to 25 percent slopes	442
714F—Mooseflat-Mohaggin complex, 25 to 60 percent slopes	443

724B—Con loam, 0 to 4 percent slopes, moderately impacted	444
724C—Con loam, 4 to 8 percent slopes, moderately impacted	444
724D—Con loam, 8 to 15 percent slopes, moderately impacted	445
732B—Beaverell loam, 0 to 4 percent slopes, moderately impacted	445
735B—Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	446
737B—Sixbeacon gravelly loam, 0 to 4 percent slopes, moderately impacted	447
737C—Sixbeacon gravelly loam, 4 to 8 percent slopes, moderately impacted	448
737D—Sixbeacon gravelly loam, 8 to 15 percent slopes, moderately impacted	448
739E—Tolbert-Wilsping-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	449
751C—Shawmut gravelly loam, 4 to 8 percent slopes, moderately impacted ...	450
751D—Shawmut gravelly loam, 8 to 15 percent slopes, moderately impacted	450
751E—Shawmut gravelly loam, 15 to 35 percent slopes, moderately impacted	451
752D—Clasoil-Crackerville-Rock outcrop complex, 8 to 15 percent slopes	451
752E—Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes	452
753E—Redchief-Copenhaver gravelly loams, 15 to 35 percent slopes, moderately impacted	453
758F—Mishakal-Tolbert complex, 35 to 60 percent slopes, moderately impacted	454
774F—Wilsping-Tolbert complex, 35 to 60 percent slopes	455
774G—Wilsping-Rubble land complex, 50 to 75 percent slopes	456
776B—Finn-Water complex, 0 to 4 percent slopes	457
782D—Evaro stony ashy loam, 4 to 15 percent slopes	458
782E—Evaro stony ashy loam, 15 to 35 percent slopes	458
782F—Evaro stony ashy loam, 35 to 60 percent slopes	459
786E—Winkler gravelly loam, cool, 15 to 35 percent slopes	459
791D—Mohaggin-Rubble land complex, 8 to 15 percent slopes	460
791E—Mohaggin-Rubble land complex, 15 to 35 percent slopes	461
791F—Mohaggin-Rubble land complex, 35 to 60 percent slopes	461
791G—Mohaggin-Rubble land complex, 60 to 80 percent slopes	462
797E—Waldbillig-Elve complex, 8 to 25 percent slopes	463
797F—Waldbillig-Elve complex, 25 to 50 percent slopes	463
800B—Aridic Ustorthents, 1 to 4 percent slopes	464
800C—Aridic Ustorthents, 4 to 8 percent slopes	465
800D—Aridic Ustorthents, 8 to 15 percent slopes	465
800E—Aridic Ustorthents, 15 to 35 percent slopes	466
824E—Con-Sixbeacon cobbly loams, 15 to 35 percent slopes	466
824F—Con-Sixbeacon cobbly loams, 35 to 60 percent slopes	467
834B—Blossberg loam, 0 to 4 percent slopes, rarely flooded	468
835B—Tetonview loam, 0 to 4 percent slopes, rarely flooded	469
837B—Poronto loam, 0 to 4 percent slopes, rarely flooded	469
839F—Windham-Lap-Rock outcrop complex, 35 to 60 percent slopes	470
840D—Arlen-Caramon-Rock outcrop complex, 8 to 15 percent slopes, severely impacted	471
840F—Arlen-Caramon-Rock outcrop complex, 15 to 60 percent slopes, severely impacted	472
846F—Roy-Tolbert complex, 35 to 60 percent slopes	473
854E—Libeg-Monad-Copenhaver complex, 15 to 35 percent slopes	474
854F—Libeg-Monad-Copenhaver complex, 35 to 60 percent slopes	475

855A—Mannixlee-Blossberg complex, 0 to 2 percent slopes	476
865F—Karloff gravelly ashy sandy loam, 35 to 60 percent slopes, moderately impacted	477
882E—Phillcher-Rock outcrop complex, 15 to 35 percent slopes	478
882F—Phillcher-Rock outcrop complex, 35 to 60 percent slopes	479
882G—Phillcher-Rock outcrop complex, 60 to 80 percent slopes	479
888E—Caramon ashy loam, 15 to 35 percent slopes, moderately impacted	480
889E—Karloff ashy loam, 15 to 35 percent slopes	481
897E—Evaro gravelly ashy loam, moist, 8 to 25 percent slopes	481
903B—Foolhen loam, 0 to 4 percent slopes, rarely flooded	482
914A—Kilgore-Mooseflat complex, 0 to 2 percent slopes	482
922E—Judco gravelly ashy sandy clay loam, 15 to 35 percent slopes, moderately impacted	483
924E—Con-Sixbeacon cobbly loams, 15 to 35 percent slopes, moderately impacted	484
932F—Sula-Shook-Rock outcrop complex, 35 to 60 percent slopes	485
933E—Burrfoot-Nivean complex, 15 to 35 percent slopes, moderately impacted	486
934B—Cetrack loam, 0 to 4 percent slopes, moderately impacted	487
935B—Anaconda sandy loam, 0 to 4 percent slopes, moderately impacted	487
935C—Anaconda sandy loam, 4 to 8 percent slopes, moderately impacted	488
935D—Anaconda sandy loam, 8 to 15 percent slopes, moderately impacted	489
935E—Anaconda sandy loam, 15 to 35 percent slopes, moderately impacted	489
937B—Sixbeacon cobbly loam, 0 to 4 percent slopes, moderately impacted	490
937C—Sixbeacon cobbly loam, 4 to 8 percent slopes, moderately impacted ...	490
937D—Sixbeacon cobbly loam, 8 to 15 percent slopes, moderately impacted	491
938D—Lap-Windham loams, 4 to 15 percent slopes, very stony, moderately impacted	492
939F—Windham-Lap-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted	493
944F—Work-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, severely impacted	494
945B—Saypo loam, 0 to 4 percent slopes, moderately impacted	495
946E—Roy-Tolbert-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	495
946F—Roy-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	496
951F—Roy-Shawmut-Danvers complex, 35 to 60 percent slopes, moderately impacted	497
954E—Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes	498
954F—Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes	499
958F—Mishakal loam, 35 to 60 percent slopes	500
966D—Macabre-Arlen complex, 8 to 15 percent slopes, severely impacted	501
966E—Macabre-Arlen complex, 15 to 35 percent slopes, severely impacted	502
975F—Hanson-Rock outcrop complex, 35 to 60 percent slopes	503
977E—Work-Julius-Arlen complex, 15 to 35 percent slopes, severely impacted	504
977F—Work-Julius-Arlen complex, 35 to 60 percent slopes, severely impacted	505
982E—Elve-Rock outcrop complex, 15 to 35 percent slopes	506

982F—Elve-Rock outcrop complex, 35 to 60 percent slopes	507
982G—Elve-Rock outcrop complex, 60 to 80 percent slopes	507
988F—Whitocow-Rock outcrop complex, 35 to 60 percent slopes	508
992E—Whitore-Rock outcrop complex, 15 to 35 percent slopes	509
992F—Whitore-Rock outcrop complex, 35 to 60 percent slopes	509
992G—Whitore-Rock outcrop complex, 60 to 80 percent slopes	510
996F—Worock-Rock outcrop complex, 35 to 60 percent slopes	511
997E—Waldbillig stony ashy very fine sandy loam, 8 to 25 percent slopes	511
1021D—Maurice cobbly loam, 8 to 15 percent slopes, moderately impacted ...	512
1025D—Staad silty clay loam, 8 to 15 percent slopes, moderately impacted	512
1025F—Copenhaver, stony-Libeg, very stony-Rock outcrop complex, 15 to 60 percent slopes, moderately impacted	513
1039D—Winspect gravelly loam, 8 to 15 percent slopes, moderately impacted	514
1039E—Winspect gravelly loam, 15 to 35 percent slopes, moderately impacted	515
1039F—Winspect gravelly loam, 35 to 60 percent slopes, moderately impacted	515
1041E—Perma gravelly loam, 15 to 35 percent slopes, moderately impacted	516
1041F—Perma gravelly loam, 35 to 60 percent slopes, moderately impacted	517
1046C—Roy gravelly loam, 4 to 8 percent slopes, moderately impacted	517
1052B—Martinsdale loam, 0 to 4 percent slopes, moderately impacted	518
1052C—Martinsdale loam, 4 to 8 percent slopes, moderately impacted	518
1054C—Libeg gravelly loam, 4 to 8 percent slopes, moderately impacted	519
1054D—Libeg gravelly loam, 8 to 15 percent slopes, moderately impacted	520
1054E—Libeg gravelly loam, 15 to 35 percent slopes, moderately impacted	520
1054F—Libeg gravelly loam, 35 to 60 percent slopes, moderately impacted	521
1060E—Quigley loam, 15 to 35 percent slopes, moderately impacted	521
1076F—Tibson gravelly loam, 35 to 60 percent slopes, moderately impacted	522
1081F—Holloway gravelly ashy silt loam, 35 to 60 percent slopes, moderately impacted	523
1084F—Helmville cobbly loam, 35 to 60 percent slopes, moderately impacted	523
1096D—Worock gravelly loam, 4 to 15 percent slopes, moderately impacted	524
1096E—Worock gravelly loam, 15 to 35 percent slopes, moderately impacted	524
1096F—Worock gravelly loam, 35 to 60 percent slopes, moderately impacted	525
1110A—Carten-Wetsand complex, 0 to 2 percent slopes, moderately impacted	526
1141F—Perma gravelly loam, 35 to 60 percent slopes, severely impacted	527
1152C—Clasoil sandy loam, 4 to 8 percent slopes, moderately impacted	527
1152D—Clasoil sandy loam, 8 to 15 percent slopes, moderately impacted	528
1236B—Varney sandy clay loam, 2 to 4 percent slopes, moderately impacted	528
1236C—Varney sandy clay loam, 4 to 8 percent slopes, moderately impacted	529
1236D—Varney sandy clay loam, 8 to 15 percent slopes, moderately impacted	530
1242E—Braziel gravelly loam, 15 to 35 percent slopes, moderately impacted	530

1276D—Tibson stony loam, 2 to 15 percent slopes, moderately impacted	531
1314A—Kilgore-Foolhen-Mooseflat complex, 0 to 2 percent slopes, moderately impacted	532
1338F—Perma cobbly loam, 35 to 60 percent slopes, moderately impacted	533
1392E—Whitore cobbly loam, 15 to 35 percent slopes, moderately impacted	533
1392F—Whitore cobbly loam, 35 to 60 percent slopes, moderately impacted	534
1442E—Braziel-Tolbert complex, 15 to 35 percent slopes, moderately impacted	535
1446C—Danvers-Roy complex, 4 to 8 percent slopes, moderately impacted ...	536
1446D—Danvers-Roy complex, 8 to 15 percent slopes, moderately impacted	537
1446E—Danvers-Roy complex, 15 to 35 percent slopes, moderately impacted	538
1446F—Danvers-Roy complex, 35 to 60 percent slopes, moderately impacted	539
1454E—Libeg-Macabre-Redchief complex, 15 to 35 percent slopes, moderately impacted	540
1482E—Elve gravelly loam, dry, 15 to 35 percent slopes, moderately impacted	541
1482F—Elve gravelly loam, dry, 35 to 60 percent slopes, moderately impacted	541
1533B—Pozega silty clay loam, 0 to 4 percent slopes, moderately impacted ...	542
1537B—Truchot gravelly loam, 0 to 4 percent slopes, moderately impacted	543
1552C—Clasoil-Crackerville complex, 4 to 8 percent slopes, moderately impacted	543
1552D—Clasoil-Crackerville complex, 8 to 15 percent slopes, moderately impacted	544
1552E—Clasoil-Crackerville complex, 15 to 35 percent slopes, moderately impacted	545
1562B—Carten loam, 0 to 4 percent slopes, moderately impacted	546
1580E—Comad-Elkner complex, 15 to 35 percent slopes, moderately impacted	547
1580F—Comad-Elkner complex, 35 to 60 percent slopes, moderately impacted	547
1582D—Elve-Rock outcrop complex, 8 to 15 percent slopes, moderately impacted	548
1596E—Worock-Loberg complex, 15 to 35 percent slopes, moderately impacted	549
1634B—Blossberg loam, 0 to 4 percent slopes, moderately impacted	550
1635B—Tetonview loam, 0 to 4 percent slopes, moderately impacted	550
1637B—Poronto loam, 0 to 4 percent slopes, moderately impacted	551
1680F—Comad-Rubble land complex, 35 to 60 percent slopes, moderately impacted	552
1735B—Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded, moderately impacted	552
1752E—Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	553
1774F—Wilspring-Tolbert complex, 35 to 60 percent slopes, moderately impacted	554
1774G—Wilspring-Rubble land complex, 50 to 75 percent slopes, moderately impacted	555
1834B—Blossberg loam, 0 to 4 percent slopes, rarely flooded, moderately impacted	556

1835B—Tetonview loam, 0 to 4 percent slopes, rarely flooded, moderately impacted	556
1854E—Libeg-Monad-Copenhaver complex, 15 to 35 percent slopes, moderately impacted	557
1854F—Libeg-Monad-Copenhaver complex, 35 to 60 percent slopes, moderately impacted	558
1954E—Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	559
1954F—Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	560
1982E—Elve-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	561
1982F—Elve-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	562
1996F—Worock-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	563
1996G—Worock-Rock outcrop complex, 60 to 80 percent slopes, moderately impacted	563
5001E—Bendoh-Karloff-Eremis complex, 15 to 35 percent slopes, moderately impacted	564
5002F—Coslaw-Rock outcrop association, 15 to 60 percent slopes, severely impacted	565
5003D—Daras-Bendoh-Karloff complex, 4 to 15 percent slopes, moderately impacted	566
5005C—Liert-Mooseflat-Tibkey complex, 0 to 4 percent slopes, moderately impacted	567
5006D—Bendoh-Eremis-Karloff complex, 2 to 15 percent slopes, moderately impacted	568
5007E—Karloff-Figaro-Bendoh complex, 8 to 25 percent slopes, moderately impacted	570
5008D—Elve-Bendoh-Mooseflat complex, 4 to 25 percent slopes, moderately impacted	571
5008E—Elve-Bendoh-Mooseflat complex, 8 to 35 percent slopes, moderately impacted	572
5009E—Vitroff-Elve-Karloff complex, 8 to 35 percent slopes, moderately impacted	573
5010E—Karloff-Bendoh-Eremis complex, 8 to 35 percent slopes, moderately impacted	574
5011E—Karloff-Illiano-Rock outcrop complex, 8 to 35 percent slopes, moderately impacted	576
5011F—Karloff-Illiano-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	577
5012E—Worock-Finn-Cujob complex, 1 to 25 percent slopes, moderately impacted	578
5013F—Tibson very cobbly loam, 35 to 60 percent slopes	579
5014E—Loberg-Finn complex, 8 to 25 percent slopes	580
5016F—Illiano-Bendoh-Rock outcrop association, 35 to 70 percent slopes, moderately impacted	581
5017E—Karloff-Coslaw-Illiano association, 8 to 35 percent slopes, moderately impacted	582
5017F—Karloff-Coslaw-Illiano association, 35 to 70 percent slopes, moderately impacted	583
5019F—Illiano-Karloff-Rock outcrop complex, 35 to 70 percent slopes, moderately impacted	584

5021E—Karloff-Coslaw-Bendoh complex, 15 to 45 percent slopes, moderately impacted	586
5023E—Worock-Elve-Libeg complex, 15 to 35 percent slopes	587
5023F—Worock-Elve-Libeg complex, 35 to 60 percent slopes	588
5023G—Worock-Elve-Libeg complex, 60 to 85 percent slopes	589
5024D—Elve-Worock-Lowland complex, 4 to 15 percent slopes	590
5025E—Redfern-Copenhaver-Rock outcrop complex, 15 to 45 percent slopes	591
5025F—Copenhaver, stony-Libeg, very stony-Rock outcrop complex, 15 to 60 percent slopes	592
5026E—Elve complex, very stony, 15 to 35 percent slopes	593
5026F—Elve-Cowood complex, very stony, 35 to 60 percent slopes	594
5027F—Cowood-Elve, very stony-Rock outcrop association, 35 to 70 percent slopes	596
5028E—Bendoh-Karloff complex, 15 to 35 percent slopes	597
5028F—Bendoh-Karloff-Rock outcrop complex, 35 to 70 percent slopes	597
5029F—Karloff-Judco-Illiano complex, 35 to 70 percent slopes	598
5030F—Tepecreek-Ellena-Caseypeak complex, 35 to 60 percent slopes, very bouldery	600
5031D—Elve, stony-Karloff-Worock complex, 4 to 15 percent slopes	601
5031E—Elve, stony-Worock-Karloff complex, 15 to 35 percent slopes	602
5031F—Elve-Worock-Karloff complex, 35 to 60 percent slopes, stony	603
5032E—Karloff-Bendoh-Coslaw complex, 15 to 35 percent slopes	605
5032F—Karloff-Coslaw-Bendoh complex, 35 to 60 percent slopes	606
5033F—Illiano-Karloff-Rock outcrop complex, 25 to 70 percent slopes	607
5034E—Judco-Karloff-Rock outcrop complex, 8 to 35 percent slopes	608
5034F—Karloff-Judco-Rock outcrop complex, 35 to 60 percent slopes	609
5035E—Pax-Karloff-Illiano complex, 15 to 35 percent slopes	610
5035F—Pax-Karloff-Illiano complex, 35 to 60 percent slopes	612
5036D—Litag-Pax-Nivean complex, 4 to 15 percent slopes, moderately impacted	613
5036E—Pax-Nivean-Litag complex, 15 to 35 percent slopes, moderately impacted	614
5036F—Pax-Nivean-Litag complex, 35 to 60 percent slopes, moderately impacted	616
5037E—Macabre-Nivean-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted	617
5038F—Litag-Arlen-Rock outcrop complex, 25 to 60 percent slopes, moderately impacted	618
LDF—Landfill	619
M-W—Water, miscellaneous	619
W—Water	619
Use and Management of the Soils	621
Agronomy	623
Crops and Pasture	623
Cropland Management	623
Land Capability Classification	623
Prime Farmland and Other Important Farmland	624
Rangeland	741
Rangeland Condition	743
Rangeland Management	743
Forestland Understory Management	744
Forestland	945
Forest Resource Statistics	945

Parent Materials	946
Forestland Management and Productivity	946
Wildlife Habitat	1243
Elements of Wildlife Habitat	1243
Kinds of Wildlife Habitat	1244
Engineering	1245
Building Site Development	1246
Sanitary Facilities	1247
Agricultural Waste Management	1249
Construction Materials	1252
Water Management	1253
Soil Properties	1959
Engineering Index Properties	1959
Physical Properties	1960
Chemical Properties	1962
Water Features	1963
Soil Features	1964
References	2439
Glossary	2441

Issued 2005

Alphabetical Index to Map Units

37C	Adel loam, 2 to 8 percent slopes	256
437E	Adel-Mooseflat complex, 8 to 35 percent slopes	396
600A	Aeric Fluvaquents, 0 to 2 percent slopes	430
179E	Ambrant-Rochester complex, 15 to 35 percent slopes	343
179F	Ambrant-Rochester complex, 35 to 60 percent slopes	344
379E	Ambrant-Rochester-Rock outcrop complex, 15 to 35 percent slopes	386
379F	Ambrant-Rochester-Rock outcrop complex, 35 to 60 percent slopes	387
35B	Anaconda sandy loam, 0 to 4 percent slopes	249
935B	Anaconda sandy loam, 0 to 4 percent slopes, moderately impacted	487
235B	Anaconda sandy loam, 0 to 4 percent slopes, severely impacted	353
935E	Anaconda sandy loam, 15 to 35 percent slopes, moderately impacted	489
35C	Anaconda sandy loam, 4 to 8 percent slopes	250
935C	Anaconda sandy loam, 4 to 8 percent slopes, moderately impacted	488
35D	Anaconda sandy loam, 8 to 15 percent slopes	251
935D	Anaconda sandy loam, 8 to 15 percent slopes, moderately impacted	489
107A	Aquic Cumulic Haplustolls-Aridic Ustifluvents-Slickens complex, 0 to 2 percent slopes, severely impacted	315
300B	Arents, 1 to 4 percent slopes	370
300F	Arents, 30 to 45 percent slopes	370
800B	Aridic Ustorthents, 1 to 4 percent slopes	464
800E	Aridic Ustorthents, 15 to 35 percent slopes	466
800C	Aridic Ustorthents, 4 to 8 percent slopes	465
800D	Aridic Ustorthents, 8 to 15 percent slopes	465
400D	Aridic Ustorthents, clayey substratum, 4 to 15 percent slopes	390
840F	Arlen-Caramon-Rock outcrop complex, 15 to 60 percent slopes, severely impacted	472
840D	Arlen-Caramon-Rock outcrop complex, 8 to 15 percent slopes, severely impacted	471
66E	Bata gravelly ashy loam, 15 to 35 percent slopes	284
26C	Bearmouth gravelly loam, 2 to 8 percent slopes	243
132B	Beaverell cobbly loam, 0 to 4 percent slopes	328
432B	Beaverell cobbly loam, 0 to 4 percent slopes, moderately impacted	395
232B	Beaverell cobbly loam, 1 to 4 percent slopes, severely impacted	352
232E	Beaverell cobbly loam, 15 to 35 percent slopes, severely impacted	352
132C	Beaverell cobbly loam, 4 to 8 percent slopes	329
432C	Beaverell cobbly loam, 4 to 8 percent slopes, moderately impacted	395
332B	Beaverell loam, 0 to 4 percent slopes	372
732B	Beaverell loam, 0 to 4 percent slopes, moderately impacted	445
5006D	Bendoh-Eremis-Karloff complex, 2 to 15 percent slopes, moderately impacted	568
5028E	Bendoh-Karloff complex, 15 to 35 percent slopes	597
5001E	Bendoh-Karloff-Eremis complex, 15 to 35 percent slopes, moderately impacted	564
5028F	Bendoh-Karloff-Rock outcrop complex, 35 to 70 percent slopes	597
99E	Bignell gravelly clay loam, 15 to 35 percent slopes	311

634B Blossberg loam, 0 to 4 percent slopes	431
1634B Blossberg loam, 0 to 4 percent slopes, moderately impacted	550
834B Blossberg loam, 0 to 4 percent slopes, rarely flooded	468
1834B Blossberg loam, 0 to 4 percent slopes, rarely flooded, moderately impacted	556
242E Braziel gravelly loam, 15 to 35 percent slopes	358
1242E Braziel gravelly loam, 15 to 35 percent slopes, moderately impacted	530
242D Braziel gravelly loam, 8 to 15 percent slopes	357
442E Braziel-Tolbert complex, 15 to 35 percent slopes	397
1442E Braziel-Tolbert complex, 15 to 35 percent slopes, moderately impacted	535
442F Braziel-Tolbert complex, 35 to 60 percent slopes	398
47E Bridger cobbly loam, 15 to 35 percent slopes	266
47C Bridger cobbly loam, 2 to 8 percent slopes	265
47D Bridger cobbly loam, 8 to 15 percent slopes	265
933E Burrfoot-Nivean complex, 15 to 35 percent slopes, moderately impacted	486
632B Bushong loam, 0 to 4 percent slopes	431
888E Caramon ashy loam, 15 to 35 percent slopes, moderately impacted	480
562B Carten loam, 0 to 4 percent slopes	421
1562B Carten loam, 0 to 4 percent slopes, moderately impacted	546
110A Carten-Wetsand complex, 0 to 2 percent slopes	317
1110A Carten-Wetsand complex, 0 to 2 percent slopes, moderately impacted	526
34B Cetrack loam, 0 to 4 percent slopes	249
934B Cetrack loam, 0 to 4 percent slopes, moderately impacted	487
134C Cetrack loam, 4 to 8 percent slopes, severely impacted	329
152C Clasoil sandy loam, 4 to 8 percent slopes	339
1152C Clasoil sandy loam, 4 to 8 percent slopes, moderately impacted	527
152D Clasoil sandy loam, 8 to 15 percent slopes	340
1152D Clasoil sandy loam, 8 to 15 percent slopes, moderately impacted	528
552E Clasoil-Crackerville complex, 15 to 35 percent slopes	416
1552E Clasoil-Crackerville complex, 15 to 35 percent slopes, moderately impacted	545
552F Clasoil-Crackerville complex, 35 to 60 percent slopes	417
552C Clasoil-Crackerville complex, 4 to 8 percent slopes	414
1552C Clasoil-Crackerville complex, 4 to 8 percent slopes, moderately impacted	543
552D Clasoil-Crackerville complex, 8 to 15 percent slopes	415
1552D Clasoil-Crackerville complex, 8 to 15 percent slopes, moderately impacted	544
1752E Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	553
752E Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes	452
752D Clasoil-Crackerville-Rock outcrop complex, 8 to 15 percent slopes	451
580E Comad-Elkner complex, 15 to 35 percent slopes	423
1580E Comad-Elkner complex, 15 to 35 percent slopes, moderately impacted	547
580F Comad-Elkner complex, 35 to 60 percent slopes	424
1580F Comad-Elkner complex, 35 to 60 percent slopes, moderately impacted	547
580D Comad-Elkner complex, 8 to 15 percent slopes	422
280E Comad-Elkner-Rock outcrop complex, 15 to 35 percent slopes	364
280F Comad-Elkner-Rock outcrop complex, 35 to 60 percent slopes	365
680E Comad-Rubble land complex, 15 to 35 percent slopes	436

680F	Comad-Rubble land complex, 35 to 60 percent slopes	437
1680F	Comad-Rubble land complex, 35 to 60 percent slopes, moderately impacted	552
24B	Con loam, 0 to 4 percent slopes	240
724B	Con loam, 0 to 4 percent slopes, moderately impacted	444
24C	Con loam, 4 to 8 percent slopes	241
724C	Con loam, 4 to 8 percent slopes, moderately impacted	444
24D	Con loam, 8 to 15 percent slopes	241
724D	Con loam, 8 to 15 percent slopes, moderately impacted	445
824E	Con-Sixbeacon cobbly loams, 15 to 35 percent slopes	466
924E	Con-Sixbeacon cobbly loams, 15 to 35 percent slopes, moderately impacted	484
824F	Con-Sixbeacon cobbly loams, 35 to 60 percent slopes	467
1025F	Copenhaver, stony-Libeg, very stony-Rock outcrop complex, 15 to 60 percent slopes, moderately impacted	513
5025F	Copenhaver, stony-Libeg, very stony-Rock outcrop complex, 15 to 60 percent slopes	592
5002F	Coslaw-Rock outcrop association, 15 to 60 percent slopes, severely impacted	565
5027F	Cowood-Elve, very stony-Rock outcrop association, 35 to 70 percent slopes	596
87E	Danaher loam, 15 to 35 percent slopes	300
87D	Danaher loam, 4 to 15 percent slopes	300
387E	Danaher-Loberg complex, 15 to 35 percent slopes	387
8B	Danielvil loam, 2 to 4 percent slopes	234
49E	Danvers clay loam, 15 to 35 percent slopes	269
49B	Danvers clay loam, 2 to 4 percent slopes	268
1446E	Danvers-Roy complex, 15 to 35 percent slopes, moderately impacted	538
646B	Danvers-Roy complex, 2 to 4 percent slopes, moderately impacted	434
1446F	Danvers-Roy complex, 35 to 60 percent slopes, moderately impacted	539
1446C	Danvers-Roy complex, 4 to 8 percent slopes, moderately impacted	536
1446D	Danvers-Roy complex, 8 to 15 percent slopes, moderately impacted	537
5003D	Daras-Bendoh-Karloff complex, 4 to 15 percent slopes, moderately impacted	566
2A	Dougcliff mucky peat, 0 to 2 percent slopes	232
20A	Dougcliff mucky peat, 0 to 2 percent slopes, moderately impacted	236
686A	Dougcliff mucky peat, loamy substratum, 0 to 2 percent slopes	439
103	Dumps, mine	313
15A	Dunkleber mucky peat, 0 to 2 percent slopes	235
116A	Eine-Nana complex, 0 to 2 percent slopes	318
6B	Elliston loam, 0 to 2 percent slopes	234
682F	Elve bouldery sandy loam, 25 to 50 percent slopes	438
682E	Elve bouldery sandy loam, 4 to 25 percent slopes	438
5026E	Elve complex, very stony, 15 to 35 percent slopes	593
82E	Elve gravelly loam, 15 to 35 percent slopes	292
282E	Elve gravelly loam, 15 to 35 percent slopes, moderately impacted	367
82F	Elve gravelly loam, 35 to 60 percent slopes	293
282F	Elve gravelly loam, 35 to 60 percent slopes, moderately impacted	367
82D	Elve gravelly loam, 4 to 15 percent slopes	292
82G	Elve gravelly loam, 60 to 80 percent slopes	293
282G	Elve gravelly loam, 60 to 85 percent slopes, moderately impacted	368
282D	Elve gravelly loam, 8 to 15 percent slopes, moderately impacted	366
482E	Elve gravelly loam, dry, 15 to 35 percent slopes	403
1482E	Elve gravelly loam, dry, 15 to 35 percent slopes, moderately impacted	541

482F	Elve gravelly loam, dry, 35 to 60 percent slopes	404
1482F	Elve gravelly loam, dry, 35 to 60 percent slopes, moderately impacted	541
182F	Elve very cobbly loam, 35 to 60 percent slopes	345
5031D	Elve, stony-Karloff-Worock complex, 4 to 15 percent slopes	601
5031E	Elve, stony-Worock-Karloff complex, 15 to 35 percent slopes	602
5008D	Elve-Bendoh-Mooseflat complex, 4 to 25 percent slopes, moderately impacted.....	571
5008E	Elve-Bendoh-Mooseflat complex, 8 to 35 percent slopes, moderately impacted.....	572
5026F	Elve-Cowood complex, very stony, 35 to 60 percent slopes	594
982E	Elve-Rock outcrop complex, 15 to 35 percent slopes	506
1982E	Elve-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted.....	561
982F	Elve-Rock outcrop complex, 35 to 60 percent slopes	507
1982F	Elve-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted.....	562
982G	Elve-Rock outcrop complex, 60 to 80 percent slopes	507
582D	Elve-Rock outcrop complex, 8 to 15 percent slopes	424
1582D	Elve-Rock outcrop complex, 8 to 15 percent slopes, moderately impacted.....	548
5031F	Elve-Worock-Karloff complex, 35 to 60 percent slopes, stony	603
5024D	Elve-Worock-Lowland complex, 4 to 15 percent slopes	590
97E	Evaro gravelly ashy loam, 15 to 35 percent slopes	310
97F	Evaro gravelly ashy loam, 35 to 60 percent slopes	310
97C	Evaro gravelly ashy loam, 4 to 8 percent slopes	309
97D	Evaro gravelly ashy loam, 8 to 15 percent slopes	309
597E	Evaro gravelly ashy loam, cold, 15 to 35 percent slopes	428
597F	Evaro gravelly ashy loam, cold, 35 to 60 percent slopes	429
597D	Evaro gravelly ashy loam, cold, 8 to 15 percent slopes	428
897E	Evaro gravelly ashy loam, moist, 8 to 25 percent slopes	481
782E	Evaro stony ashy loam, 15 to 35 percent slopes	458
782F	Evaro stony ashy loam, 35 to 60 percent slopes	459
782D	Evaro stony ashy loam, 4 to 15 percent slopes	458
20B	Eyebrow gravelly loam, 2 to 4 percent slopes	237
20C	Eyebrow gravelly loam, 4 to 8 percent slopes	237
120C	Eyebrow-Donald cobbly loams, 4 to 8 percent slopes	320
120D	Eyebrow-Donald cobbly loams, 8 to 15 percent slopes	321
120E	Eyebrow-Donald complex, 15 to 35 percent slopes	322
576B	Finn gravelly loam, dry, 0 to 4 percent slopes	421
676B	Finn loam, 0 to 4 percent slopes	435
776B	Finn-Water complex, 0 to 4 percent slopes	457
104A	Fluvaquentic Endoaquolls-Slickens complex, 0 to 2 percent slopes, severely impacted	313
3B	Foolhen loam, 0 to 4 percent slopes	233
903B	Foolhen loam, 0 to 4 percent slopes, rarely flooded	482
3C	Foolhen loam, 4 to 8 percent slopes	233
214A	Foolhen-Mooseflat-Water complex, 0 to 2 percent slopes	349
509B	Gregson fine sandy loam, 0 to 4 percent slopes, moderately impacted	408
544B	Gregson loam, 0 to 4 percent slopes.....	411
75E	Hanson gravelly loam, 15 to 35 percent slopes	285
75F	Hanson gravelly loam, 35 to 60 percent slopes	286
275F	Hanson stony loam, 35 to 60 percent slopes	363
975F	Hanson-Rock outcrop complex, 35 to 60 percent slopes	503
84E	Helmville cobbly loam, 15 to 35 percent slopes	295

84C	Helmville cobbly loam, 2 to 8 percent slopes	294
84F	Helmville cobbly loam, 35 to 60 percent slopes	296
1084F	Helmville cobbly loam, 35 to 60 percent slopes, moderately impacted	523
84D	Helmville cobbly loam, 8 to 15 percent slopes	294
81E	Holloway gravelly ashy silt loam, 15 to 35 percent slopes	291
81F	Holloway gravelly ashy silt loam, 35 to 60 percent slopes	291
1081F	Holloway gravelly ashy silt loam, 35 to 60 percent slopes, moderately impacted	523
5016F	Illiano-Bendoh-Rock outcrop association, 35 to 70 percent slopes, moderately impacted	581
5033F	Illiano-Karloff-Rock outcrop complex, 25 to 70 percent slopes	607
5019F	Illiano-Karloff-Rock outcrop complex, 35 to 70 percent slopes, moderately impacted	584
922E	Judco gravelly ashy sandy clay loam, 15 to 35 percent slopes, moderately impacted	483
5034E	Judco-Karloff-Rock outcrop complex, 8 to 35 percent slopes	608
127D	Julius clay loam, 8 to 15 percent slopes, severely impacted	324
227E	Julius-Tolbert complex, 15 to 35 percent slopes, moderately impacted	350
889E	Karloff ashy loam, 15 to 35 percent slopes	481
865F	Karloff gravelly ashy sandy loam, 35 to 60 percent slopes, moderately impacted	477
5032E	Karloff-Bendoh-Coslaw complex, 15 to 35 percent slopes	605
5010E	Karloff-Bendoh-Eremis complex, 8 to 35 percent slopes, moderately impacted	574
5021E	Karloff-Coslaw-Bendoh complex, 15 to 45 percent slopes, moderately impacted	586
5032F	Karloff-Coslaw-Bendoh complex, 35 to 60 percent slopes	606
5017F	Karloff-Coslaw-Illiano association, 35 to 70 percent slopes, moderately impacted	583
5017E	Karloff-Coslaw-Illiano association, 8 to 35 percent slopes, moderately impacted	582
5007E	Karloff-Figaro-Bendoh complex, 8 to 25 percent slopes, moderately impacted	570
5011F	Karloff-Illiano-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	577
5011E	Karloff-Illiano-Rock outcrop complex, 8 to 35 percent slopes, moderately impacted	576
5029F	Karloff-Judco-Illiano complex, 35 to 70 percent slopes	598
5034F	Karloff-Judco-Rock outcrop complex, 35 to 60 percent slopes	609
314A	Kilgore-Foolhen-Mooseflat complex, 0 to 2 percent slopes	371
1314A	Kilgore-Foolhen-Mooseflat complex, 0 to 2 percent slopes, moderately impacted	532
914A	Kilgore-Mooseflat complex, 0 to 2 percent slopes	482
414A	Kilgore-Mooseflat-Water complex, 0 to 2 percent slopes	391
557B	Kleinschmidt gravelly loam, 0 to 4 percent slopes	420
547B	Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes	412
LDF	Landfill	619
938D	Lap-Windham loams, 4 to 15 percent slopes, very stony, moderately impacted	492
5005C	Liart-Mooseflat-Tibkey complex, 0 to 4 percent slopes, moderately impacted	567
154E	Libeg cobbly loam, 15 to 35 percent slopes	340
154F	Libeg cobbly loam, 35 to 60 percent slopes	341
54E	Libeg gravelly loam, 15 to 35 percent slopes	278

1054E	Libeg gravelly loam, 15 to 35 percent slopes, moderately impacted	520
54B	Libeg gravelly loam, 2 to 4 percent slopes	276
54F	Libeg gravelly loam, 35 to 60 percent slopes	278
1054F	Libeg gravelly loam, 35 to 60 percent slopes, moderately impacted	521
54C	Libeg gravelly loam, 4 to 8 percent slopes	276
1054C	Libeg gravelly loam, 4 to 8 percent slopes, moderately impacted	519
54D	Libeg gravelly loam, 8 to 15 percent slopes	277
1054D	Libeg gravelly loam, 8 to 15 percent slopes, moderately impacted	520
254E	Libeg stony loam, 15 to 35 percent slopes	362
254F	Libeg stony loam, 35 to 60 percent slopes	363
954E	Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes	498
1954E	Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted.....	559
954F	Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes	499
1954F	Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted.....	560
454E	Libeg-Macabre-Redchief complex, 15 to 35 percent slopes	401
1454E	Libeg-Macabre-Redchief complex, 15 to 35 percent slopes, moderately impacted.....	540
454F	Libeg-Macabre-Redchief complex, 35 to 60 percent slopes	402
454D	Libeg-Macabre-Redchief complex, 8 to 15 percent slopes	400
854E	Libeg-Monad-Copenhaver complex, 15 to 35 percent slopes	474
1854E	Libeg-Monad-Copenhaver complex, 15 to 35 percent slopes, moderately impacted.....	557
854F	Libeg-Monad-Copenhaver complex, 35 to 60 percent slopes	475
1854F	Libeg-Monad-Copenhaver complex, 35 to 60 percent slopes, moderately impacted.....	558
354E	Libeg-Redchief complex, 15 to 35 percent slopes	384
354D	Libeg-Redchief complex, 8 to 15 percent slopes	383
5038F	Litag-Arlen-Rock outcrop complex, 25 to 60 percent slopes, moderately impacted.....	618
5036D	Litag-Pax-Nivean complex, 4 to 15 percent slopes, moderately impacted.....	613
85E	Loberg gravelly loam, 15 to 35 percent slopes	297
85F	Loberg gravelly loam, 35 to 60 percent slopes	297
85D	Loberg gravelly loam, 4 to 15 percent slopes	296
5014E	Loberg-Finn complex, 8 to 25 percent slopes	580
22E	Lolon gravelly loam, 4 to 25 percent slopes, bouldery	239
966E	Macabre-Arlen complex, 15 to 35 percent slopes, severely impacted	502
966D	Macabre-Arlen complex, 8 to 15 percent slopes, severely impacted	501
5037E	Macabre-Nivean-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted.....	617
55E	Maciver gravelly loam, 15 to 35 percent slopes, moderately impacted	279
55D	Maciver gravelly loam, 8 to 15 percent slopes, moderately impacted	279
16B	Maciver loam, 2 to 4 percent slopes	235
645A	Mannixlee clay loam, 0 to 2 percent slopes, moderately impacted	433
855A	Mannixlee-Blossberg complex, 0 to 2 percent slopes	476
549B	Marcott silty clay loam, 0 to 4 percent slopes, moderately impacted	413
352E	Martinsdale cobbly loam, 15 to 35 percent slopes	382
352F	Martinsdale cobbly loam, 35 to 60 percent slopes	383
352C	Martinsdale cobbly loam, 4 to 8 percent slopes	381
352D	Martinsdale cobbly loam, 8 to 15 percent slopes	381
52B	Martinsdale loam, 0 to 4 percent slopes	273
1052B	Martinsdale loam, 0 to 4 percent slopes, moderately impacted	518

52E	Martinsdale loam, 15 to 35 percent slopes	275
52C	Martinsdale loam, 4 to 8 percent slopes	274
1052C	Martinsdale loam, 4 to 8 percent slopes, moderately impacted	518
52D	Martinsdale loam, 8 to 15 percent slopes	275
21E	Maurice cobbly loam, 15 to 35 percent slopes	239
21D	Maurice cobbly loam, 8 to 15 percent slopes	238
1021D	Maurice cobbly loam, 8 to 15 percent slopes, moderately impacted	512
21C	Maurice loam, 2 to 8 percent slopes	238
121B	Maurice-Danielvil complex, 2 to 4 percent slopes	323
958F	Mishakal loam, 35 to 60 percent slopes	500
758F	Mishakal-Tolbert complex, 35 to 60 percent slopes, moderately impacted	454
391F	Mohaggin bouldery ashy very fine sandy loam, 35 to 60 percent slopes	388
91E	Mohaggin stony ashy very fine sandy loam, 15 to 35 percent slopes	302
91F	Mohaggin stony ashy very fine sandy loam, 35 to 60 percent slopes	302
91D	Mohaggin stony ashy very fine sandy loam, 8 to 15 percent slopes	301
791E	Mohaggin-Rubble land complex, 15 to 35 percent slopes	461
791F	Mohaggin-Rubble land complex, 35 to 60 percent slopes	461
791G	Mohaggin-Rubble land complex, 60 to 80 percent slopes	462
791D	Mohaggin-Rubble land complex, 8 to 15 percent slopes	460
148C	Mollet cobbly loam, 2 to 8 percent slopes	336
148D	Mollet cobbly loam, 8 to 15 percent slopes	337
48E	Mollet loam, 15 to 35 percent slopes	268
48C	Mollet loam, 2 to 8 percent slopes	266
48D	Mollet loam, 8 to 15 percent slopes	267
50C	Monad loam, 2 to 8 percent slopes	269
50D	Monad loam, 8 to 15 percent slopes	270
114A	Mooseflat loam, 0 to 2 percent slopes	317
514A	Mooseflat-Foolhen complex, 0 to 2 percent slopes	408
714F	Mooseflat-Mohaggin complex, 25 to 60 percent slopes	443
714E	Mooseflat-Mohaggin complex, 4 to 25 percent slopes	442
5035E	Pax-Karloff-Illiano complex, 15 to 35 percent slopes	610
5035F	Pax-Karloff-Illiano complex, 35 to 60 percent slopes	612
5036E	Pax-Nivean-Litag complex, 15 to 35 percent slopes, moderately impacted	614
5036F	Pax-Nivean-Litag complex, 35 to 60 percent slopes, moderately impacted	616
438B	Perma cobbly loam, 2 to 4 percent slopes, moderately impacted	397
1338F	Perma cobbly loam, 35 to 60 percent slopes, moderately impacted	533
338C	Perma cobbly loam, 4 to 8 percent slopes	376
1041E	Perma gravelly loam, 15 to 35 percent slopes, moderately impacted	516
41F	Perma gravelly loam, 35 to 60 percent slopes	258
1041F	Perma gravelly loam, 35 to 60 percent slopes, moderately impacted	517
1141F	Perma gravelly loam, 35 to 60 percent slopes, severely impacted	527
41C	Perma gravelly loam, 4 to 8 percent slopes	257
41D	Perma gravelly loam, 8 to 15 percent slopes	257
68E	Phillcher gravelly ashy silt loam, 15 to 45 percent slopes	285
68D	Phillcher gravelly ashy silt loam, 4 to 15 percent slopes	284
882E	Phillcher-Rock outcrop complex, 15 to 35 percent slopes	478
882F	Phillcher-Rock outcrop complex, 35 to 60 percent slopes	479
882G	Phillcher-Rock outcrop complex, 60 to 80 percent slopes	479
102	Pits, gravel	312
637B	Poronto loam, 0 to 4 percent slopes	433

1637B	Poronto loam, 0 to 4 percent slopes, moderately impacted	551
837B	Poronto loam, 0 to 4 percent slopes, rarely flooded	469
533B	Pozega silty clay loam, 0 to 4 percent slopes	409
1533B	Pozega silty clay loam, 0 to 4 percent slopes, moderately impacted	542
30E	Quigg loam, 15 to 35 percent slopes	245
30C	Quigg loam, 2 to 8 percent slopes	243
30D	Quigg loam, 8 to 15 percent slopes	244
230E	Quigg-Libeg complex, 15 to 35 percent slopes	351
430E	Quigg-Mollet complex, 15 to 35 percent slopes	394
430C	Quigg-Mollet complex, 2 to 8 percent slopes	392
430D	Quigg-Mollet complex, 8 to 15 percent slopes	393
1060E	Quigley loam, 15 to 35 percent slopes, moderately impacted	521
60B	Quigley loam, 2 to 4 percent slopes	282
60C	Quigley loam, 4 to 8 percent slopes	282
60D	Quigley loam, 8 to 15 percent slopes	283
45E	Redchief cobbly loam, 15 to 35 percent slopes	260
45B	Redchief cobbly loam, 2 to 4 percent slopes	259
45F	Redchief cobbly loam, 35 to 60 percent slopes	261
45C	Redchief cobbly loam, 4 to 8 percent slopes	259
45D	Redchief cobbly loam, 8 to 15 percent slopes	260
753E	Redchief-Copenhaver gravelly loams, 15 to 35 percent slopes, moderately impacted	453
554E	Redchief-Macabre-Libeg complex, 15 to 35 percent slopes	418
554F	Redchief-Macabre-Libeg complex, 35 to 60 percent slopes	419
245D	Redchief-Mollet bouldery loams, 4 to 15 percent slopes	359
145E	Redchief-Mollet complex, 15 to 35 percent slopes	335
145C	Redchief-Mollet complex, 4 to 8 percent slopes	333
145D	Redchief-Mollet complex, 8 to 15 percent slopes	334
345F	Redchief-Tibson complex, 35 to 60 percent slopes	378
5025E	Redfern-Copenhaver-Rock outcrop complex, 15 to 45 percent slopes	591
185E	Relyea-Helmville complex, 15 to 35 percent slopes	346
680G	Rock outcrop-Comad complex, 45 to 80 percent slopes	437
46E	Roy gravelly loam, 15 to 35 percent slopes	263
246E	Roy gravelly loam, 15 to 35 percent slopes, moderately impacted	360
46B	Roy gravelly loam, 2 to 4 percent slopes	262
46F	Roy gravelly loam, 35 to 60 percent slopes	264
46C	Roy gravelly loam, 4 to 8 percent slopes	262
1046C	Roy gravelly loam, 4 to 8 percent slopes, moderately impacted	517
46D	Roy gravelly loam, 8 to 15 percent slopes	263
246D	Roy gravelly loam, 8 to 15 percent slopes, moderately impacted	360
351E	Roy-Shawmut-Danvers complex, 15 to 35 percent slopes	379
351F	Roy-Shawmut-Danvers complex, 35 to 60 percent slopes	380
951F	Roy-Shawmut-Danvers complex, 35 to 60 percent slopes, moderately impacted	497
846F	Roy-Tolbert complex, 35 to 60 percent slopes	473
946E	Roy-Tolbert-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted	495
946F	Roy-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted	496
100	Rubble land-Rock outcrop complex	312
78E	Rumsey gravelly ashy silt loam, 15 to 35 percent slopes	290
78D	Rumsey gravelly ashy silt loam, 8 to 15 percent slopes	289
545B	Saypo loam, 0 to 4 percent slopes	412
945B	Saypo loam, 0 to 4 percent slopes, moderately impacted	495

535B	Saypo loam, cool, 0 to 4 percent slopes	410
151E	Shawmut cobbly loam, 15 to 35 percent slopes	338
151F	Shawmut cobbly loam, 35 to 60 percent slopes	338
151D	Shawmut cobbly loam, 8 to 15 percent slopes	337
551F	Shawmut extremely bouldery loam, 8 to 50 percent slopes	413
51E	Shawmut gravelly loam, 15 to 35 percent slopes	272
751E	Shawmut gravelly loam, 15 to 35 percent slopes, moderately impacted.....	451
51B	Shawmut gravelly loam, 2 to 4 percent slopes	270
51F	Shawmut gravelly loam, 35 to 60 percent slopes	273
51C	Shawmut gravelly loam, 4 to 8 percent slopes	271
751C	Shawmut gravelly loam, 4 to 8 percent slopes, moderately impacted	450
51D	Shawmut gravelly loam, 8 to 15 percent slopes	272
751D	Shawmut gravelly loam, 8 to 15 percent slopes, moderately impacted	450
251D	Shawmut stony loam, 0 to 15 percent slopes	361
251E	Shawmut stony loam, 15 to 35 percent slopes	361
451E	Shawmut very bouldery loam, 8 to 25 percent slopes	399
599D	Silverchief-Trapps complex, 8 to 15 percent slopes	429
137B	Sixbeacon cobbly loam, 0 to 4 percent slopes	332
937B	Sixbeacon cobbly loam, 0 to 4 percent slopes, moderately impacted	490
137C	Sixbeacon cobbly loam, 4 to 8 percent slopes	332
937C	Sixbeacon cobbly loam, 4 to 8 percent slopes, moderately impacted	490
137D	Sixbeacon cobbly loam, 8 to 15 percent slopes	333
937D	Sixbeacon cobbly loam, 8 to 15 percent slopes, moderately impacted	491
337B	Sixbeacon fine sandy loam, 1 to 4 percent slopes, severely impacted	375
337C	Sixbeacon fine sandy loam, 4 to 8 percent slopes, severely impacted	375
237B	Sixbeacon gravelly loam, 0 to 4 percent slopes	356
737B	Sixbeacon gravelly loam, 0 to 4 percent slopes, moderately impacted	447
237C	Sixbeacon gravelly loam, 4 to 8 percent slopes	356
737C	Sixbeacon gravelly loam, 4 to 8 percent slopes, moderately impacted	448
237D	Sixbeacon gravelly loam, 8 to 15 percent slopes	357
737D	Sixbeacon gravelly loam, 8 to 15 percent slopes, moderately impacted.....	448
106	Slickens	314
108A	Slickens-Aridic Ustifluvents-Aquic Cumulic Haplustolls complex, 0 to 2 percent slopes, severely impacted	316
105A	Slickens-Fluvaquentic Endoaquolls complex, 0 to 2 percent slopes, severely impacted	314
25B	Staad silty clay loam, 0 to 4 percent slopes	242
25D	Staad silty clay loam, 8 to 15 percent slopes	242
1025D	Staad silty clay loam, 8 to 15 percent slopes, moderately impacted	512
32E	Sula-Shook complex, 15 to 35 percent slopes	247
32F	Sula-Shook complex, 35 to 60 percent slopes	248
932F	Sula-Shook-Rock outcrop complex, 35 to 60 percent slopes	485
5030F	Tepecreek-Ellena-Caseypeak complex, 35 to 60 percent slopes, very bouldery	600
635B	Tetonview loam, 0 to 4 percent slopes.....	432
1635B	Tetonview loam, 0 to 4 percent slopes, moderately impacted	550
835B	Tetonview loam, 0 to 4 percent slopes, rarely flooded	469
1835B	Tetonview loam, 0 to 4 percent slopes, rarely flooded, moderately impacted.....	556
735B	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded	446
1735B	Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded, moderately impacted.....	552

335B	Tetonview-Blossberg-Poronto complex, 0 to 4 percent slopes, rarely flooded	373
59E	Tewfel-Hackney complex, 15 to 35 percent slopes	281
59D	Tewfel-Hackney complex, 4 to 15 percent slopes	280
76E	Tibson gravelly loam, 15 to 35 percent slopes	288
76B	Tibson gravelly loam, 2 to 4 percent slopes	286
76F	Tibson gravelly loam, 35 to 60 percent slopes	289
1076F	Tibson gravelly loam, 35 to 60 percent slopes, moderately impacted	522
76C	Tibson gravelly loam, 4 to 8 percent slopes	287
76D	Tibson gravelly loam, 8 to 15 percent slopes	288
276D	Tibson stony loam, 2 to 15 percent slopes	364
1276D	Tibson stony loam, 2 to 15 percent slopes, moderately impacted	531
5013F	Tibson very cobbly loam, 35 to 60 percent slopes	579
376E	Tibson very stony loam, 8 to 25 percent slopes	385
176F	Tibson-Levengood gravelly loams, 35 to 60 percent slopes	342
176D	Tibson-Levengood gravelly loams, 8 to 15 percent slopes	341
739E	Tolbert-Wilsping-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted.....	449
98F	Trapps gravelly loam, 35 to 60 percent slopes	311
198E	Trapps-Yreka stony loams, 8 to 25 percent slopes	348
537B	Truchot gravelly loam, 0 to 4 percent slopes	410
1537B	Truchot gravelly loam, 0 to 4 percent slopes, moderately impacted	543
649B	Turrah silty clay loam, 0 to 4 percent slopes.....	435
31B	Varney clay loam, 0 to 4 percent slopes, moderately impacted	245
31C	Varney clay loam, 4 to 8 percent slopes	246
31D	Varney clay loam, 8 to 15 percent slopes	246
131E	Varney cobbly clay loam, 15 to 35 percent slopes	327
131F	Varney cobbly clay loam, 35 to 50 percent slopes	328
131C	Varney cobbly clay loam, 4 to 8 percent slopes	326
131D	Varney cobbly clay loam, 8 to 15 percent slopes	327
236E	Varney sandy clay loam, 15 to 35 percent slopes	355
236B	Varney sandy clay loam, 2 to 4 percent slopes	353
1236B	Varney sandy clay loam, 2 to 4 percent slopes, moderately impacted	528
236C	Varney sandy clay loam, 4 to 8 percent slopes	354
1236C	Varney sandy clay loam, 4 to 8 percent slopes, moderately impacted	529
236D	Varney sandy clay loam, 8 to 15 percent slopes	354
1236D	Varney sandy clay loam, 8 to 15 percent slopes, moderately impacted	530
336B	Varney-Anaconda loams, 0 to 4 percent slopes, moderately impacted	374
136E	Varney-Con complex, 15 to 35 percent slopes.....	330
136F	Varney-Con complex, 35 to 60 percent slopes.....	331
36B	Varney-Con loams, 0 to 4 percent slopes.....	251
36E	Varney-Con loams, 15 to 35 percent slopes, moderately impacted.....	254
36F	Varney-Con loams, 35 to 60 percent slopes	255
36C	Varney-Con loams, 4 to 8 percent slopes.....	252
36D	Varney-Con loams, 8 to 15 percent slopes.....	253
5009E	Vitroff-Elve-Karloff complex, 8 to 35 percent slopes, moderately impacted.....	573
497C	Waldbillig gravelly ashy loam, 2 to 8 percent slopes	407
497E	Waldbillig gravelly ashy loam, 8 to 25 percent slopes	407
997E	Waldbillig stony ashy very fine sandy loam, 8 to 25 percent slopes	511
797F	Waldbillig-Elve complex, 25 to 50 percent slopes	463
797E	Waldbillig-Elve complex, 8 to 25 percent slopes	463
697E	Waldbillig-Mooseflat complex, 4 to 25 percent slopes	441
W	Water	619

M-W	Water, miscellaneous	619
88F	Whitcow gravelly loam, 35 to 60 percent slopes	301
988F	Whitcow-Rock outcrop complex, 35 to 60 percent slopes	508
392E	Whitore cobbly loam, 15 to 35 percent slopes	389
1392E	Whitore cobbly loam, 15 to 35 percent slopes, moderately impacted	533
392F	Whitore cobbly loam, 35 to 60 percent slopes	389
1392F	Whitore cobbly loam, 35 to 60 percent slopes, moderately impacted	534
192E	Whitore gravelly clay loam, 15 to 35 percent slopes	347
92E	Whitore gravelly loam, 15 to 35 percent slopes	304
92C	Whitore gravelly loam, 2 to 8 percent slopes	303
92F	Whitore gravelly loam, 35 to 60 percent slopes	305
92D	Whitore gravelly loam, 8 to 15 percent slopes	304
592E	Whitore gravelly loam, cold, 15 to 35 percent slopes	425
592F	Whitore gravelly loam, cold, 35 to 60 percent slopes	426
592G	Whitore gravelly loam, cold, 60 to 80 percent slopes	426
492E	Whitore, dry-Rock outcrop complex, 15 to 35 percent slopes	405
492F	Whitore, dry-Rock outcrop complex, 35 to 60 percent slopes	405
492G	Whitore, dry-Rock outcrop complex, 60 to 80 percent slopes	406
992E	Whitore-Rock outcrop complex, 15 to 35 percent slopes	509
992F	Whitore-Rock outcrop complex, 35 to 60 percent slopes	509
992G	Whitore-Rock outcrop complex, 60 to 80 percent slopes	510
774G	Wilspring-Rubble land complex, 50 to 75 percent slopes	456
1774G	Wilspring-Rubble land complex, 50 to 75 percent slopes, moderately impacted	555
774F	Wilspring-Tolbert complex, 35 to 60 percent slopes	455
1774F	Wilspring-Tolbert complex, 35 to 60 percent slopes, moderately impacted	554
129E	Wimper-Winspect complex, 15 to 35 percent slopes	325
129C	Wimper-Winspect complex, 4 to 8 percent slopes	324
939F	Windham-Lap-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted	493
839F	Windham-Lap-Rock outcrop complex, 35 to 60 percent slopes	470
86E	Winkler gravelly loam, 15 to 35 percent slopes	298
86F	Winkler gravelly loam, 35 to 60 percent slopes	299
86D	Winkler gravelly loam, 8 to 15 percent slopes	298
786E	Winkler gravelly loam, cool, 15 to 35 percent slopes	459
339E	Winspect cobbly loam, 15 to 35 percent slopes	376
339F	Winspect cobbly loam, 35 to 60 percent slopes	377
39E	Winspect gravelly loam, 15 to 35 percent slopes	256
1039E	Winspect gravelly loam, 15 to 35 percent slopes, moderately impacted ...	515
1039F	Winspect gravelly loam, 35 to 60 percent slopes, moderately impacted ...	515
1039D	Winspect gravelly loam, 8 to 15 percent slopes, moderately impacted	514
977E	Work-Julius-Arlen complex, 15 to 35 percent slopes, severely impacted	504
977F	Work-Julius-Arlen complex, 35 to 60 percent slopes, severely impacted	505
944F	Work-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, severely impacted	494
96E	Worock gravelly loam, 15 to 35 percent slopes	307
1096E	Worock gravelly loam, 15 to 35 percent slopes, moderately impacted	524
96F	Worock gravelly loam, 35 to 60 percent slopes	308
1096F	Worock gravelly loam, 35 to 60 percent slopes, moderately impacted	525
96D	Worock gravelly loam, 4 to 15 percent slopes	307
1096D	Worock gravelly loam, 4 to 15 percent slopes, moderately impacted	524

696E	Worock gravelly loam, dry, 15 to 35 percent slopes	440
696F	Worock gravelly loam, dry, 35 to 60 percent slopes	440
5023E	Worock-Elve-Libeg complex, 15 to 35 percent slopes	587
5023F	Worock-Elve-Libeg complex, 35 to 60 percent slopes	588
5023G	Worock-Elve-Libeg complex, 60 to 85 percent slopes	589
296E	Worock-Elve-Whitore stony loams, 15 to 35 percent slopes	369
5012E	Worock-Finn-Cujob complex, 1 to 25 percent slopes, moderately impacted.....	578
596E	Worock-Loberg complex, 15 to 35 percent slopes	427
1596E	Worock-Loberg complex, 15 to 35 percent slopes, moderately impacted.....	549
996F	Worock-Rock outcrop complex, 35 to 60 percent slopes	511
1996F	Worock-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted.....	563
1996G	Worock-Rock outcrop complex, 60 to 80 percent slopes, moderately impacted.....	563
95E	Yreka gravelly loam, 15 to 35 percent slopes	306
95F	Yreka gravelly loam, 35 to 60 percent slopes	306
95D	Yreka gravelly loam, 8 to 15 percent slopes	305
195E	Yreka gravelly loam, cool, 15 to 35 percent slopes	347
117A	Zelda-Nana-Foolhen complex, 0 to 2 percent slopes	319

Summary of Tables

Temperature and Precipitation	15
Freeze Dates in Spring and Fall.....	16
Growing Season	17

For tables with the most current data, please visit the
Soil Data Mart at <http://soildatamart.nrcs.usda.gov/>.

Foreword

This soil survey contains information that affects land use planning in this survey area. It contains predictions of soil behavior for selected land uses. The survey also highlights limitations and hazards inherent in the soil.

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

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

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

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

Dave White
State Conservationist
Natural Resources Conservation Service

Soil Survey of Deer Lodge County Area, Montana

Fieldwork by Brian D. Dougherty, Frank Gariglio III, Arnie Irwin, Thomas J. Keck, Huey A. Long, George A. Rolfes, and Neal Svendsen, Natural Resources Conservation Service

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

DEER LODGE COUNTY AREA is located in southwestern Montana (fig. 1). The survey area includes 309,600 acres, or about 484 square miles. Deer Lodge County is bordered by Powell County to the north, Granite County to the west, Silver Bow County to the east, and Beaverhead County to the south. Anaconda, the county seat, is located in the north-central part of the county.

Over half of the county is included in the mapping area. Areas within Deer Lodge County that were not mapped include the portion of the Beaverhead-Deerlodge National Forest in the Anaconda Range, southwest of the Continental Divide; the southernmost part of the Flint Creek Range near Olson Mountain; and the easternmost extension of the county that includes Saratoga, Orofino, and Cottonwood Mountains. Lost Creek State Park is included in the mapping area.

In the mapping area, elevations range from 4,680 feet (1,426 m) above sea level at Racetrack, where the Clark Fork River flows out of Deer Lodge County, to a high of 10,607 feet (3,233 m) at Mount Haggin in the Anaconda Range. The high peaks of the Continental Divide have elevations between 9,500 and 10,650 feet (2,896 and 3,246 m). The elevation at Anaconda is approximately 5,200 feet (1,585 m) above sea level.

The survey area's residents are dependent on the area's natural resources for most of their livelihood. Ranching and farming, timber harvesting, and mining rely on the wealth of the geology, soil, and water of the region.

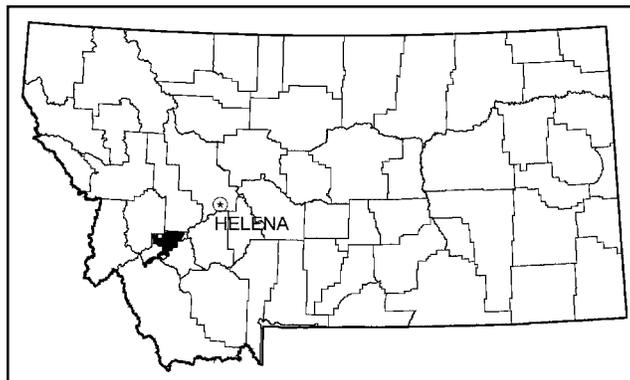


Figure 1.—Location of Deer Lodge County Area, Montana

General Nature of the Survey Area

This section describes some of the environmental and cultural features that affect the use and management of soils in the survey area. These features are history and development; physiography, drainage, and geology; mineral resources; ground-water resources; geothermal resources, seismic activity; and climate.

History and Development

Michael Garverich, Montana Geotechnical Engineer (Civil), Natural Resources Conservation Service, prepared this section.

The area covered by this soil survey gets its name from a mound of travertine and iron oxides deposited by the waters of a warm spring. This spring is located in the NW $\frac{1}{4}$, NE $\frac{1}{4}$, Section 24, T. 5 N., R. 10 W., on the west side of the Montana State Hospital, Warm Springs Campus. The Native Americans knew of the surrounding area as a winter range for deer. The mound of spring deposits resembled a large lodge as used for winter shelter; hence, it became known as "The Deer Lodge" (fig. 2). Subsequently, the name was given to the local valley, county, and the county seat of Powell County, the adjoining county to the north.

The Deer Lodge County Area lies in the upper reaches of the Clark Fork River Valley, also known as the Deer Lodge Valley; the northern part of the Big Hole Valley; and the adjoining mountain ranges. Its location places it along the Continental Divide, where a segment oriented in an east-west direction interrupts the divide's general north-south alignment. Near the eastern end of the east-west segment is a low, open pass. This pass is so low and inconspicuous that it does not have a name but acts as a funnel for travel through the Deer Lodge area.

Initially, Deer Lodge County was established as a county within the area included in Idaho Territory in 1863. The county originally extended from its current southern boundary northward to the international boundary with Canada. When Montana Territory was established in 1864, Deer Lodge County was continued in the new territory, but much of its original area was transferred to several other counties as they were formed.



Figure 2.—"The Deer Lodge" from which Deer Lodge County takes its name

Native Americans first used the area of Deer Lodge County as one of the travel routes between the mountain valleys located west and north and the valleys and plains located east and south. The early trappers, followed by prospectors, and then ranchers and those with transportation interests continued to use this travel route. In the early 1860s, it was recognized that the area provided good year-round pasture for livestock. Ranching, along with a little farming, soon became the dominant use of the area.

In 1883, Marcus Daly of the Anaconda Company chose a site on Warm Spring Creek as the location to build a smelting facility for the rich copper ores of the Butte area, located about 25 miles to the east. This site, now the town of Anaconda, quickly became a major industrial location and continued to be so until 1980, when the last smelter closed. For almost 100 years, Deer Lodge County was the site of a succession of ever larger copper smelters, beginning with the 500-tons-per-day Upper Old Works Smelter, built in 1884, and ending with the closure of the Washoe Reduction Works, which produced 160,328,000 pounds of copper in 1979, the year before its closure in 1980. For much of this time, it was the largest nonferrous smelter in the world.

In 1977, the Anaconda Company merged with ARCO, a major oil company. Managerial decisions relating to this merger led to the closure of the smelter in 1980. The resulting loss of jobs and economic impacts continue to plague the area. In addition, a large area near the smelter had been contaminated by metals and sulfur released in the smelting process. After the closure of the smelter, the area was declared a "Superfund Site" in 1983 because of its contaminated soils. The ongoing reclamation of the area has had a large economic impact that will continue for some time.

The smelters and their smokestacks overshadowed nearly all facets of life in Deer Lodge County from their inception until their closure; their effects still linger because of the environmental degradation that they caused. Today, all that remains of these great smelters are the smokestacks, a few foundations and broken-down flues, great heaps of slag and tailings, and the largest "Superfund Site" in the United States.

As of 2005, farming, tourism, reclamation, and minor manufacturing provide the economic foundations of the area.

Physiography, Drainage, and Geology

Marie V. Marshall, Montana State Geologist, Natural Resources Conservation Service, prepared this section.

Physiography

The Deer Lodge County soil survey area lies in the Northern Rocky Mountain physiographic province, within the structural province of the Rocky Mountain Fold-Thrust Belt. The Continental Divide forms the southwestern portion of the county border, then trends eastward through the center of the county.

The county is characterized by rugged, mountainous terrain separated by the broad valleys of the Clark Fork and Big Hole Rivers. Portions of three mountain ranges extend into the county. The Flint Creek Range is high and rugged and extends into the northwestern part of the county. The high peaks of the Anaconda Range form the Continental Divide, and the range extends into the central and southwestern parts of the county. Warm Springs Creek separates these two ranges. The relatively low, rounded mountains on the eastern margin of the county are known locally as the Deer Lodge Mountains.

The Deer Lodge Valley is characterized by large, gravel-capped terraces that slope gently away from the high mountains toward the Clark Fork River. Near the river, there

are low terraces that were formed more recently. In the southern part of the valley, the terraces grade into coalescing alluvial fans that radiate outward from the mouths of some of the tributary canyons. The Big Hole Valley is crescent-shaped, with broad bottomlands and extensive grass-covered terraces. A northeast-trending fault bounds the valley to the west and rugged mountains surround it.

Drainage

North of the Continental Divide, the Clark Fork River system drains Deer Lodge County. South of the divide, the Big Hole River and its tributaries drain the county. The headwaters of the Clark Fork River are located in the northeastern corner of the county, at the confluence of Warm Springs and Silver Bow Creeks near Anaconda. The headwaters of Silver Bow Creek are approximately one-quarter mile south of the Berkeley Pit in Butte. Major Clark Fork tributaries that drain the Anaconda Range north of the Continental Divide are Storm Lake, Twin Lakes, Barker, and Mill Creeks. Major Clark Fork tributaries that drain the Flint Creek Range include Flint, Warm Springs, Lost, and Modesty Creeks.

The Big Hole River drains the Anaconda Range south of the Continental Divide. Its major tributaries are Mudd, Fishtrap, La Marche, Seymour, French, Calvert, and Pintler Creeks.

Originally constructed by the Anaconda Company to provide water to its smelting facilities, Silver Lake, in the northwestern corner of the county, provides off-stream storage for water from Storm Lake Creek and Twin Lakes Creek. A dam on Flint Creek impounds Georgetown Lake. This facility was originally built to provide electricity for the Granite-Bimetallic Mine near Philipsburg but is now a regional recreational area.

Geologic History and Regional Geology

Geologic Time Scale					
Age	Eon	Era	Period	Epoch	Years before Present million years ago (mya)
		Cenozoic	Quaternary	Holocene	11,500 years to present
				Pleistocene	1.8 mya to 11,500 years
			Tertiary	Pliocene	5.3 to 1.8 mya
				Miocene	23 to 5.3 mya
				Oligocene	33.9 to 23 mya
				Eocene	55.8 to 33.9 mya
			Paleocene	65 to 55.8 mya	
		Mesozoic	Cretaceous		145.5 to 65 mya
			Jurassic		200 to 145.5 mya
			Triassic		251 to 200 mya
		Paleozoic	Permian		299 to 251 mya
			Pennsylvanian		318 to 299 mya
			Mississippian		359 to 318 mya
			Devonian		416 to 359 mya
			Silurian		443 to 416 mya
			Ordovician		488 to 443 mya
			Cambrian		543 to 488 mya
Precambrian					
	Proterozoic				2,500 to 543 mya
	Archean				>3,800 to 2,500 mya

Deer Lodge County has had an extremely complex and active geologic history, which has been greatly simplified here. Because of the significant mineral deposits in the area, it has been mapped and studied extensively; however, due to the complexity of the geology, not all the geologic maps agree. Formation names for rock units of similar ages are different in several of the mountain ranges, and the structural geology is not completely understood.

The geologic history of Deer Lodge County began approximately 1.5 billion years ago, with the deposition of a very thick sequence of sedimentary rocks known as the Belt Supergroup. Vegetation had not yet developed on the continents, so erosion was extensive. Vast amounts of sediment were deposited into a broad basin that contained exposed mudflats; small beaches; and shallow, probably brackish, water. Sandstone was deposited on beach and near-shore environments; siltstone and shale were deposited in lower energy, deep-water environments; and limestone normally was formed in warm, shallow water.

These sediments continued to accumulate for about 600 million years; some estimates place the total thickness of Belt rocks at a minimum of 60,000 feet (18.3 km) (Harrison, Griggs, and Wells, 1986). Over time, the sediments were metamorphosed by pressure caused by the weight of accumulated sediments and increased temperatures caused by regional volcanic activity. Shale was metamorphosed to argillite, siltstone to siltite, and sandstone to quartzite.

Alternate periods of deposition and erosion have occurred with changing sea levels since the Precambrian Age, producing a thick sedimentary sequence of interbedded sandstone, shale, and limestone. There were long periods, including the early Cambrian, the Ordovician and Silurian, and the upper Triassic through mid-Jurassic, where much of Montana was above sea level. Erosion that occurred during these periods created disconformities, or gaps, in the geologic record. Deer Lodge County contains rocks from every geologic period except those listed above.

The geologic record contains evidence for at least three major periods of tectonism, or mountain building. These occurred during the early Cambrian Period, the late Cretaceous Period, and the early Eocene Epoch. Ongoing seismic activity indicates that tectonic forces are still active in this region.

The most prominent structural features visible today began forming approximately 90-million years ago, in the late Cretaceous Period. At that time, a collision between major tectonic plates to the west created compressional forces that formed the Rocky Mountains. This regional northeast-southwest compression resulted in large-scale folding and faulting. Relatively thin sheets of Belt and Paleozoic rocks were broken into large blocks and thrust up over younger sedimentary rocks in a series of imbricate, or overlapping, faults. These sheets have an internal stratigraphic continuity and are stacked along flat, regionally extensive thrust faults. Accompanying the large-scale faults are numerous closely spaced thrust faults with minor displacement. Continued compression during the late Cretaceous Period subsequently folded, overturned, and faulted the stacks of thrust sheets.

Deer Lodge County lies on the leading edge of one of these large thrust sheets, known as the Sapphire Tectonic Block, which has been displaced an estimated 50 miles (80 km) from the west. The Garnet Range on the north, the Flint Creek Range on the east, and the Anaconda Range on the south define the limits of the Sapphire Tectonic Block. The eastern flank of the Flint Creek Range is tightly folded; it probably was bulldozed into its present position as the Sapphire Tectonic Block advanced.

These multiple events of thrust faulting and folding were followed by widespread episodes of plutonism and volcanism that continued throughout the Cretaceous and early Tertiary periods into the Eocene Epoch. The first plutonic events may have occurred during the last stages of thrust faulting. During this time, melting deep within the crust created masses of magma, or molten rock, that rose toward the surface. As it rose, it deformed and metamorphosed the surrounding country rock and lubricated

planes of thrust faulting. In many areas, hydrothermal activity occurred as these intrusions cooled forming a variety of mineral deposits.

There are numerous stocks and batholiths, most with a granitic composition, in this county. Stocks are igneous intrusions with a surface exposure of less than 40 square miles (100 km²); batholiths are larger. They are frequently associated with smaller sills and dikes. Plutonic complexes form most of the crest and southern flank of the Anaconda Range, the crest of the Flint Creek Range, and the western portion of the Deer Lodge Mountains.

Radiometric dating has been performed on some of the intrusive rocks in the Anaconda Range and the nearby Sapphire Mountains, which are similar in composition and texture. Their ages have been calculated to be between 43 and 78 million years. The Philipsburg Batholith, east of Philipsburg in the Flint Creek Range, has been dated at 73 to 79 million years (Weidman, 1988).

During this period of increased igneous activity, some of the magma rose to the surface and erupted on land, forming large fields of volcanic rocks. The most extensive of these is the Lowland Creek Volcanics, which cover approximately 800 square miles (2,070 km²) in central Deer Lodge and northern Silver Bow counties. The Lowland Creek Volcanics have been dated at 48 to 50 million years.

Mountain building continued into the early Tertiary Period. The Anaconda Range was uplifted and tilted to the north either during or immediately after the final plutonic episode. This uplift was accompanied by high-angle faulting, which offset the igneous rocks and the folded stacks of thrust sheets. Great volumes of sediment were washed into the valleys as the surrounding mountains were uplifted, forming extensive basin-fill deposits. Volcanic eruptions blanketed the area with ash, which was also washed into the valleys. Sediment continued to accumulate in these large basins throughout the Tertiary Period, although the region has been relatively quiet for the last 10 million years.

The character of the basin-fill deposits was affected by the climate, which was arid throughout most of the Tertiary Period, although there were periods during the mid-Miocene Epoch when it was lush and tropical. Lush vegetation prevented widespread erosion, and streams carried relatively fine-grained sediment through permanent channels. It turned dry again ten-million years ago and remained arid until the beginning of the ice ages in the Pleistocene Epoch. As the climate turned from tropical to arid, permanent streams became ephemeral and the character of the sediment changed as well. Coarser-grained sediments were laid down in flash-flood deposits that choked the stream channels and spread across the landscape. The sediments first filled the valleys, which had been created during tropical times, then buried the hills between them.

The Quaternary Period has been dominated by periods of glaciation, volcanism and continuing erosion and deposition. During the ice ages of the Pleistocene Epoch, alpine glaciers covered the high mountain peaks, eroded U-shaped valleys, and deposited linear moraines and glacial outwash in many valleys. At least four separate glacial events are known to have affected the Anaconda Range and three events are known to have affected the Flint Creek Range (Rowan, Trautwein, and Purdy, 1991). The Deer Lodge Mountains have no glacial deposits; they were probably too low to be affected by the ice. The last ice age ended approximately 15,000 years ago.

The landscape has continued to evolve since the end of the last ice age, although the changes are not as dramatic. Today, streams and rivers are reworking alluvial deposits in the active flood plains. These flood plains are subject to overflow from fluctuating water levels during periods of high runoff. Alluvial terraces at higher elevations along the valley floor show former river levels. These older terraces are no longer undergoing active deposition and are relatively stable. There are landslides occurring along steep slopes composed of clayey materials, which are further modifying the topography.

Geologic Units

The sequence of rocks exposed in Deer Lodge County is summarized below, listed in order of decreasing age. Formations are defined as a succession of strata distinctive enough to constitute a basic unit for mapping, identified by similar rock type and stratigraphic position. Formations can be combined into groups or subdivided into members.

In many cases, outcrop areas for individual formations are small and difficult to differentiate in the field. In these cases, no specific soil series can be correlated with individual geologic formations because of the complexity of the geology. Rock and soil correlations are listed here primarily by rock type, although other factors including elevation, vegetation, slope, and aspect are also considered when a soil series is differentiated.

Precambrian Rocks

Rocks deposited during the Precambrian Age consist of the assemblage of formations within the Belt Supergroup. The entire Belt sequence is not completely represented in Deer Lodge County due to the regional thrust faulting. These rocks are hard and thinly bedded and consist primarily of limestone, argillite, siltite, and quartzite.

They occur in large, fault-bounded blocks in a wide, northeast-trending band. This band stretches through the center of the Anaconda Range and along the eastern side of the Flint Creek Range. Belt rocks form the steep cliffs at Lost Creek State Park. They also occur in the southeastern corner of the mapping area in the mountains along the border between Deer Lodge, Silver Bow, and Beaverhead counties. Bear Mountain and the Deep Creek Ski Area both are composed of Belt rocks. Soils typically formed in quartzite include the Elve, Evaro, and Winkler series. Soils typically formed in argillite include the Braziel, Libeg, Worock, and Yreka series.

Paleozoic Rocks

Paleozoic rocks exposed in Deer Lodge County consist of a thick sedimentary sequence of mid-Cambrian- to Permian-aged rocks. They are primarily thick-bedded limestone and dolomite, with lesser amounts of carbonate-bearing shale and siltstone, and some sandstone and quartzite. The Paleozoic sequence is not complete due to the regional thrust faulting.

In the Anaconda Range, Paleozoic rocks crop out primarily at Garrity Mountain, between Barker Creek and Big Gulch south of Highway 1. The western portion of the Flint Creek Range is composed of folded stacks of Paleozoic rocks, which are contained within the thrust sheets at the leading edge of the Sapphire Tectonic Block.

No soil series are associated with individual formations in the Paleozoic section; however, they can be classified by rock type. Typical soil series formed on limestone include the Hanson, Lap, Tibson, Whitecow, and Whitore series. Typical soil series formed in dolomite are redder than those formed in limestone and include the Helmsville, Relyea, Silverchief, and Trapps series.

Mesozoic Rocks

The oldest sedimentary rocks from the Mesozoic Era belong to the Kootenai Formation, which was deposited at the beginning of the Cretaceous Period. Blocks of the Kootenai are incorporated within the internal stratigraphy of the large thrust sheets in the Sapphire Tectonic Block and are located as described above. Other, younger Cretaceous rocks crop out in a northeast-trending band east of Lost Creek State Park, between Antelope Creek and Stucky Ridge.

A wide variety of both extrusive and intrusive rock types associated with the extensive igneous activity of the late Cretaceous and early Tertiary periods occur in the mapping area. These include coarse-grained granitic rocks of the Boulder

Batholith, the Anaconda Batholithic Suite, and the Flint Creek Batholithic Suite. These granitic rocks are characterized by their tendency to weather to rounded, bouldery outcrops. Fine-grained, extrusive rocks belong primarily to the Tertiary-aged Lowland Creek Volcanics. These finer-grained rocks are characterized by their tendency to weather to angular talus slopes.

The Boulder Batholith extends from the Deer Lodge Mountains in the northeastern corner of the mapping area, through Butte, and northeast to the Boulder River. Typical soil series formed on these granitic rocks include the Ambrant, Caseypeak, Comad, Elkner, Ellena, and Tepecreek series.

The Anaconda Batholithic Suite consists of two stocks and two batholiths, all with a granitic composition, that were emplaced during the late Cretaceous and early to mid Eocene Epoch. The stocks and batholiths make up the core of the Anaconda Range and extend into the mapping area near Mount Haggin and Short Peak. Typical soil series formed on these granitic rocks include the Comad and Mohaggin series.

In the mapping area, the Flint Creek Batholithic Suite is represented by the Mount Powell Batholith. It also has a granitic composition and occupies a small area near the mutual boundary of Granite, Powell, and Deer Lodge counties at the northwestern edge of the mapping area. Dikes and sills associated with the Mount Powell Batholith can be seen intruding Belt rocks in the steep cliffs above Lost Creek State Park. Typical soil series formed on these granitic rocks include the Comad and Elkner series.

Cenozoic Rocks

Cenozoic rocks in the mapping area consist of the igneous rocks that formed during the extensive igneous activity that began in the late Cretaceous Period and the large thickness of sedimentary basin fill that was deposited in the intermontane basin during the Tertiary Period. The most recent deposits include colluvium, alluvium, terrace gravels, and landslide debris, which are currently being deposited and reworked.

The Lowland Creek Volcanics were erupted approximately 50-million years ago in the Eocene Epoch; these volcanics occupy a large area on the west side of the Deer Lodge Valley just north of Anaconda. The Lowland Creek Volcanics also occur in a large area south of Anaconda where they cover much of the Mount Haggin Wildlife Management Area. The Anaconda smelter stack is constructed on this unit. The volcanics are over 4,000-feet (1,220-m) thick where fully exposed. The Lowland Creek Volcanics consist predominantly of volcanic breccias and flows composed mostly of rhyolite, with minor amounts of andesite and basalt, interbedded with ash-flow tuffs, welded tuffs, and sedimentary strata. In some areas, sedimentary units contain coal beds up to 6-inches (15-cm) thick. Typical soil series formed on these volcanic rocks include the Bendoh, Daras, Karloff, Lowland, Pax, and Vitroff series. Typical soils formed on tuffaceous materials include the Burrfoot, Julius, and Macabre series.

The Tertiary basin fill consists of a variety of sedimentary rock types formed from material that was eroded off the surrounding mountains as they were uplifted. The sedimentary rocks vary widely in both grain size and their degree of consolidation, and individual units grade into and interfinger with each other. Some of the rocks are unconsolidated to semiconsolidated, while some of the rocks are hard and completely lithified. These rocks are interbedded with volcanic materials that are both in-place air fall deposits of volcanic ash and tuff and reworked ash that was eroded off the hills and deposited in the basin fill. Some of the units contain bentonite, formed when volcanic ash weathers under water.

Tertiary sediments are very thick in the Deer Lodge Valley. These sediments are overlain by a thin veneer of glacial outwash to the west of the Clark Fork River and by alluvium near the center of the valley. Tertiary strata underlie the high terraces at the margins of the valley and occur in a wide band east of the Clark Fork River, which

extends the length of the county. This deposit is approximately 6,000 feet (1,830 m) thick near Warm Springs and thicker near the center of the valley.

The Tertiary sediments have been subdivided into two formations in this area—the Renova and the overlying Sixmile Creek. The Renova Formation is a fine-grained deposit consisting of tuffaceous shale and siltstone. The Renova Formation has limited surface exposures in Deer Lodge County but is present at depth in the basin fill.

The Sixmile Creek Formation, coarser grained than the Renova Formation, was deposited in the arid, late Miocene Epoch. The Sixmile Creek Formation is also tuffaceous and consists of interbedded conglomerates, sandstone, shale, and coal. Typical soil series formed from this formation include the Arlen, Litag, and Nivean series. The Mishakal and Wilspring series were formed on sedimentary beds.

Glacial deposits consist primarily of moraine, which are hummocky, unsorted deposits that cover glaciated valley bottoms and extend up the adjacent slopes. In the Anaconda Range, major glacial moraines extend into the mapping area in the following drainages: Mill, Tenmile, Seymour, La Marche, and Fishtrap Creeks. Typical soil series formed on these unconsolidated deposits include the Shawmut series.

One of the most distinctive moraines in the Flint Creek Range is the Racetrack Moraine, located at the southern end of Granite County just north of the Deer Lodge County line. While not as obvious, there are remnants of lateral and terminal moraines along Lost Creek near the junction of Timber Gulch and the canyon of Lost Creek. These moraines are composed of large blocks of granite in a poorly sorted matrix and occur up to an altitude of 6,500 feet (1,980 m).

Quaternary surficial deposits include terrace gravels, colluvium, alluvium, travertine, and landslide deposits. Quaternary surficial deposits are generally unconsolidated and relatively thin. Most of these deposits are originally of glacial origin and have been reworked and transported by the current streams. Recent alluvium includes both coarse-grained channel deposits and fine-grained flood plain deposits. In the Clark Fork Valley, the alluvium has an average thickness of 20 feet (6 m). Fan deposits and cemented colluvium occur near the valley margins. Typical soils derived from alluvium include the Beaverell, Con, Gregson, Kleinschmidt, Saypo, and Sixbeacon series.

Travertine deposits in Deer Lodge County include the 40-foot (12-m) high mound near the hospital at Warm Springs. In addition, there is a 10- to 20-foot (3 to 6 m) thick travertine bed with an exposure area of approximately 1 square mile at the mouth of Warm Springs Creek canyon. Travertine is also exposed on the access road to the smelter stack at Anaconda. Travertine is precipitated in warm, saline lakes and also occurs as mounds and terraces deposited by hot springs. Typical soils derived from travertine deposits are the Lap and Windham series.

Landslides occur on steep terrace slopes composed of clayey Tertiary basin fill or glacial till and in tuffaceous portions of the Lowland Creek Volcanics. Landslides can also occur in most rock types near faults where saturated strata have been weakened by excessive seepage.

Mineral Resources

Mining has had a significant impact on Deer Lodge County, although perhaps more ground has been disturbed for ore processing than for the actual mines. The first smelter was completed in Anaconda in 1884, processing copper for the Butte mines. A succession of smelters were built and operated near Anaconda until final closure in 1980. Mineral deposits are relatively small by comparison to the surrounding counties. Mining activity has been sporadic since 1864, although exploration for gold and silver was reported for 1992 on Dry Cottonwood Creek northeast of Warm Springs (McCulloch, 1993).

Many small placer deposits in both the Flint and Anaconda Ranges have been worked with varying degrees of success, particularly in the Georgetown Lake area. A placer deposit at Cable Creek, east of Georgetown Lake, is considered to have been the richest deposit; the Dry Gulch deposit near the headwaters of Modesty Creek is considered to have been the most persistent. Gold and silver have been produced from lode mines near Georgetown Lake and in the Mill Creek and Lost Creek drainages.

Most of the mineral production in Deer Lodge County has been gold and silver. Tungsten was produced from the Bonanza Mine just east of Georgetown Lake, and sapphires have been mined from the Dry Cottonwood Creek drainage. Nonmetallic deposits mined in Deer Lodge County include limestone and marble for use as a flux in smelting, tuffaceous clays for use in ceramics and as fire clay, and sand and gravel.

Five wildcat wells were drilled for oil and gas in the Deer Lodge Valley. In 1984, two wells were drilled in Deer Lodge County near Warm Springs to depths of 6,701 and 11,774 feet (2,042 and 3,589 m). Although minor amounts of oil were found, both were abandoned as dry holes.

Coal is included within sedimentary interbeds of the Lowland Creek Volcanics and the Tertiary sediments. The beds are thin and impure and are not considered to be of commercial value.

Ground-water Resources

The principle sources of ground water in Deer Lodge County are the unconsolidated to partially consolidated Quaternary alluvium and Tertiary basin-fill sediments. The most productive wells are developed in river alluvium. These wells are shallow, with depths ranging between 20 to 150 feet (6 to 46 m), and they have maximum reported yields of 1,500 gpm (5,670 L/min). Water in the alluvial sediments is unconfined, and the water table is subject to seasonal fluctuations.

The water in wells completed in the Tertiary basin-fill sediments is confined, resulting in artesian conditions, although there are no known flowing wells. In general, these sediments are finer grained than the alluvium, and wells have typical yields of 10 to 30 gpm (38 to 113 L/min). Maximum yields of 600 to 700 gpm (2,270 to 2,646 L/min) have been reported from relatively deep wells.

Quantities of water suitable for stock and domestic use can also be developed from joints and fractures in the igneous rocks and from sandstone or limestone beds within the Paleozoic- and Mesozoic-aged formations. Shale formations are saline and impermeable and are not reliable aquifers.

Well use, current to January 1996, for Deer Lodge County is summarized below. This information is contained within the database maintained by the Montana Groundwater Information Center at the Bureau of Mines and Geology in Butte. The list contains 1,290 well records. Many wells have multiple uses (most commonly domestic and stock water) so the sum of the uses appears to be greater than the total number of wells.

WATER USE	NUMBER OF WELLS
Domestic	1,052
Stock water	127
Monitoring	62
Irrigation	42
Industrial	25
Public water supply	22
Unused	12
Commercial	8

Three wells had reported yields greater than 1,000 gpm (3,780 L/min); 55 wells had reported yields of 100 gpm (378 L/min) or more; and 564 wells had reported yields of 20 gpm (76 L/min) or more. There were 479 wells with yields of 10 gpm (38 L/min) or less. One well had a total depth of 1,498 feet (466 m); 47 had total depths greater than 250 feet (76 m); and 235 had total depths greater than 100 feet (30 m).

Geothermal Resources

There are several thermal springs of moderate temperature in the Deer Lodge Valley. These include Warm Springs, Anaconda Hot Springs near Opportunity, and Fairmont Hot Springs. The hot water is derived from deep circulation systems within fractured bedrock; the water is brought to the surface through faults underlying the valley fill. The geothermal system of the grounds of the Warm Springs State Hospital shows considerable potential for geothermal energy development; this system has been studied extensively.

Seismicity

Deer Lodge County is located on the western edge of the intermountain seismic belt, although its seismic activity is relatively quiet for this region. The intermountain seismic belt extends from southern Nevada north to Flathead Lake and contains most of the known active faults in Montana, Idaho, Wyoming, and Utah. It is characterized by shallow seismicity, earthquake swarms, and normal fault scarps that show evidence of Holocene-aged or historic movement.

Seismicity information provided by the Earthquake Studies Office of the Montana Bureau of Mines and Geology shows 96 earthquakes recorded in or near Deer Lodge County since the recordkeeping began in 1982. The maximum magnitude recorded in Deer Lodge County was 3.1, and only three earthquakes had magnitudes greater than 2.5. Earthquakes with magnitudes of 2.0 or less are known as microearthquakes. They are not commonly felt and are recorded only on local seismographs. It is unusual for earthquakes with magnitudes under 4.5 to cause any significant damage.

Deer Lodge County lies in seismic zones 2B and 3, as defined by the Uniform Building Code, 1991. For comparison, southern California and the Hebgen Lake area in Montana are in zone 4, the highest available, and Plentywood, Montana, lies in zone 0.

Deer Lodge County Hot Springs

Location	Flow		Temperature		TDS mg/L
	gpm	L/min	°F	°C	
Warm Springs	60	30	172°	78°	1,250
Anaconda Hot Springs	3	11	72°	22°	2,310
Fairmont Hot Springs	40	150	158°	70°	560

Climate

Natural Resources Conservation Service, National Water and Climate Center, Portland, Oregon, prepared this section.

Climate tables were created from climate stations Butte FAA Airport, in adjoining Silver Bow County, and Deer Lodge 3 W, in adjoining Powell County. There are no long-term climate stations in Deer Lodge County. Additional information for the

narrative below was extracted from 1961 through 1990 mean annual precipitation and temperature maps of Montana developed by Oregon State University for the U.S. Department of Agriculture, National Resources Conservation Service, using the PRISM system.

Thunderstorm days, relative humidity, percent sunshine, and wind information were estimated from First Order stations Missoula and Helena.

Climate tables on the following pages show data for the period 1971 through 2000 for the survey area as recorded at Butte and Deer Lodge. The "Temperature and Precipitation" table shows average, maximum, and minimum temperature and precipitation data. The "Freeze Dates in Spring and Fall" table shows probable dates of the first freeze in fall and the last freeze in spring. The "Growing Season" table provides data on the probable length of the growing season.

Average annual total precipitation over the soil survey area is variable and dependent on elevation. The driest valley locations around and north of Anaconda receive only about 10 inches of precipitation annually. Annual precipitation is 12.86 inches at Butte and 10.72 inches at Deer Lodge. However, higher elevations of the mapping area receive up to 25 inches of precipitation annually, including around 22 inches along the Continental Divide region. The Big Hole valley region receives between 16 and 20 inches of precipitation. The growing season is ordinarily very short, usually falling between June and August. Usually only about 30 percent of annual precipitation falls during this period at lower elevations. The heaviest 1-day precipitation amounts during the period of record were 2.02 inches at Butte on August 2, 1943, and 2.13 inches at Deer Lodge on July 31, 1997. Thunderstorms occur on about 25 days each year, mostly between June and August.

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

In summer, the average temperatures are 60 and 59 degrees F, respectively, at Butte and Deer Lodge. Average daily maximum temperatures are 76.4 and 76.9 degrees F, respectively. The highest temperature ever recorded was 100 degrees F at Butte on June 30, 2000, and at Deer Lodge on August 24, 1969.

In winter, average temperatures are 19.2 and 22.4 degrees F, respectively, at Butte and Deer Lodge. Average daily minimum temperatures are 7.1 and 10.5 degrees F, respectively. The lowest temperatures on record are -52 degrees F at Butte on December 23, 1983, and -40 degrees F at Deer Lodge on December 24, 1983.

The average seasonal snowfall is 61.1 inches at Butte and 35.4 inches at Deer Lodge. Lower elevations in the survey area between Anaconda and Deer Lodge receive between 40 and 50 inches of snowfall annually, while higher elevations receive between 80 and 100 inches, with even more over the higher mountains to the west. The greatest snow depths at any one time during the period of record were 27 inches at Butte on December 28, 1996, and 28 inches at Deer Lodge on February 8, 1975. On average, 107 days per year have at least 1 inch of snow on the ground. The heaviest 1-day snowfalls on record were 12.8 inches at Butte on October 31, 1973, and 14.8 inches at Deer Lodge on February 7, 1975.

The average relative humidity in midafternoon is about 30 percent in summer and about 70 percent in winter. Humidity is higher at night, and the average at dawn is about 80 percent in most months. The sun shines about 72 percent of the time in summer and about 40 percent in winter. The prevailing wind is highly dependent on terrain. Usually the prevailing wind follows the valleys, with south winds for much of the year in the main valley, but also from the north a good percentage of the time. Average wind speed is highest, around 9 miles per hour, in April and May.

How This Survey Was Made

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

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

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

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

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

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

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

Temperature and Precipitation
(Recorded in the period 1971 through 2000 at Butte and Deer Lodge)

Month	Temperature (degrees F)					Precipitation (inches)					
	Average daily maximum	Average daily minimum	Average	2 years in 10 will have—		Average number of growing degree days*	Average	2 years in 10 will have—		Average number of days with 0.10 or more	Average total snowfall
				Maximum temperature more than	Minimum temperature less than			Less than	More than		
BUTTE:											
January----	29.6	5.8	17.7	51	-34	2	0.55	0.21	0.82	1	8.3
February---	34.7	9.7	22.2	55	-32	2	0.47	0.23	0.70	1	7.6
March-----	42.0	18.5	30.3	64	-16	14	0.84	0.52	1.13	2	10.9
April-----	51.7	26.4	39.0	76	5	85	1.03	0.47	1.57	3	8.5
May-----	60.8	34.3	47.6	83	18	252	2.02	1.15	2.80	5	3.3
June-----	70.7	41.3	56.0	91	28	480	2.07	0.93	3.08	5	0.2
July-----	79.6	45.5	62.6	94	32	697	1.51	0.49	2.42	4	0.0
August-----	79.0	44.1	61.5	94	30	667	1.36	0.57	2.12	4	0.3
September--	67.8	35.3	51.5	89	18	356	1.09	0.30	1.82	3	1.1
October----	55.5	26.3	40.9	79	1	115	0.80	0.31	1.22	2	4.5
November---	38.9	15.3	27.1	63	-20	15	0.60	0.30	0.87	1	7.6
December---	29.8	5.7	17.7	52	-32	2	0.53	0.24	0.78	1	8.9
Yearly:											
Average--	53.4	25.7	39.5	—	—	—	—	—	—	—	—
Extreme--	100.0	-52.0	—	96	-41	—	—	—	—	—	—
Total----	—	—	—	—	—	2,686	12.86	9.77	15.43	32	61.1
Average number of days per year with at least 1 inch of snow on the ground: 107											
DEER LODGE:											
January----	32.4	8.6	20.5	53	-28	2	0.33	0.06	0.54	0	7.0
February---	37.9	13.5	25.7	59	-26	6	0.30	0.08	0.51	1	5.6
March-----	45.8	20.3	33.1	67	-8	24	0.50	0.16	0.80	1	7.8
April-----	55.1	25.6	40.3	78	8	100	0.71	0.24	1.19	2	3.3
May-----	62.7	32.8	47.8	83	17	255	1.99	1.15	2.71	6	0.0
June-----	72.1	39.4	55.7	90	26	468	1.57	0.80	2.26	5	0.0
July-----	79.1	42.7	60.9	94	29	648	1.50	0.51	2.37	4	0.0
August-----	79.5	41.0	60.3	95	27	620	1.38	0.61	2.13	4	0.0
September--	69.7	32.8	51.2	90	16	340	1.14	0.27	1.90	3	0.0
October----	57.9	25.2	41.6	81	4	126	0.55	0.20	0.73	2	1.2
November---	41.4	16.1	28.8	65	-15	19	0.38	0.14	0.62	1	4.9
December---	32.9	9.4	21.1	55	-26	4	0.38	0.13	0.54	1	5.5
Yearly:											
Average--	55.6	25.6	40.6	—	—	—	—	—	—	—	—
Extreme--	98.0	-40.0	—	96	-34	—	—	—	—	—	—
Total----	—	—	—	—	—	2,613	10.72	6.01	12.92	30	35.4
Average number of days per year with at least 1 inch of snow on the ground: 31											

* A growing-degree day is a unit of heat available for plant growth. It can be calculated by adding the maximum and minimum daily temperatures, dividing the sum by 2, and subtracting the temperature below which growth is minimal for the principal crops in the area (40 degrees F).

Freeze Dates in Spring and Fall

(Recorded in the period 1971 through 2000 at Butte and Deer Lodge)

Probability	Temperature		
	24 degrees F or lower	28 degrees F or lower	32 degrees F or lower
BUTTE:			
Last freezing temperature in spring: January-July			
1 year in 10 later than-----	May 22	June 15	July 7
2 years in 10 later than----	May 16	June 8	July 1
5 years in 10 later than----	May 5	May 25	June 19
First freezing temperature in fall: August-December			
1 year in 10 earlier than---	September 11	September 4	August 20
2 years in 10 earlier than--	September 16	September 8	August 25
5 years in 10 earlier than--	September 25	September 14	September 2
DEER LODGE:			
Last freezing temperature in spring: January-July			
1 year in 10 later than-----	June 5	July 5	July 19
2 years in 10 later than----	May 30	June 28	July 13
5 years in 10 later than----	May 17	June 13	July 2
First freezing temperature in fall: August-December			
1 year in 10 earlier than---	September 1	August 22	August 8
2 years in 10 earlier than--	September 6	August 26	August 14
5 years in 10 earlier than--	September 14	September 5	August 24

Growing Season

(Recorded in the period 1971 through 2000 at Butte and Deer Lodge)

Probability	Daily minimum temperature		
	Higher than 24 degrees F	Higher than 28 degrees F	Higher than 32 degrees F
	<i>Days</i>	<i>Days</i>	<i>Days</i>
BUTTE:			
9 years in 10-----	118	87	51
8 years in 10-----	126	95	59
5 years in 10-----	142	111	74
2 years in 10-----	157	127	89
1 year in 10-----	165	135	96
DEER LODGE:			
9 years in 10-----	98	61	31
8 years in 10-----	105	69	40
5 years in 10-----	120	84	56
2 years in 10-----	135	100	72
1 year in 10-----	143	108	81

Formation of the Soils

This section relates the soils in the survey area to the major factors of soil formation and describes the system of soil classification. The tables, "Taxonomic Classification of the Soils" and "Acreage and Proportionate Extent of the Soils," show the classification and extent of the soils in this survey area.

Factors of Soil Formation

Soil is a natural, three-dimensional body on the earth's surface. Soil has properties that result from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief over a period of time.

Although there are many different soils, each soil is the result of the interaction of the same five factors. These factors are the effect of climate on the parent material, the kinds of plants and organisms living in the soil, the relief of the land, the physical and chemical composition of the parent material, and the length of time it took for the soil to form.

Within short distances, the combination of these factors varies, and, consequently, the soils that form differ in fertility, productivity, and physical and chemical characteristics. In the following paragraphs, the factors of soil formation are discussed.

Parent Material

Parent material is the unconsolidated mass in which a soil forms. It strongly affects the chemical and mineralogical composition of the soil. The soils in the Deer Lodge County Area formed in many different kinds of parent materials. The major materials are recent alluvium, glacial alluvium, mixed alluvium and colluvium, soft bedrock, hard bedrock, and volcanic mudflows.

Recent alluvium is water-deposited material on the bottomlands and low terraces along the major streams and rivers. These soils contain varying amounts of sand, silt, and clay. Many of them contain rounded gravel, cobbles, and stones. Soils formed on these positions lack significant soil development; they tend to be stratified. Many soils are still subject to flooding.

Glacial alluvium is material deposited by glacial melt water. This material is on terraces and outwash plains throughout the county. The deposits range from Pleistocene to Miocene Ages. These soils contain varying amounts of sand, silt, and clay with large amounts of gravel and cobbles. The soils formed in these materials generally have good horizon development.

The combined forces of gravity and water have deposited mixed alluvium and colluvium. They consist of materials that have been moved downslope from higher areas and redeposited on footslopes, alluvial fans, and along drainageways. They contain varying amounts of silt and clay with lesser amounts of sand. Soils formed in these materials show varying degrees of development, depending upon the other soil-forming factors.

Material weathered from soft bedrock formations is a major parent material in the uplands in this survey area. Most of these materials are calcareous. The soils formed

in place, or they formed in material that was locally reworked and transported by water and wind. These deposits range in thickness from a few inches to several feet over the underlying bedrock.

Material weathered from hard sandstone is another parent material for many upland soils. These deposits range from a few inches to a little over a foot in thickness. They formed in place and include large amounts of angular sandstone channers. Soils formed in this material typically have weakly expressed horizons.

Climate

Temperature and precipitation mainly determine climate, an active force in the formation of soils. Climate indirectly affects soil formation through its effect on the kind and amount of living organisms on and in the soil. Vegetation and organisms decay to produce organic matter in the soil. Soils that have cool temperatures and high precipitation generally contain more organic matter and are dark colored. Soils that have warm temperatures and low precipitation generally contain less organic matter and are light colored.

Soils form in rocks that have been broken into suitable materials by erosion and alternate freezing and thawing. Chemical reactions, such as solution and hydration, further break down this weathered material.

Topography

Topography, or relief, is determined by glaciation and mountain formation and by the age and resistance of geologic formations to erosion by wind and water. Topography influences soil development through its effect on drainage and runoff. The degree of slope, shape of the land surface, and permeability of the soil determine the rate of runoff, internal drainage, and moisture content of the soil.

The number and distinctness of soil horizons generally decrease as slope increases. Soils on steep slopes with rapid runoff have many characteristics similar to those of soils formed in arid climates. Soils on east- and north-facing slopes have cooler temperatures than those on west- and south-facing slopes. East- and north-facing slopes receive less sunlight. As a result, the soils on these slopes retain water longer and are cooler than soils on west- and south-facing slopes. The surface soil is darker and the depth to lime is generally deeper on north-facing slopes than on south-facing slopes. In some parts of the survey area, these differences are pronounced.

The soil horizons on gently sloping surfaces are generally more distinct than soils formed in similar parent material on steep and very steep surfaces. Gently sloping soils absorb more moisture, and water is retained in the soil to a greater depth. Soils on steeper slopes generally have a thinner, lighter colored surface layer and a shallower depth to lime than soils formed on lesser slopes. Erosion caused by the runoff on steeper soils also restricts the formation of distinct soil horizons.

Living Organisms

Living organisms are active in the formation of soils. Plants, animals, insects, and microorganisms affect gains or losses in organic matter, plant nutrients in the soil, and changes in porosity and structure.

The kinds and amounts of living organisms are determined by soil-forming factors, such as climate and topography.

Roots, rodents, and insects penetrate the soil and alter its structure. The deep, fibrous root system of grasses improves the porosity and structure of the soil. Because of this porosity, the activity of microbes, earthworms, and burrowing

animals increases. Animals, in turn, increase porosity by burrowing through the soil and leaving open channels for the movement of water and air. Deep roots transport minerals and plant nutrients to the surface, thus improving fertility. Under coniferous trees, needles that drop to the soil surface increase the acidity of the soil.

Some organisms in the soil take in nitrogen from the air and incorporate it into plant tissues. After these organisms die, the nitrogen is released in various forms and becomes available to plants.

Soils under forest plants tend to be cooler than soils under grassland plants. Wet soils have less oxygen available to microbes than drier soils. The activity of microorganisms and animals is less extensive in cooler, wetter soils. As a result, organic matter is broken down more slowly and more organic litter remains on the surface of the soil.

Time

Change taking place in soils over a long period is called soil genesis. As a result of these changes, distinct horizons, or layers, develop in the soils. The length of time that parent materials have been in place and exposed to climate and living organisms is generally reflected in the degree to which the soil profile has developed. The kind and arrangement of these horizons are called soil morphology. These layers are described in terms of chemistry, color, consistence, permeability, structure, texture, and thickness.

Soils are classified according to their approximate age, from young to mature. Age, or maturity, of a soil is generally indicated by the thickness and distinctness of subsurface horizons, content of organic matter and clay, depth to which soluble material is leached, and form and distribution of calcium carbonate and gypsum in the soil.

Young soils show very little profile development. Wetsand soils are considered a young soil. They are on flood plains and are inundated by water at some times. The parent material has been in place for a short time. This soil has little accumulation of organic matter, and there has been no clay movement within the soil. The soil profile has thin strata of water-lain material that has not been altered, and the soil is limy up to the surface.

The Anaconda soil formed in parent material that is similar to the parent material of the Wetsand soil but is older. The soil material has been in place longer and time has had longer to affect this soil. The surface layer is darker and thicker than the Wetsand soil, and lime has leached out of the surface soil. This soil has very little subsoil development.

The Martinsdale soil is an example of a mature soil. It has extensive alteration of the subsoil. Fine clay particles have moved out of the surface soil and been deposited in the subsoil. Lime and soluble minerals have leached out of the subsoil and been redeposited in a layer of increased lime content below the subsoil. The passage of time has effected a great deal of change in the original water-lain parent material.

Many of the sloping and steep, shallow, and very shallow soils appear to have been in the process of formation for about as long as some of the more developed, less sloping soils. However, erosion has removed the soil as fast as it formed. In this case, the effect of time has been offset by the effect of relief.

Classification of the Soils

The system of soil classification used by the National Cooperative Soil Survey has six categories (Soil Survey Staff, 1998 and 1999). Beginning with the broadest, these categories are the order, suborder, great group, subgroup, family, and series. Classification is based on soil properties observed in the field or inferred from those observations or from laboratory measurements. The table, "Taxonomic Classification of the Soils," shows the classification of the soils in the survey area. The categories are defined in the following paragraphs.

ORDER. Twelve soil orders are recognized. The differences among orders reflect the dominant soil-forming processes and the degree of soil formation. Each order is identified by a word ending in *sol*. An example is Mollisols, from *mollis*, meaning soft.

SUBORDER. Each order is divided into suborders primarily on the basis of properties that influence soil genesis and are important to plant growth or properties that reflect the most important variables within the orders. The last syllable in the name of a suborder indicates the order. An example is Ustolls (*Ust*, meaning burnt, plus *oll*, from Mollisol).

GREAT GROUP. Each suborder is divided into great groups on the basis of close similarities in kind, arrangement, and degree of development of pedogenic horizons; soil moisture and temperature regimes; type of saturation; and base status. Each great group is identified by the name of a suborder and by a prefix that indicates a property of the soil. An example is Argiustolls (*Argi*, meaning having an argillic horizon or clay accumulation, plus *ustoll*, the suborder of the Mollisols that has a dry climate).

SUBGROUP. Each great group has a typic subgroup. Other subgroups are intergrades or extragrades. The typic subgroup is the central concept of the great group; it is not necessarily the most extensive. Intergrades are transitions to other orders, suborders, or great groups. Extragrades have some properties that are not representative of the great group but do not indicate transitions to any other taxonomic class. Each subgroup is identified by one or more adjectives preceding the name of the great group. The adjective *Typic* identifies the subgroup that typifies the great group. An example is Typic Argiustolls.

FAMILY. Families are established within a subgroup on the basis of physical and chemical properties and other characteristics that affect management. Generally, the properties are those of horizons below plow depth where there is much biological activity. Among the properties and characteristics considered are particle-size class, mineralogy class, cation-exchange activity class, soil temperature regime, soil depth, and reaction class. A family name consists of the name of a subgroup preceded by terms that indicate soil properties. An example is fine-loamy, mixed, superactive, frigid Typic Argiustolls.

SERIES. The series consists of soils within a family that have horizons similar in arrangement in the profile, color, consistence, mineral and chemical composition, reaction, structure, and texture. An example is the Clasoil series. The soils in the Clasoil series are fine-loamy, mixed, superactive, frigid Typic Argiustolls.

The table "Taxonomic Classification of the Soils" indicates the order, suborder, great group, subgroup, and family of the soil series in the survey area.

Soil Series and Their Morphology

In this section, each soil series recognized in the survey area is described. Characteristics of the soil and the material in which it formed are identified for each series. A pedon, a small three-dimensional area of soil, that is typical of the series in the survey area, is described. The detailed description of each soil horizon follows standards in the "Soil Survey Manual" (Soil Survey Division Staff, 1993). Many of the technical terms used in the descriptions are defined in "Soil Taxonomy" (Soil Survey Staff, 1999) and in "Keys to Soil Taxonomy" (Soil Survey Staff, 1998). Unless otherwise indicated, colors in the descriptions are for dry soil. Following the pedon description is the range of important characteristics of the soils in the series.

Adel Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Drainageways on alluvial fans

Parent material: Alluvium

Slope range: 2 to 60 percent

Elevation range: 5,000 to 7,400 feet

Annual precipitation: 15 to 23 inches

Annual air temperature: 36 to 45 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy, mixed, superactive Pachic Haplocryolls

Typical Pedon

Adel loam, in an area of Adel-Mooseflat complex, 8 to 35 percent slopes, in an area of aspen, 1,100 feet south and 1,700 feet east of the northwest corner of sec. 36, T. 10 N., R. 13 W.

Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.

A1—2 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many irregular pores; 1 percent gravel; neutral; clear smooth boundary.

A2—6 to 8 inches; dark brown (10YR 3/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; common very fine, fine, and medium roots; few very fine tubular pores; 1 percent gravel; neutral; clear smooth boundary.

Bw1—8 to 24 inches; very dark gray (10YR 3/1) loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; 1 percent gravel; neutral; clear smooth boundary.

Bw2—24 to 36 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium and coarse subangular blocky structure; slightly hard, firm, moderately sticky, moderately plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; 1 percent gravel; neutral; clear wavy boundary.

Bw3—36 to 60 inches; brown (10YR 5/3) gravelly clay loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; common very fine, fine, and medium discontinuous tubular pores; 15 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 60 inches

A horizons

Value: 2 to 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 10 percent gravel

Reaction: pH 6.1 to 7.3

Bw horizons

Value: 3 to 5 dry; 2 to 4 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent stones and cobbles;

0 to 25 percent gravel

Reaction: pH 6.1 to 7.8

Aeric Fluvaquents

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour), moderately slow (0.2 to 0.6 inch/hour), or rapid (6 to 20 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 4,700 to 5,100 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Aeric Fluvaquents

Typical Pedon

Aeric Fluvaquents, 0 to 2 percent slopes, in an area of pasture, 200 feet west and 1,200 feet north of the southeast corner of sec. 24, T. 5 N., R. 10 W.

A—0 to 10 inches; very dark grayish brown (10YR 3/2) very cobbly clay loam, pale brown (10YR 6/3) dry; moderate medium granular structure; hard, friable, moderately sticky, moderately plastic; common very fine and fine roots; 20 percent cobbles; 25 percent gravel; violently effervescent; moderately alkaline; gradual smooth boundary.

C1—10 to 16 inches; dark grayish brown (10YR 4/2) very gravelly sandy clay loam, light brownish gray (10YR 6/2) dry; few fine redox concentrations; massive; soft, very friable, slightly sticky, moderately plastic; few very fine roots; 20 percent cobbles; 40 percent gravel; violently effervescent; moderately alkaline; clear smooth boundary.

2C2—16 to 60 inches; brown (10YR 5/3) extremely gravelly sand, light brownish gray (10YR 6/2) dry; few fine redox concentrations; single grain; loose, nonsticky, nonplastic; few very fine roots in top 2 inches; 10 percent cobbles; 65 percent gravel; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 to 4

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 60 percent—15 to 25 percent cobbles; 25 to 40 percent gravel

Reaction: pH 7.4 to 8.4

C1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 20 to 30 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 30 to 50 percent gravel

Reaction: pH 7.4 to 8.4

2C2 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Sand or loamy sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 70 percent—10 to 25 percent cobbles; 30 to 65 percent gravel

Reaction: pH 7.4 to 8.4

Ambrant Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountain side slopes

Parent material: Colluvium from granite

Slope range: 15 to 60 percent

Elevation range: 5,000 to 7,400 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 37 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Lamellic Haplustepts

Typical Pedon

Ambrant bouldery coarse sandy loam, in an area of Ambrant-Rochester-Rock outcrop complex, 15 to 35 percent slopes, in an area of woodland, 2,600 feet north and 2,200 feet east of the southwest corner of sec. 19, T. 6 N., R. 8 W.

Oi—0 to 2 inches; slightly decomposed forest litter.

A—2 to 7 inches; brown (10YR 4/3) bouldery coarse sandy loam, very dark gray (10YR 3/1) moist; weak medium subangular blocky structure; soft, friable,

- nonsticky, nonplastic; common fine and medium and many very fine roots; common fine and many very fine discontinuous interstitial pores; 20 percent boulders; 5 percent stones; 5 percent gravel; neutral; clear wavy boundary.
- E—7 to 15 inches; brown (10YR 5/3) gravelly sandy loam, brown (10YR 4/3) moist; weak medium and coarse subangular blocky structure; soft, friable, nonsticky, nonplastic; few coarse, common fine, and many very fine roots; common fine and many very fine discontinuous interstitial pores; 15 percent gravel; neutral; clear wavy boundary.
- E & Bt—15 to 30 inches; E part (80 percent) is light brownish gray (10YR 6/2) cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; B part (20 percent) is brown (10YR 4/3) sandy loam lamellae dark brown (10YR 3/3) moist; texture mixed is cobbly sandy loam; moderate medium and coarse subangular blocky structure; soft, friable, nonsticky, nonplastic; few coarse, common fine, and many very fine roots; common fine and many very fine discontinuous interstitial pores; 10 percent cobbles; 15 percent gravel; slightly acid; clear wavy boundary.
- 2C—30 to 60 inches; yellowish brown (10YR 5/4) very cobbly loamy coarse sand, dark yellowish brown (10YR 4/4) moist; massive; soft, friable, nonsticky, nonplastic; common very fine and fine roots; common fine and many very fine discontinuous interstitial pores; 20 percent cobbles; 25 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 8 and 24 inches

Depth to the 2C horizon: 28 to 46 inches

Note: Some pedons do not have an A horizon.

A horizon

Texture: Sandy loam or coarse sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—5 to 25 percent boulders or stones;
0 to 10 percent gravel

Reaction: pH 5.6 to 7.3

E horizon

Texture: Loamy sand, sandy loam, or loam

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to
25 percent gravel

Reaction: pH 5.6 to 7.3

E & Bt horizon

Texture: Loamy sand or sandy loam

Clay content: 5 to 18 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to
25 percent gravel

Reaction: pH 5.6 to 7.3

2C horizon

Texture: Sand, loamy sand, or loamy coarse sand

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to
40 percent gravel

Reaction: pH 5.6 to 7.3

Anaconda Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Stream terraces and alluvial fans

Parent material: Calcareous alluvium

Slope range: 0 to 35 percent

Elevation range: 4,000 to 5,900 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 43 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Coarse-loamy, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Anaconda sandy loam, 0 to 4 percent slopes, moderately impacted, in an area of rangeland, 3,000 feet east and 1,800 feet north of the southwest corner of sec. 13, T. 4 N., R. 10 W.

- A1—0 to 2 inches; brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; common fine interstitial pores; 5 percent gravel; strongly acid; clear smooth boundary.
- A2—2 to 8 inches; dark brown (10YR 3/3) sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; common fine interstitial pores; 5 percent gravel; moderately acid; clear smooth boundary.
- Bw—8 to 15 inches; brown (10YR 5/3) sandy loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; soft, very friable, nonsticky, nonplastic; few medium and common very fine and fine roots; common fine interstitial pores; 10 percent gravel; neutral; clear smooth boundary.
- Bk1—15 to 25 inches; light yellowish brown (10YR 6/4) sandy loam, dark brown (10YR 4/3) moist; weak moderate subangular blocky structure; soft, very friable, nonsticky, nonplastic; few fine and common very fine roots; common fine interstitial pores; 10 percent gravel; common fine threads of lime; strongly effervescent; moderately alkaline; clear smooth boundary.
- Bk2—25 to 60 inches; pale brown (10YR 6/3) sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky, nonplastic; few very fine and fine roots; common fine interstitial pores; 10 percent gravel; common fine threads of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 8 and 24 inches; dry in all parts between four tenths and five tenths of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the calcic horizon: 10 to 16 inches

A horizons

Value: 3 to 5 dry

Chroma: 2 or 3

Texture: Sandy loam or loam
 Clay content: 5 to 18 percent
 Content of rock fragments: 0 to 10 percent gravel
 Reaction: pH 5.1 to 7.3

Bw horizon

Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Fine sandy loam, sandy loam, or coarse sandy loam
 Clay content: 5 to 18 percent
 Content of rock fragments: 0 to 15 percent gravel
 Reaction: pH 6.6 to 7.3

Bk horizons

Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Fine sandy loam, sandy loam, or coarse sandy loam
 Clay content: 5 to 18 percent
 Content of rock fragments: 0 to 15 percent gravel
 Calcium carbonate equivalent: 15 to 40 percent
 Reaction: pH 7.9 to 8.4

Aquic Cumulic Haplustolls

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 4,600 to 5,100 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Aquic Cumulic Haplustolls

Typical Pedon

Aquic Cumulic Haplustolls, in an area of Slickens-Aridic Ustifluvents-Aquic Cumulic Haplustolls complex, 0 to 2 percent slopes, severely impacted, in an area of pasture, 300 feet west and 1,200 feet south of the northeast corner of sec. 26, T. 4 S., R. 10 W.

C—0 to 10 inches; light yellowish brown (10YR 6/4) stratified tailings and fine sandy loam sediment, yellowish brown (10YR 5/4) moist; moderate very thin platy structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; very strongly acid; clear smooth boundary.

Ab—10 to 12 inches; very dark gray (2.5Y 3/1) and grayish brown (2.5Y 5/2) loam, black (2.5Y 2/1) moist; weak medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common very fine tubular pores; neutral; clear smooth boundary.

Bwb—12 to 30 inches; gray brown (2.5Y 5/2) loam, very dark gray (2.5Y 3/1) moist; weak medium and coarse subangular blocky structure; hard, friable, moderately sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common very fine and fine tubular pores; disseminated lime; slightly effervescent; slightly alkaline; abrupt smooth boundary.

- A'b—30 to 38 inches; dark gray (2.5Y 4/1) clay loam, black (2.5Y 2/1) moist; many fine and medium redox depletions; strong fine and medium granular structure; hard, friable, moderately sticky, moderately plastic; few very fine, fine, and medium roots; few fine and common very fine tubular pores; slightly alkaline; clear smooth boundary.
- Cg—38 to 55 inches; light brownish gray (10YR 6/2) loam with two very fine seams of loamy sand, very dark gray (10YR 3/1) moist; common medium prominent strong brown (7.5YR 5/6) dry redox concentrations; massive; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and fine roots; few very fine, fine, and medium tubular pores; 1 percent gravel; very strongly acid; clear smooth boundary.
- 2C—55 to 62 inches; strong brown (7.5YR 5/8) very gravelly coarse sand, strong brown (7.5YR 4/6) moist; many coarse prominent strong brown (7.5YR 5/8) dry redox concentrations; single grain; loose, nonsticky, nonplastic; 50 percent gravel; extremely acid.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Thickness of the mollic epipedon: 16 to 40 inches

Depth to the seasonal high water table: 24 to 42 inches

C horizon

Hue: 10YR or 7.5YR

Value: 4 to 6

Chroma: 4 or 6

Clay content: 10 to 20 percent

Content of rock fragments: 0 to 5 percent gravel

Reaction: pH 4.5 to 6.0

Ab and Bwb horizons

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Loam or fine sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 6.1 to 7.8

A'b horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 7.4 to 7.8

Cg horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 2 to 4 moist

Chroma: 1 or 2

Texture: Loam or fine sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 4.5 to 7.8

2C horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 4, 6, or 8

Texture: Sand or coarse sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 55 percent gravel

Reaction: pH 3.5 to 7.8

Arents*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Moderate (0.6 to 2.0 inches/hour) to 15 inches, rapid (6 to 20 inches/hour) below*Slope range:* 1 to 45 percent*Elevation range:* 5,080 to 5,300 feet*Annual precipitation:* 10 to 14 inches*Annual air temperature:* 39 to 45 degrees F*Frost-free period:* 90 to 105 days**Taxonomic Class:** Arents**Typical Pedon**

Arents, 30 to 45 percent slopes, in an area of revegetated slickens, 50 feet south and 800 feet west of the northeast corner of sec. 7, T. 4 N., R. 11 W.

- C1—0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; hard, very friable, slightly sticky, moderately plastic; common fine and many very fine roots; common very fine tubular pores; 5 percent gravel; strongly effervescent; slightly alkaline; clear smooth boundary.
- C2—6 to 15 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, soft, slightly sticky, slightly plastic; strongly effervescent; common very fine and fine roots; few very fine tubular pores; 2 percent gravel; slightly alkaline; abrupt smooth boundary.
- C3—15 to 22 inches; white (N 8/) lime rock that crushes to very gravelly loamy sand, gray (10YR 6/1) moist; massive; very hard, very firm, nonsticky, nonplastic; few very fine roots in top 1 to 2 inches; 1/4-inch thick discontinuous iron pan forming at top of horizon; 50 percent gravel less than 1 inch in size; violently effervescent; moderately alkaline; abrupt smooth boundary.
- C4—22 to 60 inches; pale yellow (2.5Y 8/3) loamy fine sand tailings; olive (5Y 7/3) moist; single grain; loose, nonsticky, nonplastic; many soft small dark brown (7.5YR 5/6) iron concretions; extremely acid.

Range in Characteristics*Soil temperature:* 41 to 46 degrees F*C1 horizon*

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent gravel

Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

C2 horizon

Clay content: 18 to 27 percent
Content of rock fragments: 0 to 15 percent gravel
Calcium carbonate equivalent: 5 to 10 percent
Reaction: pH 7.4 to 8.4

C3 horizon

Clay content: 0 to 10 percent
Content of rock fragments: 35 to 60 percent gravel
Calcium carbonate equivalent: 5 to 15 percent
Reaction: pH 7.9 to 9.0

C4 horizon

Clay content: 0 to 10 percent
Reaction: pH 3.5 to 4.4

Aridic Ustifluents

Depth class: Very deep (greater than 60 inches)

Drainage class: Moderately well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 30 inches, rapid (6 to 20 inches/hour) below

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 4,700 to 5,100 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Aridic Ustifluents

Typical Pedon

Aridic Ustifluents, in an area of Aquic Cumulic Haplustolls-Aridic Ustifluents-Slickens complex, 0 to 2 percent slopes, severely impacted, in an area of pasture, 450 feet east and 900 feet south of the northwest corner of sec. 36, T. 4 N., R. 10 W.

Oi—0 to 1/2 inch; partially decomposed roots, twigs, and leaves.

C1—1/2 to 9 inches; light yellowish brown (10YR 6/4) fine sandy loam consisting of stratified loam to loamy sand, brown (10YR 4/3) moist; common fine oxidized mine tailings; strong brown (7.5YR 5/8) dry; weak fine and medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine and fine tubular pores; 1 percent gravel; moderately acid; clear smooth boundary.

C2—9 to 30 inches; light yellowish brown (2.5Y 6/3) fine sandy loam consisting of stratified loam to loamy sand, very dark grayish brown (2.5Y 3/2) moist; few fine oxidized mine tailings; strong brown (7.5YR 5/6) dry; massive; slightly hard, very friable, slightly sticky, slightly plastic; common fine, medium, and coarse roots; few very fine and fine tubular pores; 1 percent gravel; slightly acid; gradual smooth boundary.

C3—30 to 42 inches; light brownish gray (2.5Y 6/2) fine sandy loam consisting of stratified loamy sand to sandy loam, very dark grayish brown (2.5Y 3/2) moist; few fine oxidized mine tailings; strong brown (7.5YR 5/6) dry; massive; soft, very

friable, nonsticky, nonplastic; few very fine, fine, and medium roots; 1 percent gravel; slightly alkaline; clear smooth boundary.

C4—42 to 61 inches; light yellowish brown (2.5Y 6/3) very gravelly loamy sand, dark olive brown (2.5Y 3/3) moist; common fine oxidized mine tailings; strong brown (7.5YR 5/8) dry; massive; soft, very friable, nonsticky, nonplastic; few very fine roots; few very fine tubular pores; 10 percent cobbles; 40 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Depth to the seasonal high water table: 42 to 60 inches

C1 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 10 to 20 percent

Reaction: pH 5.1 to 7.3

C2 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 10 to 20 percent

Reaction: pH 5.6 to 7.3

C3 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 5 to 15 percent

Reaction: pH 6.6 to 8.4

C4 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 5 to 10 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent gravel

Reaction: pH 6.6 to 8.4

Aridic Ustorthents

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Slope range: 1 to 35 percent

Elevation range: 5,080 to 5,600 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Aridic Ustorthents

Typical Pedon

Aridic Ustorthents, 8 to 15 percent slopes, in an area of range reclamation, 2,300 feet north and 300 feet east of the southwest corner of sec. 7, T. 4 N., R. 10 W.

- A—0 to 11 inches; light olive brown (2.5Y 5/3) very cobbly clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine interstitial pores; 25 percent rounded cobbles; 25 percent rounded gravel; slightly effervescent; moderately alkaline; abrupt smooth boundary.
- C1—11 to 20 inches; light brownish gray (10YR 6/2) very gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; massive; very hard, very firm, moderately sticky, very plastic; violently effervescent; 5 percent cobbles; 35 percent angular gravel; slightly alkaline; clear wavy boundary.
- C2—20 to 28 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam, grayish brown (10YR 5/2) moist; massive; very hard, very firm, moderately sticky, moderately plastic; 20 percent rounded rhyolite gravel; slightly effervescent; moderately alkaline; clear wavy boundary.
- C3—28 to 60 inches; light brownish gray (10YR 6/2) gravelly sandy clay loam, grayish brown (10YR 5/2) moist; massive; very hard, very firm, moderately sticky, moderately plastic; 5 percent cobbles; 25 percent rounded rhyolite gravel; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 3 to 5 moist
 Chroma: 2 to 4
 Clay content: 28 to 35 percent
 Content of rock fragments: 35 to 60 percent—15 to 25 percent cobbles; 25 to 45 percent gravel
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 7.4 to 8.4

C1 horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loam or sandy clay loam
 Clay content: 20 to 30 percent
 Content of rock fragments: 15 to 50 percent—0 to 5 percent cobbles; 20 to 45 percent gravel
 Reaction: pH 7.4 to 8.4

C2 and C3 horizons

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loam or sandy clay loam
 Clay content: 20 to 30 percent
 Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 35 percent gravel
 Reaction: pH 7.4 to 8.4

Aridic Ustorthents, clayey substratum

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Slope range: 35 to 60 percent

Elevation range: 4,700 to 5,400 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Aridic Ustorthents

Typical Pedon

Aridic Ustorthents, clayey substratum, 4 to 15 percent slopes, in an area of golf course reclamation, 2,000 feet west and 400 feet south of the northeast corner of sec. 2, T. 4 N., R. 11 W.

- A—0 to 2 inches; light olive brown (2.5Y 5/3) coarse sandy loam, brown (10YR 4/3) moist; weak medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine interstitial pores; 5 percent gravel; strongly effervescent; moderately alkaline; abrupt smooth boundary.
- C1—2 to 10 inches; light yellowish brown (10YR 6/3) cobbly clay loam, dark grayish brown (10YR 4/2) moist; massive; very hard, very firm, moderately sticky, very plastic; slightly effervescent; 1 percent stones; 15 percent cobbles; 10 percent gravel; slightly alkaline; clear wavy boundary.
- C2—10 to 14 inches; light yellowish brown (2.5Y 6/4) cobbly clay loam, brown (10YR 5/3) moist; massive; very hard, very firm, moderately sticky, very plastic; 1 percent stones; 15 percent cobbles; 5 percent gravel; slightly effervescent; moderately alkaline; clear wavy boundary.
- C3—14 to 22 inches; light brownish gray (2.5Y 6/2) clay, dark grayish brown (10YR 4/2) moist; massive; very hard, very firm, moderately sticky, very plastic; 5 percent gravel; slightly alkaline; clear wavy boundary.
- C4—22 to 29 inches; light gray (2.5Y 7/2) clay loam, brown (10YR 5/3) moist; massive; hard, friable, moderately sticky, moderately plastic; few very fine interstitial pores; 10 percent gravel; slightly alkaline; abrupt wavy boundary.
- Ab—29 to 60 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; massive; extremely hard, very firm, moderately sticky, very plastic; 5 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

A horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 10 to 20 percent

Content of rock fragments: 0 to 15 percent gravel

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

C1, C2, and C3 horizons

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Clay loam or clay
 Clay content: 35 to 45 percent
 Content of rock fragments: 0 to 35 percent—0 to 5 percent stones; 0 to 15 percent cobbles; 0 to 20 percent gravel
 Reaction: pH 7.4 to 8.4

C4 horizon

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry; 5 or 6 moist
 Chroma: 2 to 4
 Clay content: 30 to 40 percent
 Content of rock fragments: 0 to 15 percent gravel
 Reaction: pH 7.4 to 8.4

Ab horizon

Hue: 10YR or 2.5Y
 Value: 4 or 5 dry; 2 to 4 moist
 Chroma: 2 or 3
 Clay content: 35 to 40 percent
 Content of rock fragments: 0 to 15 percent gravel
 Reaction: pH 7.4 to 8.4

Arlen Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Crests, ridges, and side slopes of mountains and hills
Parent material: Residuum from welded tuff
Slope range: 8 to 60 percent
Elevation range: 5,200 to 6,200 feet
Annual precipitation: 15 to 24 inches
Annual air temperature: 36 to 39 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Ashy-skeletal, glassy, calcareous, frigid Lithic Ustorthents

Typical Pedon

Arlen very gravelly ashy sandy loam, in an area of Arlen-Caramon-Rock outcrop complex, 15 to 60 percent slopes, severely impacted, in an area of woodland, 1,700 feet east and 1,600 feet north of the southwest corner of sec. 18, T. 5 N., R. 10 W.

A—0 to 3 inches; light gray (2.5Y 7/2) very gravelly ashy sandy loam, dark grayish brown (2.5Y 4/2) moist; weak coarse granular structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine and common very fine roots; 10 percent cobbles; 30 percent gravel; slightly alkaline; abrupt wavy boundary.

B_{Ck}—3 to 9 inches; light gray (2.5Y 7/2) very gravelly ashy sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; common fine and many very fine roots; 10 percent cobbles; 40 percent gravel; common fine threads and masses of lime; slightly effervescent; slightly alkaline; clear wavy boundary.

Cr—9 to 13 inches; light gray (2.5Y 7/2) decomposing welded tuff bedrock.

R—13 inches; light gray (5Y 7/1) fractured hard welded tuff bedrock.

Range in Characteristics

Soil temperature: 38 to 42 degrees F

Moisture control section: Between 4 and 12 inches or between 4 inches and the paralithic contact if less than 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Depth to the Cr horizon: 8 to 17 inches

Depth to bedrock: 11 to 18 inches

A horizon

Hue: 10YR or 2.5Y

Value: 3 to 7 dry; 2 to 4 moist

Chroma: 1 or 2

Clay content: 10 to 20 percent

Content of rock fragments: 35 to 45 percent—5 to 15 percent stones and cobbles; 10 to 30 percent gravel

Reaction: pH 6.6 to 7.8

B_{ck} horizon

Hue: 10YR or 2.5Y

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Ashy sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 10 to 24 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and cobbles; 30 to 40 percent gravel

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 6.6 to 7.8

Bata Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Mountains

Parent material: Colluvium from argillite

Slope range: 15 to 35 percent

Elevation range: 6,300 to 7,400 feet

Annual precipitation: 25 to 40 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Glossocryalfs

Typical Pedon

Bata gravelly ashy loam, mod temp, 15 to 35 percent slopes, in an area of woodland, 1,200 feet west and 1,450 feet north of the southeast corner of sec. 33, T. 6 N., R. 11 W.

Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.

Bw—2 to 9 inches; light yellowish brown (10YR 6/4) gravelly ashy loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common coarse and many fine and medium roots; many very fine irregular pores; 5 percent cobbles; 25 percent gravel; moderately acid; clear smooth boundary.

2E/Bt—9 to 22 inches; E part (80 percent) is light brownish gray (10YR 6/2) very gravelly loam, grayish brown (10YR 5/2) moist; interfingering into B part; B part (20 percent) is brown (10YR 5/3) very gravelly sandy clay loam, brown (10YR 4/3) moist; texture mixed is very gravelly clay loam; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; few very fine and fine tubular pores; 15 percent cobbles; 40 percent gravel; moderately acid; clear smooth boundary.

2Bt—22 to 60 inches; pale brown (10YR 6/3) very gravelly sandy clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few medium and common very fine and fine roots; common fine tubular pores; few distinct clay films on faces of peds and lining pores; 15 percent cobbles; 40 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 37 to 40 degrees F

Moisture control section: Between 4 and 12 inches

Bw horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 4 or 6

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent stones and cobbles; 15 to 30 percent gravel

Acid oxalate extractable Fe + Al: More than 1 percent

Moist bulk density: 1 g/cm³ or less

Reaction: pH 5.1 to 6.5

2E/Bt horizon

Value: E part: 6 to 8 dry; 5 or 6 moist; B part: 5 or 6 dry; 4 or 5 moist

Chroma: E part: 2 to 4; B part: 3 or 4

Clay content: 12 to 25 percent

Content of rock fragments: 25 to 60 percent—0 to 15 percent stones and cobbles; 25 to 50 percent gravel

Reaction: pH 5.6 to 6.5

2Bt horizon

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Clay loam or sandy clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 15 percent stones and cobbles; 35 to 50 percent gravel

Reaction: pH 5.6 to 6.5

Bearmouth Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate to 14 inches (0.6 to 2.0 inches/hour), rapid (6 to 20 inches/hour) below

Landform: Flood plains

Parent material: Alluvium

Slope range: 2 to 4 percent

Elevation range: 5,700 to 6,200 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 36 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Sandy-skeletal, mixed Ustic Haplocryolls

Typical Pedon

Bearmouth gravelly loam, 2 to 8 percent slopes, in an area of irrigated hay, 600 feet east and 1,900 feet south of the northwest corner of sec. 23, T. 1 N., R. 14 W.

A—0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; many very fine and fine roots; few fine interstitial pores; 5 percent cobbles; 10 percent gravel; neutral; clear smooth boundary.

Bw1—3 to 10 inches; grayish brown (10YR 5/2) loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to moderate medium granular; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; 5 percent cobbles; 5 percent gravel; neutral; clear smooth boundary.

Bw2—10 to 14 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 15 percent cobbles; 30 percent gravel; neutral; clear wavy boundary.

2C—14 to 60 inches; light yellowish brown (10YR 6/4) extremely cobbly loamy sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; many very fine and fine roots; few fine interstitial pores; 40 percent cobbles; 35 percent gravel; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the 2C horizon: 10 to 20 inches

A horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 10 to 25 percent

Content of rock fragments: 10 to 50 percent—5 to 35 percent cobbles; 5 to 15 percent gravel

Reaction: pH 6.6 to 7.3

Bw horizons

Hue: 10YR or 7.5YR

Value: 3 to 6 dry; 2 to 4 moist

Chroma: 2 to 4

Texture: Loam, sandy clay loam, or sandy loam

Clay content: 10 to 25 percent

Content of rock fragments: 10 to 60 percent—5 to 30 percent cobbles; 5 to 30 percent gravel

Reaction: pH 6.6 to 7.8

2C horizon

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 60 to 90 percent—25 to 50 percent stones and cobbles; 35 to 40 percent gravel
 Reaction: pH 6.6 to 7.8

Beaverell Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to the 2C horizon, rapid (6 to 20 inches/hour) below
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 35 percent
Elevation range: 3,600 to 6,400 feet
Annual precipitation: 10 to 14 inches
Annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Argiustolls

Typical Pedon

Beaverell cobbly loam, 0 to 4 percent slopes, in an area of rangeland, 2,000 feet south and 1,200 feet east of the northwest corner of sec. 10, T. 7 N., R. 10 W.; Powell County, Montana.

- A—0 to 5 inches; grayish brown (10YR 5/2) cobbly loam, very dark brown (10YR 2/2) moist; weak medium platy structure parting to moderate medium granular; soft, friable, nonsticky, nonplastic; many very fine and fine roots; common very fine discontinuous vesicular pores; 10 percent cobbles; 15 percent gravel; slightly acid; clear wavy boundary.
- Bt1—5 to 12 inches; brown (7.5YR 5/4) very cobbly loam, brown (7.5YR 4/4) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky, slightly plastic; common very fine and fine roots; few very fine discontinuous tubular pores; few faint clay films on faces of peds; 15 percent cobbles; 35 percent gravel; neutral; gradual wavy boundary.
- Bt2—12 to 16 inches; yellowish brown (10YR 5/6) very cobbly loam, dark yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, slightly plastic; common very fine and fine roots; few very fine discontinuous tubular pores; common faint clay films on faces of peds; 15 percent cobbles; 35 percent gravel; neutral; clear wavy boundary.
- 2Bk1—16 to 31 inches; white (10YR 8/2) extremely gravelly loamy sand, light brownish gray (10YR 6/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few fine roots; 25 percent cobbles; 40 percent gravel; disseminated lime; continuous distinct lime casts coating coarse fragments; violently effervescent; slightly alkaline; gradual wavy boundary.
- 2Bk2—31 to 60 inches; reddish yellow (5YR 6/6) extremely gravelly loamy sand, yellowish red (5YR 5/6) moist; single grain; loose, nonsticky, nonplastic; 20 percent cobbles; 45 percent gravel; disseminated lime; continuous distinct lime casts coating coarse fragments; strongly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 40 to 47 degrees F

Moisture control section: Between 4 and 12 inches; dry in some part less than five-tenths and dry in some part more than six-tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or higher

Thickness of the mollic epipedon: 7 to 14 inches

Depth to the Bk horizon: 10 to 20 inches

A horizon

Value: 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 10 to 35 percent

Content of rock fragments: 5 to 35 percent—0 to 15 percent cobbles; 5 to 20 percent gravel

Reaction: pH 6.6 to 7.8

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 3 to 5 dry; 2 to 4 moist

Chroma: 2 to 4

Texture: Clay loam, sandy clay loam, or loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 15 percent cobbles; 35 to 45 percent gravel

Reaction: pH 6.6 to 7.8

Bt2 horizon

Hue: 10YR, 7.5Y, or 2.5Y

Value: 3 to 5 dry; 2 to 4 moist

Chroma: 2 to 4 or 6

Texture: Clay loam, sandy clay loam, or loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 15 percent cobbles; 35 to 45 percent gravel

Reaction: pH 6.6 to 7.8

2Bk1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 8 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loamy sand, sand, or sandy loam

Clay content: 0 to 15 percent

Content of rock fragments: 35 to 75 percent—5 to 30 percent cobbles; 30 to 45 percent gravel

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

2Bk2 horizon

Hue: 10YR, 5YR, or 2.5Y

Value: 4 to 6 dry; 4 to 6 moist

Chroma: 2 to 4 or 6

Texture: Loamy sand or sand

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 80 percent—5 to 30 percent stones and cobbles; 30 to 60 percent gravel

Calcium carbonate equivalent: 2 to 10 percent

Reaction: pH 6.6 to 8.4

Bendoh Series

Depth class: Deep (40 to 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountainsides

Parent material: Colluvium and alluvium over residuum from rhyolite

Slope range: 2 to 70 percent

Elevation range: 5,400 to 7,800 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 30 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Ashy, glassy Vitrandic Eutrocryepts

Typical Pedon

Bendoh very gravelly ashy loam, in an area of Bendoh-Karloff-Eremis complex, 15 to 35 percent slopes, moderately impacted, in an area of forestland, 2,000 feet south and 2,400 feet west of the northeast corner of sec. 16, T. 3 N., R. 11 W.

Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.

A—1 to 3 inches; dark grayish brown (10YR 4/2) very gravelly ashy loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; slightly hard, very friable, slightly sticky, nonplastic; 5 percent cobbles; 35 percent gravel; strongly acid; clear smooth boundary.

E—3 to 7 inches; grayish brown (10YR 5/2) gravelly ashy loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine roots; many very fine and fine tubular pores; 5 percent cobbles; 15 percent gravel; moderately acid; clear wavy boundary.

Bw—7 to 15 inches; light brownish gray (10YR 6/2) gravelly ashy sandy clay loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; 5 percent cobbles; 15 percent gravel; moderately acid; gradual wavy boundary.

BC—15 to 29 inches; light gray (2.5Y 7/2) gravelly ashy sandy clay loam, olive gray (5Y 4/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; 10 percent cobbles; 20 percent gravel; moderately acid; gradual irregular boundary.

C1—29 to 43 inches; light gray (2.5Y 7/2) very gravelly ashy sandy clay loam, olive gray (5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and fine roots; few very fine and fine tubular pores; 10 percent cobbles; 25 percent gravel; slightly acid; gradual irregular boundary.

C2—43 to 51 inches; light gray (5Y 7/2) very gravelly ashy sandy clay loam, olive gray (5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; 15 percent cobbles; 40 percent gravel; slightly acid; gradual wavy boundary.

Cr—51 to 56 inches; light gray (5Y 7/2) decomposing welded tuff bedrock that crushes to gravelly or very gravelly ashy sandy clay loam; slightly acid.

R—56 inches; light gray (5Y 7/2) fractured welded tuff bedrock.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F

Mean summer soil temperature: 40 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Depth to the Cr horizon: 40 to 55 inches

Depth to bedrock: 55 to 60 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 3 to 5 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 45 percent—0 to 10 percent stones and cobbles; 15 to 35 percent gravel

Reaction: pH 5.1 to 6.5

E horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Ashy loam, ashy sandy loam, or ashy sandy clay loam

Clay content: 15 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 15 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.1 to 6.5

Bw horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent stones and cobbles; 5 to 30 percent gravel

Reaction: pH 5.6 to 7.3

BC and C1 horizons

Hue: 2.5Y or 5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 1 or 2

Texture: Ashy sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.6 to 7.3

C2 horizon

Hue: 2.5Y or 5Y

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 1 or 2

Texture: Ashy sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 60 percent—0 to 15 percent stones and cobbles; 15 to 40 percent gravel

Reaction: pH 5.6 to 7.3

Bignell Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Mountains and moraines

Parent material: Colluvium from fine-grained extrusive igneous rocks and glacial till

Slope range: 8 to 60 percent

Elevation range: 4,000 to 7,400 feet

Annual precipitation: 18 to 30 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Clayey-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Bignell gravelly clay loam, 15 to 35 percent slopes, in an area of woodland, 1,400 feet west and 2,100 feet south of the northeast corner of sec. 24, T. 10 N., R. 9 W.; Powell County, Montana.

Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.

E—2 to 15 inches; light brownish gray (10YR 6/2) gravelly clay loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; common medium and many very fine and fine roots; common very fine and fine tubular pores; 5 percent cobbles; 20 percent gravel; moderately acid; clear wavy boundary.

E/Bt—15 to 19 inches; E part (75 percent) is pinkish gray (7.5YR 6/2) very gravelly clay loam, brown (7.5YR 5/3) moist; B part (25 percent) is brown (7.5YR 5/2) very gravelly clay loam, dark brown (7.5YR 3/4) moist; common distinct clay films on faces of peds; moderate medium subangular blocky structure parting to weak fine subangular blocky; slightly hard, firm, slightly sticky, moderately plastic; common medium and many very fine and fine roots; common very fine and fine tubular pores; 5 percent cobbles; 40 percent gravel; slightly acid; clear wavy boundary.

Bt1—19 to 27 inches; brown (7.5YR 5/4) very gravelly clay, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few fine and common very fine roots; few very fine and fine tubular pores; common distinct clay films on faces of peds; 15 percent cobbles; 40 percent gravel; slightly acid; clear wavy boundary.

Bt2—27 to 60 inches; brown (7.5YR 5/4) very gravelly clay loam; dark brown (7.5YR 4/4) moist; strong fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine and fine roots; few very fine and fine tubular pores; common distinct clay films on faces of peds; 15 percent cobbles; 45 percent gravel; moderately acid.

Range in Characteristics

Soil temperature: 40 to 44 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 10 to 30 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent gravel
 Reaction: pH 5.1 to 7.3

E/Bt horizon

Hue: 10YR or 7.5YR
 Value: E part: 5 to 7 dry; 5 or 6 moist; B part: 5 to 7 dry
 Chroma: E part: 1 to 3; B part: 2 to 4 or 6
 Texture: Loam or clay loam
 Clay content: 10 to 35 percent
 Content of rock fragments: 35 to 55 percent—0 to 5 percent cobbles; 35 to 50 percent gravel
 Reaction: pH 5.1 to 7.3

Bt horizons

Hue: 10YR or 7.5YR
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Clay loam or clay
 Clay content: 35 to 60 percent
 Content of rock fragments: 35 to 60 percent—0 to 15 percent cobbles; 35 to 45 percent gravel
 Reaction: pH 5.1 to 7.3

Blossberg Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour) to the 2C horizon, rapid (6 to 20 inches/hour) below

Landform: Flood plains, depressions, drainageways, and alluvial fans

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Typic Endoaquolls

Typical Pedon

Blossberg loam, 0 to 4 percent slopes, in an area of pasture, 2,400 feet south and 200 feet west of the northeast corner of sec. 6, T. 6 N., R. 9 W.; Powell County, Montana.

A—0 to 14 inches; black (10YR 2/1) loam, very dark gray (10YR 3/1) dry; many large prominent yellowish brown (10YR 5/6) redox concentrations; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine, medium, and coarse roots; many very fine and fine irregular pores; neutral; clear smooth boundary.

Bg1—14 to 23 inches; dark grayish brown (2.5Y 4/2) loam, grayish brown (2.5Y 5/2) dry; many large prominent yellowish brown (10YR 5/8) redox concentrations; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, moderately plastic; many very fine roots; many very fine and fine irregular pores; 5 percent cobbles; slightly alkaline; gradual smooth boundary.

- Bg2—23 to 28 inches; grayish brown (2.5Y 5/2) gravelly loam, light brownish gray (2.5Y 6/2) dry; few fine prominent red (2.5YR 5/8) redox concentrations; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine irregular pores; 5 percent cobbles; 20 percent gravel; slightly alkaline; gradual wavy boundary.
- 2Cg—28 to 60 inches; dark grayish brown (10YR 4/2) very cobbly loamy coarse sand; light brownish gray (10YR 6/2) dry; common large prominent red (2.5YR 5/8) redox concentrations; single grain; loose, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 35 percent cobbles; 20 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 24 inches

Depth to the 2Cg horizon: 20 to 40 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Value: 2 or 3 moist; 3 to 5 dry

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 6.6 to 7.8

Bg1 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 3 or 4 moist; 3 to 6 dry

Chroma: 2 or 3

Texture: Clay loam, loam, or silty clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Calcium carbonate equivalent: 0 to 15 percent

Reaction: pH 7.4 to 8.4

Bg2 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4 or 5 moist; 5 or 6 dry

Chroma: 1 or 2

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 20 to 40 percent—5 to 15 percent cobbles; 15 to 25 percent gravel

Calcium carbonate equivalent: 0 to 15 percent

Reaction: pH 7.4 to 8.4

2Cg horizon

Value: 4 or 5 moist; 6 or 7 dry

Chroma: 2 to 4

Texture: Coarse sand, loamy coarse sand, or sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 60 percent—25 to 35 percent cobbles; 15 to 25 percent gravel

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 7.4 to 8.4

Braziel Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Hills and mountains

Parent material: Colluvium from fine-grained extrusive igneous rock

Slope range: 2 to 60 percent

Elevation range: 3,800 to 6,900 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Pachic Argiustolls

Typical Pedon

Braziel gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 1,200 feet south and 1,450 feet east of the northwest corner of sec. 21, T. 7 N., R. 10 W.; Powell County, Montana.

A1—0 to 5 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/3) moist; strong fine granular structure; soft, friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; 10 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.

A2—5 to 8 inches; brown (10YR 5/3) gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, moderately plastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; 10 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.

Bt1—8 to 29 inches; brown (10YR 5/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; few faint clay films on faces of peds; 15 percent cobbles; 35 percent gravel; neutral; gradual smooth boundary.

Bt2—29 to 43 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine and fine roots; many very fine and fine tubular pores; common faint clay films on faces of peds; 15 percent cobbles; 35 percent gravel; neutral; clear smooth boundary.

BC—43 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; 10 percent cobbles; 40 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 30 inches

A1 horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3 dry; 1 to 3 moist

Clay content: 10 to 27 percent
 Content of rock fragments: 15 to 35 percent—5 to 15 percent stones and cobbles; 10 to 20 percent gravel
 Reaction: pH 6.6 to 7.3

A2 horizon

Value: 3 to 5 dry; 2 or 3 moist
 Chroma: 2 or 3 dry; 1 to 3 moist
 Texture: Clay loam or loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 5 to 60 percent—0 to 10 percent cobbles; 5 to 25 percent gravel
 Reaction: pH 6.6 to 7.3

Bt horizons

Value: 4 to 6 dry; 3 or 4 moist
 Chroma: 2 to 4
 Texture: Clay loam or loam
 Clay content: 25 to 35 percent
 Content of rock fragments: 35 to 75 percent—10 to 35 percent cobbles; 25 to 40 percent gravel
 Reaction: pH 6.6 to 7.3

BC horizon

Value: 5 to 7 dry; 3 to 6 moist
 Chroma: 3 or 4 dry; 2 to 4 moist
 Texture: Clay loam, loam, sandy loam, or sandy clay loam
 Clay content: 15 to 30 percent
 Content of rock fragments: 35 to 70 percent—10 to 35 percent cobbles; 25 to 40 percent gravel
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 6.6 to 7.8

Bridger Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 2 to 35 percent
Elevation range: 4,800 to 7,000 feet
Annual precipitation: 15 to 22 inches
Annual air temperature: 36 to 45 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Ustic Argicryolls

Typical Pedon

Bridger cobbly loam, 8 to 15 percent slopes, in an area of rangeland, 2,500 feet south and 400 feet west of the northeast corner of sec. 27, T. 2 N., R. 13 W.

A—0 to 9 inches; dark gray (10YR 4/1) cobbly loam, very dark gray (10YR 3/1) moist; strong fine granular structure; soft, very friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; few fine tubular pores; 10 percent cobbles; 10 percent gravel; slightly acid; clear smooth boundary.

- Bt1—9 to 13 inches; grayish brown (10YR 5/2) gravelly clay, dark brown (10YR 3/3) moist; strong fine subangular blocky structure; hard, very friable, moderately sticky, moderately plastic; few medium and many very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds; 5 percent cobbles; 15 percent gravel; slightly acid; clear wavy boundary.
- Bt2—13 to 28 inches; yellowish brown (10YR 5/4) gravelly clay, dark yellowish brown (10YR 4/4) moist; moderate medium and coarse prismatic structure parting to strong fine and medium angular blocky; very hard, very firm, very sticky, very plastic; few medium and many very fine and fine roots; few very fine tubular pores; continuous distinct grayish brown (10YR 5/3) clay films on faces of peds; 15 percent gravel; neutral; clear wavy boundary.
- Bt3—28 to 36 inches; yellowish brown (10YR 5/4) clay, dark yellowish brown (10YR 4/4) moist; strong fine and medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few very fine roots; few very fine tubular pores; many distinct grayish brown (10YR 5/3) clay films on faces of peds; 5 percent gravel; neutral; clear wavy boundary.
- Btk—36 to 43 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine and medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine roots; few very fine tubular pores; common distinct grayish brown (10YR 5/3) clay films on faces of peds; common fine and few medium soft masses of white (10YR 8/1) lime; 5 percent gravel; slightly alkaline; gradual wavy boundary.
- Bk—43 to 60 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; weak fine and medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; few very fine tubular pores; many fine and few medium soft masses of white (10YR 8/1) lime; many medium white (10YR 8/1) lime coats on gravel; violently effervescent; 10 percent gravel; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 40 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 14 inches

A horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent gravel

Reaction: pH 6.1 to 7.8

Bt horizons

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Clay, silty clay, or clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent gravel; Reaction: pH 6.1 to 7.8

Btk horizon

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Clay loam or loam

Clay content: 20 to 40 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent gravel

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

Bk horizon

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 2 to 4

Texture: Clay loam or loam

Clay content: 18 to 35 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent gravel

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

Burrfoot Series

Depth class: Deep (40 to 60 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Footslopes and side slopes of hills

Parent material: Colluvium and residuum from rhyolite

Slope range: 15 to 35 percent

Elevation range: 5,100 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Ashy-skeletal, glassy, frigid Vitrandic Haplustolls

Typical Pedon

Burrfoot gravelly ashy sandy clay loam, in an area of Burrfoot-Nivean complex, 15 to 35 percent slopes, moderately impacted, in an area of rangeland, 400 feet east and 1,300 feet north of the southwest corner of sec. 18, T. 5 N., R. 10 W.

A1—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly ashy sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, soft, slightly sticky, slightly plastic; common fine and medium and many very fine roots; 5 percent angular cobbles; 15 percent gravel; neutral; clear wavy boundary.

A2—5 to 12 inches; brown (10YR 4/3) very gravelly ashy sandy clay loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, friable, slightly sticky, moderately plastic; common fine and medium and many very fine roots; few fine and common very fine tubular pores; 15 percent angular cobbles; 30 percent gravel; neutral; clear wavy boundary.

Bw1—12 to 20 inches; light olive brown (2.5Y 5/4) very gravelly ashy coarse sandy loam, olive brown (2.5Y 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; few fine and medium and many very fine roots; common very fine tubular pores; 15 percent angular cobbles; 35 percent gravel; neutral; gradual wavy boundary.

Bw2—20 to 29 inches; light yellowish brown (2.5Y 6/4) very gravelly ashy coarse sandy loam, dark yellowish brown (10YR 4/6) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; few fine and common very fine roots; common very fine tubular pores; 15 percent angular cobbles; 35 percent gravel; neutral; gradual wavy boundary.

BC—29 to 48 inches; light gray (2.5Y 7/1) ashy sandy loam, light yellowish brown (2.5Y 6/3) moist; massive; slightly hard, very friable, slightly sticky, nonplastic; few very fine roots; common very fine tubular pores; slightly effervescent in lower portion; 10 percent gravel; slightly alkaline; gradual wavy boundary.

Cr—48 to 60 inches; light gray (10YR 7/2) semiconsolidated welded tuff bedrock that crushes to very gravelly coarse sandy loam; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 8 and 24 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Thickness of the mollic epipedon: 8 to 15 inches

Depth to the Cr horizon: 40 to 60 inches

A horizons

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 20 to 32 percent

Content of rock fragments: 15 to 60 percent—0 to 20 percent stones and cobbles; 15 to 40 percent gravel

Reaction: pH 6.1 to 7.3

Bw horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Ashy coarse sandy loam, ashy sandy loam, or ashy sandy clay loam

Clay content: 10 to 24 percent

Content of rock fragments: 35 to 60 percent—15 to 20 percent stones and cobbles; 20 to 40 percent gravel

Reaction: pH 6.1 to 7.3

BC horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy sandy loam, ashy coarse sandy loam, or ashy loamy coarse sand

Clay content: 5 to 18 percent

Content of rock fragments: 10 to 60 percent—0 to 20 percent stones and cobbles; 10 to 40 percent gravel

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 7.4 to 8.4

Bushong Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to the 2C horizon, rapid (6 to 20 inches/hour) below

Landform: Stream terraces, outwash plains, and flood plains

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, frigid Aeric Endoaquents

Typical Pedon

Bushong loam, 0 to 4 percent slopes, in an area of pasture, 500 feet east and 100 feet north of the southwest corner of sec. 6, T. 6 N., R. 9 W.; Powell County, Montana.

Oi—0 to 1 inch; partially decomposed organic matter.

A—1 to 3 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; common very fine and fine discontinuous irregular pores; 5 percent gravel; slightly effervescent; moderately alkaline; clear smooth boundary.

Bw—3 to 5 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; few fine faint dark yellowish brown (10YR 4/4) redox concentrations; moderate fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; common very fine and fine discontinuous irregular pores; 5 percent gravel; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk—5 to 16 inches; brown (10YR 5/3) gravelly loam, brown (10YR 4/3) moist; many fine distinct brown (7.5YR 4/4) redox concentrations; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; common very fine and fine discontinuous irregular pores; 10 percent cobbles; 20 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

2C—16 to 60 inches; pale brown (10YR 6/3) very cobbly sand; brown (10YR 5/3) moist; many medium distinct brown (10YR 4/4) redox concentrations; single grain; loose, nonsticky, nonplastic; few medium and common very fine and fine roots; common very fine and fine discontinuous irregular pores; 30 percent cobbles; 25 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the Bk horizon: 3 to 8 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 or 2

Clay content: 15 to 25 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent cobbles; 0 to 5 percent gravel

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 7.4 to 8.4

Bw horizon

Hue: 10YR or 2.5Y
 Value: 3 or 4 moist; 4 or 5 dry
 Chroma: 2 or 3
 Texture: Loam or sandy loam
 Clay content: 15 to 27 percent
 Content of rock fragments: 5 to 35 percent—0 to 5 percent cobbles; 5 to 30 percent gravel
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 10YR or 2.5Y
 Value: 4 or 5 moist; 5 or 6 dry
 Chroma: 3 or 4
 Texture: Loam, clay loam, or sandy loam
 Clay content: 15 to 30 percent
 Content of rock fragments: 5 to 35 percent—0 to 15 percent cobbles; 5 to 20 percent gravel
 Calcium carbonate equivalent: 3 to 15 percent
 Reaction: pH 7.4 to 8.4

2C horizon

Value: 4 to 6 moist; 6 or 7 dry
 Chroma: 2 or 3
 Clay content: 2 to 6 percent
 Content of rock fragments: 40 to 80 percent—10 to 30 percent cobbles; 25 to 55 percent gravel
 Reaction: pH 6.6 to 7.8

Caramon Series

Depth class: Deep (40 to 60 inches)
Drainage class: Well drained
Permeability: Slow (0.06 to 0.20 inch/hour)
Landform: Hills and mountains
Parent material: Colluvium and residuum from rhyolite
Slope range: 8 to 60 percent
Elevation range: 5,200 to 6,400 feet
Annual precipitation: 15 to 24 inches
Annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Ashy, glassy, frigid Vitrandic Haplustalfs

Typical Pedon

Caramon ashy loam, 15 to 35 percent slopes, moderately impacted, in an area of woodland, 1,100 feet west and 50 feet south of the northeast corner of sec. 14, T. 4 N., R. 11 W.

A—0 to 4 inches; dark grayish brown (10YR 4/2) ashy loam, black (10YR 2/1) (10YR 2/2) moist; weak fine granular structure; slightly hard, very friable, moderately sticky, moderately plastic; common fine and many very fine, medium, and coarse roots; 10 percent gravel; slightly acid; abrupt smooth boundary.

- E—4 to 9 inches; light brownish gray (10YR 6/2) gravelly ashy clay loam, brown (10YR 4/3) moist; weak fine granular structure; slightly hard, very friable, moderately sticky, moderately plastic; common very fine, fine, medium, and coarse roots; common very fine tubular pores; 20 percent gravel; neutral; abrupt smooth boundary.
- Bt1—9 to 18 inches; light olive brown (2.5Y 5/3) ashy clay, brown (10YR 4/3) moist; weak medium prismatic structure parting to moderate fine subangular blocky; very hard, firm, moderately sticky, very plastic; common very fine, fine, medium, and coarse roots; few very fine, fine, and medium tubular pores; common faint clay films on faces of peds; 10 percent gravel; neutral; clear smooth boundary.
- Bt2—18 to 30 inches; light brownish gray (10YR 6/2) ashy clay, dark grayish brown (10YR 4/2) moist; weak fine prismatic structure parting to weak fine subangular blocky; very hard, firm, moderately sticky, very plastic; few fine and medium and common very fine roots; few very fine and fine tubular pores; few faint clay films on faces of peds; 30 percent soft to semi-hard gravel-size fragments; neutral; gradual smooth boundary.
- BC—30 to 46 inches; light gray (10YR 7/1) ashy loam, grayish brown (10YR 5/2) moist; massive; slightly hard, friable, moderately sticky, moderately plastic; few very fine roots; 15 percent soft to semi-hard gravel-size fragments; neutral.
- R—46 inches; light gray (10YR 7/2) hard volcanic tuff bedrock.

Range in Characteristics

Soil temperature: 40 to 44 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Depth to the argillic horizon: 5 to 12 inches

Depth to bedrock: 40 to 60 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent stones and cobbles;
0 to 25 percent gravel

Reaction: pH 5.6 to 6.5

E horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Ashy loam or ashy clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 5 to 35 percent—0 to 5 percent stones and cobbles;
5 to 30 percent gravel

Reaction: pH 6.1 to 7.3

Bt horizons

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Ashy clay loam or ashy clay

Clay content: 35 to 50 percent

Content of rock fragments: 5 to 35 percent—0 to 5 percent stones and cobbles;
 5 to 30 percent gravel
 Reaction: pH 6.1 to 7.3

BC horizon

Value: 6 or 7 dry; 4 or 5 moist
 Chroma: 1 or 2
 Texture: Ashy loam, ashy clay loam, or ashy sandy clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 0 to 35 percent—0 to 5 percent stones and cobbles;
 0 to 30 percent gravel
 Reaction: pH 6.6 to 7.8

Carten Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour) above the 2C horizon, rapid (6 to 20 inches/hour) in the 2C horizon

Landform: Outwash plains, outwash fans, flood plains, and stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,600 to 6,000 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Oxyaquic Haplustolls

Typical Pedon

Carten loam, 0 to 4 percent slopes, in an area of irrigated hay, 2,950 feet north and 1,900 feet west of the southeast corner of sec. 30, T. 6 N., R. 9 W.

Ap—0 to 7 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine discontinuous irregular pores; 5 percent gravel; slightly effervescent; slightly alkaline; clear smooth boundary.

Bw—7 to 9 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine discontinuous irregular pores; 5 percent gravel; slightly effervescent; moderately alkaline; clear smooth boundary.

Bk—9 to 13 inches; light gray (10YR 7/2) gravelly clay loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; common very fine irregular pores; 25 percent gravel; disseminated lime; common distinct lime casts on gravel; violently effervescent; slightly alkaline; gradual wavy boundary.

BC—13 to 16 inches; brown (10YR 5/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; common very fine irregular pores; 5 percent cobbles; 35 percent gravel; strongly effervescent; slightly alkaline; clear smooth boundary.

2C—16 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; few fine distinct brownish yellow (10YR 6/8) redox concentrations; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; many fine irregular pores; 15 percent cobbles; 35 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the Bk horizon: 9 to 13 inches

Depth to the 2C horizon: 12 to 20 inches

Ap horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 0 to 30 percent gravel

Reaction: pH 7.4 to 8.4

Bk horizon

Value: 5 to 8 dry; 4 to 6 moist

Chroma 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent gravel

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.4 to 8.4

BC horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Clay content: 8 to 18 percent

Content of rock fragments: 35 to 60 percent—5 to 15 percent cobbles; 30 to 45 percent gravel

Reaction: pH 7.4 to 8.4

2C horizon

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loamy sand or sand

Clay content: 2 to 10 percent

Content of rock fragments: 40 to 80 percent—10 to 25 percent cobbles; 30 to 55 percent gravel

Reaction: pH 7.4 to 8.4

Caseypeak Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountains

Parent material: Residuum from granite

Slope range: 35 to 60 percent

Elevation range: 6,400 to 7,000 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lithic Eutrocryepts

Typical Pedon

Caseypeak gravelly coarse sandy loam, in an area of Caseypeak, very bouldery-Franconi, very bouldery-Rock outcrop complex, 25 to 60 percent slopes, in an area of forestland, 1,550 feet north and 1,100 feet west of the southeast corner of sec. 19, T. 4 N., R. 3 W.; Jefferson County, Montana.

Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.

E—1 to 6 inches; light brownish gray (10YR 6/2) gravelly coarse sandy loam, brown (10YR 5/3) moist; moderate medium granular structure; slightly hard, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; few medium and many very fine and fine tubular pores; 20 percent gravel; slightly acid; clear wavy boundary.

Bw1—6 to 12 inches; brown (10YR 5/3) very gravelly coarse sandy loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; few fine and many very fine tubular and interstitial pores; 40 percent gravel; neutral; gradual wavy boundary.

Bw2—12 to 17 inches; pale brown (10YR 6/3) very gravelly coarse sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few medium, common fine, and many very fine roots; few fine and many very fine tubular and interstitial pores; 40 percent gravel; neutral; clear wavy boundary.

Cr—17 to 19 inches; light yellowish brown (2.5Y 6/4) decomposing granite bedrock (grus) that crushes to very gravelly loamy coarse sand; neutral.

R—19 inches; hard granite bedrock.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches or to the lithic contact when bedrock is less than 12 inches

Base saturation: Greater than 60 percent throughout

Depth to the Cr horizon: 10 to 18 inches

Depth to bedrock: 12 to 20 inches

Surface fragments: 0 to 3 percent boulders

E horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 or 3

Clay content: 10 to 20 percent

Content of rock fragments: 10 to 35 percent—0 to 15 percent stones and cobbles; 10 to 20 percent gravel
 Reaction: pH 5.6 to 6.5

Bw1 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Coarse sandy loam, sandy loam, or sandy clay loam
 Clay content: 10 to 22 percent
 Content of rock fragments: 35 to 60 percent gravel (mainly less than 7 mm in diameter)
 Reaction: pH 6.1 to 7.3

Bw2 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Coarse sandy loam, sandy loam, or sandy clay loam
 Clay content: 10 to 22 percent
 Content of rock fragments: 35 to 60 percent gravel (mainly less than 10 mm in diameter)
 Reaction: pH 6.1 to 7.3

Cetrack Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to the 2C horizon, rapid (6 to 20 inches/hour) below

Landform: Alluvial fans, stream terraces, and outwash plains

Parent material: Alluvium

Slope range: 0 to 15 percent

Elevation range: 3,800 to 5,600 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Cetrack loam, 0 to 4 percent slopes, in an area of irrigated cropland, 950 feet south and 1,100 feet west of the northeast corner of sec. 20, T. 7 N., R. 9 W.; Powell County, Montana.

Ap—0 to 6 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate thick platy structure; slightly hard, very friable, moderately sticky, slightly plastic; many very fine, fine, and medium roots; few medium tubular pores; neutral; abrupt smooth boundary.

Bw—6 to 11 inches; brown (10YR 5/3) loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; slightly alkaline; clear wavy boundary.

- Bk1—11 to 16 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; 5 percent gravel; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.
- Bk2—16 to 26 inches; very pale brown (10YR 8/3) loam; pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine irregular pores; 5 percent gravel; disseminated lime, few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk3—26 to 30 inches; very pale brown (10YR 7/3) sandy loam; pale brown (10YR 6/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, slightly plastic; common very fine, fine, and medium roots; 10 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; abrupt smooth boundary.
- 2C—30 to 60 inches; very pale brown (10YR 7/3) very gravelly loamy sand; pale brown (10YR 6/3) moist; single grain; loose, nonsticky, nonplastic; few very fine, fine, and medium roots; 35 percent gravel; few faint lime casts on undersides of coarse fragments; slightly alkaline.

Range in Characteristics

Soil temperature: 42 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 14 inches

Depth to the Bk horizon: 8 to 14 inches

Depth to the 2C horizon: 20 to 40 inches

Ap horizon

Chroma: 2 or 3

Clay content: 15 to 25 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.1 to 7.3

Bw horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 22 to 32 percent

Content of rock fragments: 0 to 20 percent—0 to 5 percent cobbles; 0 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bk1 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 22 to 32 percent

Content of rock fragments: 5 to 20 percent—0 to 5 percent cobbles; 5 to 15 percent gravel

Calcium carbonate equivalent: 5 to 20 percent

Reaction: pH 7.4 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y
 Value: 7 or 8 dry; 5 or 6 moist
 Chroma: 2 or 3
 Clay content: 18 to 25 percent
 Content of rock fragments: 5 to 25 percent—0 to 5 percent cobbles; 5 to 20 percent gravel
 Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.9 to 8.4

Bk3 horizon

Hue: 10YR or 2.5Y
 Value: 7 or 8 dry; 5 or 6 moist
 Chroma: 2 or 3
 Texture: Sandy loam or loam
 Clay content: 18 to 25 percent
 Content of rock fragments: 5 to 25 percent—0 to 5 percent cobbles; 5 to 20 percent gravel
 Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.9 to 8.4

2C horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 35 to 70 percent—0 to 20 percent cobbles; 35 to 50 percent gravel
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Clasoil Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains, alluvial fans, and stream terraces
Parent material: Alluvium and colluvium from granite
Slope range: 4 to 60 percent
Elevation range: 3,500 to 6,600 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 36 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Clasoil sandy loam, 4 to 8 percent slopes, in an area of rangeland, 1,300 feet south and 200 feet west of the northeast corner of sec. 34, T. 4 N., R. 10 W.

A—0 to 4 inches; brown (10YR 4/3) sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; 10 percent gravel; strongly acid; clear smooth boundary.

- Bt1—4 to 7 inches; brown (10YR 4/3) sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common distinct clay films bridging sand grains; 10 percent gravel; moderately acid; clear smooth boundary.
- Bt2—7 to 12 inches; yellowish brown (10YR 5/4) gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common distinct clay films bridging sand grains; 30 percent gravel; neutral; clear smooth boundary.
- BC—12 to 31 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few very fine roots; 30 percent gravel; neutral; clear smooth boundary.
- C—31 to 60 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky, nonplastic; few very fine roots; 30 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 12 to 20 percent

Content of rock fragments: 5 to 15 percent gravel

Reaction: pH 5.1 to 7.3

Bt horizons

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Sandy clay loam or loam

Clay content: 18 to 30 percent

Content of rock fragments: 10 to 35 percent gravel

Reaction: pH 5.6 to 7.3

BC horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Sandy loam or coarse sandy loam

Clay content: 12 to 20 percent

Content of rock fragments: 15 to 40 percent gravel

Reaction: pH 6.1 to 7.8

C horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Sandy loam, coarse sandy loam, or loamy coarse sand

Clay content: 12 to 20 percent

Content of rock fragments: 10 to 40 percent gravel

Reaction: pH 6.1 to 7.8

Comad Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Excessively drained

Permeability: Rapid (6 to 20 inches/hour)

Landform: Mountains

Parent material: Colluvium from granite

Slope range: 8 to 80 percent

Elevation range: 6,300 to 9,200 feet

Annual precipitation: 20 to 35 inches

Annual air temperature: 34 to 41 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Sandy-skeletal, mixed Lamellic Cryorthents

Typical Pedon

Comad very stony sandy loam, in an area of Comad-Elkner complex, 35 to 60 percent slopes, in an area of woodland, 2,800 feet south and 1,650 feet east of the northwest corner of sec. 29, T. 11 N., R. 7 W.; Powell County, Montana.

Oi—0 to 1 inch; partially decomposed forest litter.

E1—1 to 5 inches; light brownish gray (10YR 6/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; few fine and medium roots; few medium discontinuous irregular pores; 30 percent stones; 15 percent cobbles; 10 percent gravel; moderately acid; clear wavy boundary.

E2—5 to 18 inches; light brownish gray (10YR 6/2) very stony loamy sand, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few medium roots; few medium discontinuous irregular pores; 25 percent stones; 20 percent cobbles; 10 percent gravel; moderately acid; gradual wavy boundary.

E and Bt—18 to 43 inches; E part (80 percent) is light brownish gray (10YR 6/2) extremely stony loamy sand, grayish brown (10YR 5/2) moist; B part (20 percent) is brownish yellow (10YR 6/6) sandy clay loam lamellae 1/4- to 1/2-inch thick, yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine roots; few medium discontinuous irregular pores; 25 percent stones; 15 percent cobbles; 20 percent gravel; slightly acid; diffuse wavy boundary.

C—43 to 60 inches; light brownish gray (10YR 6/2) extremely stony loamy sand; dark grayish brown (10YR 4/2) moist; massive; loose, nonsticky, nonplastic; few very fine roots; 25 percent stones; 15 percent cobbles; 20 percent gravel; neutral.

Range in Characteristics

Soil temperature: 37 to 40 degrees F

Moisture control section: Between 12 and 35 inches

Depth to lamellae: 13 to 20 inches

E horizons

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 or 3

Clay content: 5 to 15 percent

Texture: Sandy loam or loamy sand

Content of rock fragments: 35 to 70 percent—10 to 35 percent stones; 15 to 25 percent cobbles; 10 to 15 percent gravel

Reaction: pH 5.1 to 7.3

E and Bt horizon

Hue: 10YR or 7.5YR

Value: E part: 6 or 7 dry; 4 to 6 moist; B part: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4 or 6

Clay content: 0 to 10 percent

Content of rock fragments: 50 to 80 percent—15 to 35 percent stones; 15 to 25 percent cobbles; 10 to 20 percent gravel

Reaction: pH 5.1 to 7.3

C horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 50 to 80 percent—25 to 35 percent stones; 15 to 25 percent cobbles; 10 to 20 percent gravel

Reaction: pH 5.1 to 7.3

Con Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Moderate (0.6 to 2.0 inches/hour)*Landform:* Alluvial fans and stream terraces*Parent material:* Calcareous alluvium*Slope range:* 0 to 60 percent*Elevation range:* 4,000 to 5,800 feet*Annual precipitation:* 10 to 14 inches*Annual air temperature:* 39 to 45 degrees F*Frost-free period:* 90 to 105 days**Taxonomic Class:** Fine-loamy, mixed, superactive, frigid Aridic Haplustolls**Typical Pedon**

Con loam, 0 to 4 percent slopes, in an area of cropland, 300 feet north and 600 feet east of the southwest corner of sec. 24, T. 7 N., R. 10 W.

Ap—0 to 7 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak medium granular structure; soft; friable, nonsticky, nonplastic; common very fine and fine roots; 5 percent gravel; neutral; clear smooth boundary.

Bw—7 to 11 inches; yellowish brown (10YR 5/4) clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; common very fine and fine roots; many fine irregular pores; 5 percent gravel; slightly alkaline; clear smooth boundary.

Bk1—11 to 21 inches; white (10YR 8/2) loam, very pale brown (10YR 7/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; many fine irregular pores; continuous distinct lime coats and casts on surface of gravel; common fine masses of lime; violently effervescent; 5 percent gravel; moderately alkaline; clear wavy boundary.

Bk2—21 to 34 inches; very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, friable, slightly sticky, nonplastic; few very fine and fine roots; common fine irregular pores; 5 percent gravel; continuous distinct lime casts and coats on surface of gravel; common fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Bk3—34 to 60 inches; very pale brown (10YR 7/3) gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, friable, nonsticky, nonplastic; few very fine and fine roots; common fine irregular pores; 15 percent gravel; continuous distinct lime casts and coats on surface of gravel; common fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches; dry in some part for six-tenths or more of the cumulative days per year when the soil temperature at a depth of 20 inches is 41 degrees F or higher

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the calcic horizon: 11 to 18 inches

Ap horizon

Chroma: 1 to 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 60 percent—0 to 20 percent cobbles; 0 to 55 percent gravel

Reaction: pH 4.5 to 7.3

Bw horizon

Value: 4 to 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bk1 horizon

Value: 7 or 8 dry; 5 to 7 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or sandy loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 20 percent—0 to 5 percent cobbles; 0 to 15 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Value: 5 to 8 dry; 4 to 6 moist

Chroma: 3 or 4

Texture: Sandy loam, clay loam, or loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 25 percent—0 to 5 percent cobbles; 0 to 20 percent gravel

Calcium carbonate equivalent: 15 to 25 percent

Reaction: pH 7.9 to 8.4

Bk3 horizon

Value: 5 to 8 dry; 4 or 6 moist

Chroma: 3 or 4

Texture: Sandy loam or loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 25 percent—0 to 5 percent cobbles; 0 to 20 percent gravel

Calcium carbonate equivalent: 15 to 25 percent
 Reaction: pH 7.9 to 8.4

Copenhaver Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Hills

Parent material: Residuum from argillite, quartzite, andesite, and basalt

Slope range: 8 to 60 percent

Elevation range: 5,300 to 8,200 feet

Annual precipitation: 14 to 25 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lithic Argicryolls

Typical Pedon

Copenhaver gravelly loam, in an area of Libeg-Copenhaver–Rock outcrop complex, 8 to 15 percent slopes, in an area of rangeland, 1,700 feet west and 1,320 feet north of the southeast corner of sec. 17, T. 7 N., R. 14 W.; Granite County, Montana.

A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine roots; common very fine interstitial pores; 30 percent gravel; neutral; clear smooth boundary.

Bt—6 to 12 inches; pinkish gray (7.5YR 6/2) very gravelly clay loam, brown (7.5YR 4/2) moist; moderate fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; common very fine interstitial pores; few faint clay films on faces of peds; 5 percent cobbles; 45 percent gravel; slightly alkaline.

R—12 inches; argillite bedrock.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches or to the lithic contact if less than 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to bedrock: 10 to 20 inches

Surface fragments: 0 to 0.1 percent stones

A horizon

Hue: 10YR, 7.5YR, or 5YR

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 70 percent—0 to 10 percent stones; 0 to 20 percent cobbles; 15 to 40 percent gravel

Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 10YR, 7.5YR, or 5YR

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 to 4 or 6

Texture: Loam or clay loam
 Clay content: 25 to 35 percent
 Content of rock fragments: 35 to 75 percent—5 to 15 percent cobbles; 30 to 60 percent gravel
 Reaction: pH 6.1 to 7.8

Coslaw Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains and hills
Parent material: Colluvium over residuum from rhyolite
Slope range: 15 to 60 percent
Elevation range: 5,400 to 7,800 feet
Annual precipitation: 20 to 30 inches
Annual air temperature: 30 to 37 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Ashy-skeletal, glassy, shallow Vitrandic Eutrocryepts

Typical Pedon

Coslaw gravelly ashy sandy loam, in an area of Coslaw-Rock outcrop association, 15 to 60 percent slopes, severely impacted, in an area of nonstocked forest, 2,250 feet east and 1,500 feet south of the northwest corner of sec. 16, T. 3 N., R. 11 W.

A—0 to 4 inches; grayish brown (2.5Y 5/2) gravelly ashy sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak fine granular structure; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; 25 percent gravel; strongly acid; clear wavy boundary.

Bw—4 to 18 inches; light brownish gray (2.5Y 6/2) very gravelly ashy sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; common very fine tubular pores; 10 percent cobbles; 40 percent gravel; neutral; gradual wavy boundary.

Cr—18 to 31 inches; light gray (5Y 7/2) decomposing welded tuff bedrock that crushes to very gravelly ashy sandy loam; neutral.

R—31 inches; white (5Y 8/1) fractured hard welded tuff bedrock.

Range in Characteristics

Mean annual soil temperature: 32 to 39 degrees F
Mean summer soil temperature: 40 to 46 degrees F
Moisture control section: Between 8 and 18 inches or between 8 inches and the paralithic contact
Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction
Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent
Depth to the Cr horizon: 12 to 18 inches
Depth to bedrock: 24 to 40 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 3 to 5 moist
 Chroma: 1 or 2
 Texture: Ashy loam or ashy sandy loam

Clay content: 10 to 20 percent
 Content of rock fragments: 15 to 50 percent—0 to 15 percent stones and cobbles
 or flagstones; 10 to 40 percent gravel
 Reaction: pH 5.1 to 6.5

Bw horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 to 7 dry; 3 to 6 moist
 Chroma: 1 or 2
 Texture: Ashy loam, ashy sandy clay loam, ashy coarse sandy loam, or ashy
 sandy loam
 Clay content: 10 to 22 percent
 Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and
 cobbles; 30 to 40 percent gravel
 Reaction: pH 5.6 to 7.3

Cowood Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains
Parent material: Colluvium and residuum from granite
Slope range: 35 to 80 percent
Elevation range: 6,200 to 9,200 feet
Annual precipitation: 20 to 40 inches
Annual air temperature: 34 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lithic Eutrocryepts

Typical Pedon

Cowood very channery loam, in an area of Shadow-Cowood complex, 25 to 60 percent slopes, in an area of forestland, 2,650 feet north and 1,700 feet east of the southwest corner of sec. 29, T. 14 N., R. 5 W.; Lewis and Clark County, Montana.

Oi—0 to 1 inch; root mat and forest litter of needles and twigs.

E—1 to 5 inches; brown (10YR 5/3) very channery loam, dark brown (10YR 4/3) moist; moderate very thin platy structure; slightly hard, very friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; many very fine tubular and interstitial pores; many silt and sand skeletons on faces of peds; 40 percent channers; strongly acid; clear smooth boundary.

Bw—5 to 16 inches; light yellowish brown (10YR 6/4) extremely channery loam, yellowish brown (10YR 5/4) moist; weak fine and medium subangular blocky structure parting to moderate very fine and fine granular; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine tubular and interstitial pores; 65 percent channers; strongly acid; abrupt wavy boundary.

R—16 inches; hard argillite bedrock with a few vertical cracks; few fine roots in some cracks.

Range in Characteristics

Soil temperature: 35 to 42 degrees F

Moisture control section: Between 4 and 12 inches

Depth to bedrock: 10 to 20 inches
Surface fragments: 0 to 3 percent stones

E horizon

Value: 5 or 6 dry; 2 to 5 moist
 Chroma: 2 or 3
 Clay content: 10 to 27 percent
 Content of rock fragments: 35 to 60 percent—0 to 20 percent stones; 0 to 25 percent cobbles; 20 to 45 percent gravel or channers
 Reaction: pH 5.1 to 6.5

Bw horizon

Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 3, 4, or 6
 Clay content: 15 to 25 percent
 Content of rock fragments: 60 to 80 percent stones, cobbles, and gravel or channers
 Reaction: pH 5.1 to 6.5

Crackerville Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains and hills
Parent material: Colluvium and residuum from granite
Slope range: 4 to 60 percent
Elevation range: 3,500 to 6,600 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Crackerville gravelly loam, in an area of Clasoil-Crackerville complex, 15 to 35 percent slopes, in an area of rangeland, 1,320 feet south and 1,320 feet west of the northeast corner of sec. 33, T. 5 N., R. 9 W.

- A—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium granular structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; common fine tubular pores; 10 percent gravel; slightly acid; clear wavy boundary.
- Bt—7 to 11 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine tubular pores; common distinct clay films bridging sand grains; 45 percent gravel; neutral; gradual irregular boundary.
- BC—11 to 17 inches; light brownish gray (10YR 6/2) very gravelly coarse sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common fine roots; common very fine and fine tubular pores; 55 percent gravel; neutral; gradual irregular boundary.
- C—17 to 29 inches; pale brown (10YR 6/3) extremely gravelly loamy coarse sand, brown (10YR 5/3) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; 70 percent gravel; neutral; gradual irregular boundary.

Cr—29 to 35 inches; granite bedrock which crushes to very gravelly loamy coarse sand.

R—35 inches; granite bedrock.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the argillic horizon: 7 to 15 inches

Depth to the Cr horizon: 20 to 38 inches

Depth to bedrock: 23 to 40 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 14 to 22 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent gravel

Reaction: pH 5.1 to 7.3

Bt horizon

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 3, 4, or 6

Clay content: 20 to 30 percent

Content of rock fragments: 35 to 60 percent—0 to 15 percent cobbles; 35 to 45 percent gravel

Reaction: pH 6.1 to 7.8

BC horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4 or 6

Texture: Sandy loam, coarse sandy loam, or loamy coarse sand

Clay content: 5 to 20 percent

Content of rock fragments: 30 to 70 percent—0 to 15 percent cobbles; 30 to 55 percent gravel

Reaction: pH 6.6 to 7.8

C horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Loamy sand or loamy coarse sand

Clay content: 5 to 15 percent

Content of rock fragments: 30 to 75 percent—0 to 15 percent cobbles; 30 to 70 percent gravel

Reaction: pH 6.6 to 7.3

Cujob Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountain slumps and depressions

Parent material: Alluvium

Slope range: 1 to 4 percent

Elevation range: 6,600 to 7,600 feet

Annual precipitation: 18 to 30 inches

Annual air temperature: 36 to 37 degrees F

Frost-free period: 30 to 60 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Cumulic Cryaquolls

Typical Pedon

Cujob mucky silt loam, in an area of Worock-Finn-Cujob complex, 1 to 25 percent slopes, in an area of wet meadow rangeland, 200 feet west and 2,350 feet south of the northeast corner of sec. 7, T. 3 N., R. 11 W.

- A—0 to 4 inches; black (10YR 2/1) mucky silt loam, very dark gray (10YR 3/1) dry; weak fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine discontinuous tubular pores; 5 percent gravel; slightly alkaline; clear wavy boundary.
- Bw1—4 to 11 inches; black (10YR 2/1) mucky loam, very dark gray (7.5YR 3/1) dry; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and common very fine roots; common very fine and fine discontinuous tubular pores; 10 percent gravel; slightly alkaline; clear wavy boundary.
- Bw2—11 to 21 inches; black (7.5YR 2/1) very gravelly loam, dark gray (7.5YR 4/1) dry; few fine faint yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) dry redox concentrations; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine and common very fine roots; few fine and common very fine discontinuous tubular pores; 10 percent cobbles; 30 percent gravel; slightly alkaline; gradual wavy boundary.
- C1—21 to 33 inches; reddish brown (5YR 5/4) very cobbly clay loam, light brown (7.5YR 6/3) dry; few fine faint yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) dry redox concentrations; massive; hard, friable, moderately sticky, moderately plastic; few very fine roots; few very fine discontinuous tubular pores; 20 percent cobbles; 30 percent gravel; moderately alkaline; gradual wavy boundary.
- C2—33 to 60 inches; reddish brown (5YR 5/4) very cobbly clay loam, brown (7.5YR 5/3) dry; few fine faint yellowish brown (10YR 5/4) and light yellowish brown (10YR 6/4) dry redox concentrations; massive; hard, friable, moderately sticky, moderately plastic; 25 percent cobbles; 35 percent gravel; moderately alkaline.

Range in Characteristics

Mean annual soil temperature: 37 to 40 degrees F

Mean summer soil temperature: 50 to 55 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 20 to 25 inches

Depth to the seasonal high water table: Ponded to 12 inches

A horizon

Value: 3 or 4 dry

Chroma: 1 or 2

Clay content: 10 to 18 percent

Content of rock fragments: 0 to 10 percent gravel

Reaction: pH 6.6 to 7.8

Bw1 horizon

Hue: 10YR or 7.5YR

Value: 1 or 2 moist; 3 or 4 dry

Chroma: 1 or 2

Clay content: 10 to 18 percent

Content of rock fragments: 5 to 15 percent gravel
 Reaction: pH 6.6 to 7.8

Bw2 horizon

Hue: 10YR or 7.5YR
 Value: 1 or 2 moist; 3 or 4 dry
 Chroma: 1 or 2
 Clay content: 18 to 27 percent
 Content of rock fragments: 35 to 60 percent—5 to 15 percent cobbles; 30 to 45 percent gravel
 Reaction: pH 6.6 to 7.8

C horizons

Hue: 7.5YR or 5YR
 Value: 4 or 5 moist; 5 or 6 dry
 Chroma: 3 or 4
 Clay content: 27 to 35 percent
 Content of rock fragments: 35 to 60 percent—15 to 25 percent cobbles; 20 to 35 percent gravel
 Reaction: pH 7.4 to 8.4

Danaher Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Mountains

Parent material: Alluvium

Slope range: 4 to 35 percent

Elevation range: 5,600 to 8,100 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Ustic Glossocryalfs

Typical Pedon

Danaher loam, 4 to 15 percent slopes, in an area of forestland, 175 feet north and 850 feet east of the southwest corner of sec. 8, T. 2 N., R. 12 W.

Oe—0 to 1 inch; decomposed organic matter.

Oi—1 to 3 inches; partially decomposed organic matter.

E1—3 to 10 inches; light brownish gray (10YR 6/2) loam, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; many fine and medium roots; many very fine and fine tubular and irregular pores; 2 percent gravel; moderately acid; clear wavy boundary.

E2—10 to 18 inches; light gray (10YR 7/2) sandy loam, brown (10YR 5/3) moist; moderate medium granular structure; soft, friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; 5 percent gravel; moderately acid; clear wavy boundary.

Bt/E—18 to 24 inches; B part (60 percent) brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; E part (40 percent) light gray (10YR 7/2) clay loam, brown (10YR 5/3) moist tongues; moderate fine and medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; many very fine and fine tubular pores; few faint clay films on faces of peds; 5 percent gravel; slightly acid; gradual wavy boundary.

- Bt1—24 to 37 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; strong medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few fine roots; common very fine and fine tubular and interstitial pores; many distinct clay films on faces of peds; 5 percent gravel; moderately acid; clear wavy boundary.
- Bt2—37 to 43 inches; light yellowish brown (10YR 6/4) silty clay, pale brown (10YR 6/3) moist; moderate medium prismatic structure parting to strong fine and medium angular blocky; very hard, very firm, very sticky, very plastic; few fine roots; few very fine and fine tubular pores; continuous distinct clay films on faces of peds; 5 percent gravel; moderately acid; clear wavy boundary.
- Bt3—43 to 49 inches; yellowish brown (10YR 5/6) silty clay, dark yellowish brown (10YR 4/6) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few fine roots; many very fine and fine random tubular pores; common distinct clay films on faces of peds; 5 percent gravel; moderately acid; clear wavy boundary.
- Bt4—49 to 55 inches; light gray (10YR 7/2) silty clay, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots; few very fine and fine tubular pores; common distinct clay films on faces of peds; 5 percent gravel; moderately acid; clear wavy boundary.
- C—55 to 60 inches; pale brown (10YR 6/3) gravelly sandy clay loam, grayish brown (10YR 5/2) moist; massive; hard, firm, moderately sticky, slightly plastic; many very fine and fine random irregular pores; 20 percent gravel; moderately acid.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bt horizon: 12 to 25 inches

E horizons

Hue: 10YR or 5YR

Value: 3 to 6 moist; 6 to 8 dry

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 20 percent gravel

Reaction: pH 5.6 to 7.3

Bt/E horizon

Value: B part: 4 or 5 moist; 5 or 6 dry; E part: 5 or 6 moist; 6 or 7 dry

Chroma: 2 or 3

Texture: Clay loam or loam

Clay content: 20 to 30 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 10YR or 5YR

Value: 4 to 7 moist; 5 to 8 dry

Chroma: 2 to 4 or 6

Texture: Clay loam, silty clay, or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent gravel

Reaction: pH 5.6 to 7.3

C horizon

Hue: 10YR or 5YR

Value: 4 to 6 moist; 5 to 7 dry

Chroma: 2 to 4

Texture: Clay loam or sandy clay loam

Clay content: 35 to 40 percent

Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent gravel

Reaction: pH 5.6 to 7.3

Danielvil Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Moderate (0.6 to 2.0 inches/hour)*Landform:* Stream terraces and alluvial fans*Parent material:* Alluvium*Slope range:* 2 to 4 percent*Elevation range:* 5,800 to 6,900 feet*Annual precipitation:* 15 to 19 inches*Annual air temperature:* 34 to 39 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Coarse-loamy, mixed, superactive Ustic Haplocryolls**Typical Pedon**

Danielvil loam, 2 to 4 percent slopes, in an area of rangeland, 1,320 feet west and 120 feet south of the northeast corner of sec. 12, T. 1 S., R. 15 W.

A1—0 to 7 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; common very fine interstitial pores; neutral; clear smooth boundary.

A2—7 to 12 inches; dark grayish brown (10YR 4/2) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; common very fine interstitial pores; 5 percent cobbles; 10 percent gravel; neutral; clear smooth boundary.

Bw—12 to 21 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few medium and common very fine and fine roots; common very fine interstitial pores; 5 percent cobbles; 10 percent gravel; neutral; clear smooth boundary.

C1—21 to 34 inches; brown (10YR 5/3) fine sandy loam, dark brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky, nonplastic; few fine and common very fine roots; common very fine interstitial pores; 5 percent cobbles; 10 percent gravel; neutral; gradual smooth boundary.

C2—34 to 60 inches; dark brown (10YR 4/3) sandy loam, dark brown (10YR 3/3) moist; massive; soft, very friable, slightly sticky, nonplastic; few very fine and fine roots; common very fine interstitial pores; 5 percent cobbles; 10 percent gravel; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 7 to 15 inches

A horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam, sandy loam, or fine sandy loam

Clay content: 10 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.6 to 7.3

Bw horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Fine sandy loam or sandy loam

Clay content: 10 to 18 percent

Content of rock fragments: 0 to 35 percent—0 to 20 percent cobbles; 0 to 15 percent gravel

Reaction: pH 6.6 to 7.3

C horizons

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Fine sandy loam or sandy loam

Clay content: 5 to 18 percent

Content of rock fragments: 0 to 35 percent—0 to 20 percent cobbles; 0 to 15 percent gravel

Reaction: pH 6.6 to 7.3

Danvers Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 2 to 60 percent

Elevation range: 3,800 to 6,800 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, smectitic, frigid Vertic Argiustolls

Typical Pedon

Danvers clay loam, 4 to 8 percent slopes, in an area of irrigated pasture, 2,450 feet west and 1,300 feet north of the southeast corner of sec. 18, T. 7 N., R. 8 W.; Powell County, Montana.

A1—0 to 4 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure parting to moderate fine granular; slightly hard, very friable, slightly sticky, slightly plastic; few medium and many

fine roots; many fine and medium irregular pores; neutral; abrupt smooth boundary.

A2—4 to 8 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, very friable, moderately sticky, moderately plastic; few medium and many fine roots; common fine tubular and many fine random irregular pores; neutral; clear wavy boundary.

Bt—8 to 16 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong fine and medium subangular blocky; very hard, friable, very sticky, very plastic; common fine roots; few fine tubular pores; common distinct brown (10YR 5/3) clay films on all surfaces; slightly alkaline; clear wavy boundary.

Btk—16 to 21 inches; pale brown (10YR 6/3) clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, very plastic; common fine roots; common fine random tubular pores; few faint clay films on faces of peds; many fine and medium masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.

Bk1—21 to 38 inches; white (10YR 8/1) clay loam, very pale brown (10YR 7/3) moist; weak fine subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; common fine roots; few medium random and many fine tubular pores; 5 percent gravel; disseminated lime; common lime pendants on gravel; violently effervescent; strongly alkaline; gradual wavy boundary.

Bk2—38 to 60 inches; light brownish gray (10YR 6/2) gravelly clay loam; grayish brown (2.5Y 5/2) moist; weak fine subangular blocky structure; hard, friable, moderately sticky, moderately plastic; common fine random tubular and irregular pores; 5 percent cobbles; 15 percent gravel; disseminated lime; common lime pendants on gravel; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 12 inches

Depth to the calcic horizon: 14 to 25 inches

A horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent gravel

Reaction: pH 6.6 to 7.3

Bt horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 to 6 dry; 2 to 5 moist

Chroma: 2 to 4

Texture: Clay loam, silty clay, or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Btk horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Clay loam, silty clay loam, or clay
 Clay content: 35 to 45 percent
 Content of rock fragments: 0 to 25 percent—0 to 15 percent cobbles; 0 to 10 percent gravel
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Bk horizons

Hue: 7.5YR, 10YR, or 2.5Y
 Value: 6 to 8 dry; 5 to 7 moist
 Chroma: 1 to 3
 Texture: Clay loam or silty clay loam
 Clay content: 27 to 35 percent
 Content of rock fragments: 5 to 35 percent—0 to 20 percent cobbles; 5 to 15 percent gravel
 Calcium carbonate equivalent: 15 to 40 percent
 Reaction: pH 7.9 to 9.0

Daras Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2 to 6 inches/hour)
Landform: Side slopes of mountains and hills
Parent material: Colluvium and alluvium from welded tuff
Slope range: 4 to 15 percent
Elevation range: 6,300 to 6,900 feet
Annual precipitation: 20 to 30 inches
Annual air temperature: 30 to 37 degrees F
Frost-free period: 30 to 60 days

Taxonomic Class: Ashy, glassy Vitrandic Eutrocryepts

Typical Pedon

Daras gravelly ashy sandy loam, in an area of Daras-Bendoh-Karloff complex, 4 to 15 percent slopes, moderately impacted, in an area of forestland, 1,100 feet north and 1,650 feet west of the southeast corner of sec. 16, T. 3 N., R. 11 W.

- Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.
 A—1 to 4 inches; grayish brown (10YR 5/2) gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; 20 percent gravel; strongly acid; clear wavy boundary.
 E—4 to 8 inches; light gray (10YR 6/1) very gravelly ashy loamy coarse sand, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few medium and many very fine roots; many very fine and fine tubular pores; 10 percent cobbles; 30 percent gravel; moderately acid; clear wavy boundary.
 Bw—8 to 17 inches; pale brown (10YR 6/3) gravelly ashy sandy loam, dark grayish brown (2.5Y 4/2) moist; moderate medium prismatic structure parting to weak medium subangular blocky; slightly hard, very friable, nonsticky, nonplastic; few medium and coarse and many very fine and fine roots; many very fine and fine tubular pores; 20 percent gravel; slightly acid; gradual wavy boundary.
 BC—17 to 36 inches; light gray (2.5Y 7/2) gravelly ashy coarse sandy loam, olive

gray (5Y 4/2) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky, nonplastic; few medium and coarse and common very fine and fine roots; common very fine and fine tubular pores; 20 percent gravel; slightly acid; gradual irregular boundary.

C1—36 to 52 inches; light brownish gray (2.5Y 6/2) gravelly ashy coarse sandy loam, olive gray (5Y 4/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; few very fine and fine roots; few very fine and fine tubular pores; 25 percent gravel; slightly acid; gradual irregular boundary.

C2—52 to 60 inches; light gray (N 6/) very gravelly ashy coarse sandy loam, olive gray (5Y 4/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; 5 percent cobbles; 40 percent gravel; neutral.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F

Mean summer soil temperature: 40 to 46 degrees F

Moisture control section: Between 8 and 24 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 10 to 20 percent

Content of rock fragments: 15 to 35 percent—0 to 15 percent stones and cobbles; 5 to 35 percent gravel

Reaction: pH 5.1 to 6.0

E horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy loamy coarse sand, ashy coarse sandy loam, or ashy loam

Clay content: 5 to 18 percent

Content of rock fragments: 15 to 45 percent—0 to 15 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.1 to 6.5

Bw and BC horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy sandy loam, ashy loam, or ashy coarse sandy loam

Clay content: 8 to 18 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 6.1 to 7.3

C horizons

Hue: 2.5Y, 5Y, or N

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 1 or 2

Texture: Ashy sandy loam, ashy coarse sandy loam, ashy loamy coarse sand, or ashy loamy sand

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 60 percent—0 to 15 percent stones and cobbles; 15 to 45 percent gravel
 Reaction: pH 6.1 to 7.3

Donald Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 2 to 35 percent

Elevation range: 5,800 to 6,600 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 45 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, smectitic Alfic Argicryolls

Typical Pedon

Donald loam, 4 to 8 percent slopes, in an area of rangeland, 2,300 feet east and 1,500 feet north of the southwest corner of sec. 17, T. 5 N., R. 14 W.; Granite County, Montana.

A1—0 to 5 inches; very dark gray (10YR 3/1) loam, black (10YR 2/1) moist; moderate medium subangular blocky structure parting to strong medium granular; hard, firm, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine tubular pores; 5 percent gravel; neutral; clear smooth boundary.

A2—5 to 9 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to strong medium granular; hard, firm, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine tubular pores; 5 percent stones; 5 percent gravel; neutral; clear wavy boundary.

E—9 to 13 inches; pinkish gray (7.5YR 7/2) sandy loam, brown (7.5YR 5/2) moist; weak coarse subangular blocky structure; hard, firm, nonsticky, nonplastic; many very fine, fine, and medium roots; many fine irregular pores; 3 percent stones; 5 percent cobbles; 5 percent gravel; neutral; abrupt wavy boundary.

Bt1—13 to 16 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; strong medium columnar structure; very hard, very firm, very sticky, very plastic; common fine roots; few very fine and fine tubular pores; many continuous distinct unstained sand grains on tops of columns and discontinuous distinct unstained sand grains on vertical faces of peds; many distinct clay films on vertical faces of peds and in pores; neutral; clear wavy boundary.

Bt2—16 to 23 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; moderate medium prismatic structure; very hard, very firm, very sticky, very plastic; common fine roots; few very fine and fine tubular pores; many distinct clay films on faces of peds and in pores; slightly alkaline; clear wavy boundary.

Btk—23 to 35 inches; light brown (7.5YR 6/4) clay, brown (7.5YR 5/4) moist; moderate medium angular blocky structure; very hard, very firm, very sticky, very plastic; few fine roots; common fine and medium tubular pores; common distinct clay films on faces of peds and in pores; common medium irregular seams of lime; slightly effervescent; moderately alkaline; clear wavy boundary.

BC—35 to 60 inches; light brown (7.5YR 6/4) clay; light brown (7.5YR 6/4) moist; massive; hard, firm, moderately sticky, moderately plastic; few fine tubular pores; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 13 inches

Depth to the Btk horizon: 21 to 40 inches

A horizons

Value: 2 to 4 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent stones; 0 to 20 cobbles; 0 to 15 percent gravel

Reaction: pH 6.6 to 7.3

E horizon

Value: 6 or 7 dry; 5 or 6 moist

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent stones; 0 to 5 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.6 to 7.3

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 5 percent gravel

Reaction: pH 6.6 to 7.3

Bt2 horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 5 percent gravel

Reaction: pH 6.6 to 7.8

Btk horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Clay loam or clay

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 5 percent gravel

Calcium carbonate equivalent: 1 to 5 percent

Reaction: pH 7.4 to 8.4

BC horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 to 6 moist

Chroma: 3 or 4

Texture: Clay loam or clay

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 5 percent gravel
 Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 7.4 to 8.4

Dougcliff Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Very poorly drained
Permeability: Rapid (6 to 20 inches/hour)
Landform: Closed depressions, swales, and flood plains
Parent material: Organic material
Slope range: 0 to 2 percent
Elevation range: 3,800 to 5,800 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Euic, frigid Typic Haplofibrists

The Dougcliff soil in map unit 686A is a taxadjunct to the Series. It classifies as Loamy, mixed, euic, frigid Terric Haplofibrists. Use and management is similar.

Typical Pedon

Dougcliff mucky peat, 0 to 2 percent slopes, ponded, 200 feet north and 300 feet east of the southwest corner of sec. 2, T. 7 N., R. 10 W.; Powell County, Montana.

- Oe1—0 to 13 inches; black (10YR 2/1) mucky peat, very dark gray (10YR 3/1) dry; about 80 percent fiber and raw herbaceous plant material, 70 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear wavy boundary.
- Oe2—13 to 27 inches; black (10YR 2/1) mucky peat, black (10YR 2/1) dry; about 85 percent fiber, 80 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear wavy boundary.
- Oe3—27 to 60 inches; black (10YR 2/1) mucky peat, very dark gray (10YR 3/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid.

Range in Characteristics

Soil temperature: 41 to 47 degrees F
Depth to the seasonal high water table: 0 to 6 inches

Oe1 horizon

Hue: 10YR or 7.5YR
 Value: 2 or 3 moist
 Chroma: 1 or 2
 Fiber content: 80 to 90 percent unrubbed; 65 to 75 percent rubbed
 Reaction: pH 6.1 to 7.8

Oe2 horizon

Hue: 10YR, 7.5YR, or 5YR
 Value: 2 or 3 moist
 Chroma: 1 or 2
 Fiber content: 85 to 95 percent unrubbed; 75 to 85 percent rubbed
 Reaction: pH 6.1 to 7.8

Oe3 horizon

Hue: 10YR, 7.5YR, or 5YR

Value: 2 or 3 moist

Fiber content: 75 to 85 percent unrubbed; 60 to 75 percent rubbed

Reaction: pH 6.1 to 7.8

Dunkleber Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Very poorly drained*Permeability:* Moderately rapid (2 to 6 inches/hour)*Landform:* Flood plains, drainageways, and closed depressions*Parent material:* Organic material*Slope range:* 0 to 2 percent*Elevation range:* 4,740 to 8,800 feet*Annual precipitation:* 15 to 22 inches*Annual air temperature:* 34 to 39 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Euic Typic Cryofibrists**Typical Pedon**

Dunkleber mucky peat, 0 to 2 percent slopes, 1,300 feet west and 1,500 feet north of the southeast corner of sec. 19, T. 5 N., R. 14 W.

Oi1—0 to 12 inches; black (10YR 2/1) mucky peat, dark gray (10YR 4/1) dry; about 80 percent fiber and raw herbaceous plant material, 70 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear smooth boundary.

Oi2—12 to 28 inches; very dark gray (10YR 3/1) mucky peat, dark gray (10YR 4/1) dry; about 85 percent fiber, 80 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear smooth boundary.

Oi3—28 to 38 inches; black (10YR 2/1) mucky peat, dark gray (10YR 4/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear wavy boundary.

Oi4—38 to 44 inches; black (10YR 2/1) mucky peat, dark gray (10YR 4/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid; clear smooth boundary.

Oi5—44 to 60 inches; black (10YR 2/1) mucky peat, very dark gray (10YR 3/1) dry; about 80 percent fiber, 75 percent rubbed; massive; nonsticky, nonplastic; slightly acid.

Range in Characteristics*Soil temperature:* 36 to 41 degrees F*Depth to the seasonal high water table:* Ponded to 6 inches*Thickness of organic material:* Greater than 52 inches*Oi1 horizon*

Value: 2 or 3 moist; 4 or 5 dry

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed, 60 to 75 percent rubbed

Reaction: pH 6.1 to 6.5

Oi2 horizon

Value: 2 to 4 moist; 3 to 5 dry

Chroma: 1 or 2

Fiber content: 80 to 90 percent unrubbed, 70 to 80 percent rubbed
 Reaction: pH 6.1 to 6.5

Oi3 horizon

Value: 2 or 3 moist; 3 or 4 dry
 Chroma: 1 or 2
 Fiber content: 80 to 90 percent unrubbed, 70 to 80 percent rubbed
 Reaction: pH 6.1 to 6.5

Oi4 horizon

Value: 2 or 3 moist; 4 or 5 dry
 Chroma: 1 or 2
 Fiber content: 80 to 90 percent unrubbed, 70 to 80 percent rubbed
 Reaction: pH 6.1 to 6.5

Oi5 horizon

Value: 2 or 3 moist; 3 or 4 dry
 Chroma: 1 or 2
 Content of rock fragments: 0 to 25 percent gravel
 Reaction: pH 6.1 to 6.5

Eine Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour) to 8 inches, rapid (6 to 20 inches/hour) below

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 5,800 to 6,100 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 36 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Sandy-skeletal, mixed Argic Cryaquolls

Typical Pedon

Eine loam, in an area of Eine-Nana complex, 0 to 2 percent slopes, in an area of rangeland, 1,550 feet east and 550 feet south of the northwest corner of sec. 33, T. 1 N., R. 14 W.

A1—0 to 2 inches; very dark brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine and medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine interstitial pores; strongly alkaline; clear smooth boundary.

A2—2 to 4 inches; very dark gray (10YR 3/1) loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; strongly alkaline; clear smooth boundary.

Btn—4 to 8 inches; very dark gray (10YR 3/1) sandy clay loam, dark gray (10YR 4/1) dry; weak medium prismatic structure parting to moderate medium subangular blocky; very hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; common faint clay films on faces of peds; strongly alkaline; clear smooth boundary.

BCn—8 to 12 inches; grayish brown (10YR 5/2) very fine sandy loam, light brownish

gray (10YR 6/2) dry; weak medium subangular blocky structure; hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine tubular pores; slightly effervescent; very strongly alkaline; clear wavy boundary.

2Cn1—12 to 20 inches; dark grayish brown (10YR 4/2) sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky, nonplastic; common very fine roots; few medium tubular pores; 10 percent gravel; very strongly alkaline; clear smooth boundary.

2Cn2—20 to 60 inches; dark grayish brown (10YR 4/2) very gravelly sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky, nonplastic; common very fine roots; few medium tubular pores; 15 percent cobbles; 35 percent gravel; very strongly alkaline.

Range in Characteristics

Soil temperature: 38 to 40 degrees F

Moisture control section: Between 12 and 35 inches

Depth to the seasonal high water table: 12 to 24 inches

Depth to the 2C horizon: 8 to 13 inches

A1 horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 13 to 30

Reaction: pH 8.5 to 9.0

A2 horizon

Value: 4 or 5 dry; 3 moist

Chroma: 1 or 2

Texture: Loam, silt loam, or sandy loam

Clay content: 10 to 15 percent

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 30 to 50

Reaction: pH 8.5 to 9.0

Btn horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry

Chroma: 1 or 2

Texture: Sandy clay loam or clay loam

Clay content: 27 to 35 percent

Sodium adsorption ratio: 13 to 30

Reaction: pH 8.5 to 9.6

BCn horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 1 to 3

Texture: Very fine sandy loam, loam, or sandy loam

Clay content: 10 to 18 percent

Calcium carbonate equivalent: 0 to 5 percent

Sodium adsorption ratio: 13 to 30

Reaction: pH 8.5 to 9.6

2Cn1 horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 0 to 10 percent gravel
 Sodium adsorption ratio: 4 to 13
 Reaction: pH 7.9 to 9.6

2Cn2 horizon

Hue: 10YR or 2.5Y
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: Loamy sand or sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent gravel
 Sodium adsorption ratio: 4 to 13
 Reaction: pH 7.9 to 9.6

Elkner Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid (2 to 6 inches/hour)
Landform: Mountainsides
Parent material: Colluvium from granite
Slope range: 8 to 60 percent
Elevation range: 6,300 to 8,600 feet
Annual precipitation: 20 to 30 inches
Annual air temperature: 36 to 37 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Coarse-loamy, mixed, superactive Lamellic Eutrocryepts

Typical Pedon

Elkner stony sandy loam, in an area of Comad-Elkner complex, 15 to 35 percent slopes, in an area of woodland, 600 feet east and 200 feet north of the southwest corner of sec. 4, T. 2 N., R. 11 W.

- O_i—0 to 1 inch; slightly decomposed needles and twigs.
 E—1 to 6 inches; light brownish gray (10YR 6/2) stony sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; many very fine and fine interstitial pores; 10 percent stones; 5 percent cobbles; 15 percent gravel; moderately acid; clear smooth boundary.
 E and B_{t1}—6 to 16 inches; E part (75 percent) is light yellowish brown (10YR 6/4) stony coarse sandy loam, brown (10YR 4/3) moist; B part (25 percent) is yellowish brown (10YR 5/4) sandy loam lamellae 1/8- to 1/4-inch thick, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; many very fine and fine interstitial pores; 10 percent stones; 5 percent cobbles; 15 percent gravel; moderately acid; clear smooth boundary.

- E and Bt₂—16 to 33 inches; E part (75 percent) is light yellowish brown (10YR 6/4) gravelly coarse sandy loam, brown (10YR 4/3) moist; B part (25 percent) is yellowish brown (10YR 5/4) sandy loam lamellae 1/8- to 1/4-inch thick, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few medium and many very fine and fine roots; many very fine and fine interstitial pores; 5 percent cobbles; 15 percent gravel; moderately acid; gradual wavy boundary.
- BC—33 to 60 inches; pale brown (10YR 6/3) stony loamy coarse sand, brown (10YR 5/3) moist; massive; hard, friable, nonsticky, nonplastic; common very fine and fine roots; many very fine and fine interstitial pores; 10 percent stones; 5 percent cobbles; 15 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 37 to 40 degrees F

Moisture control section: Between 8 and 24 inches

E horizon

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 5 to 10 percent

Content of rock fragments: 5 to 35 percent—5 to 15 percent stones or boulders; 0 to 10 percent cobbles; 5 to 15 percent gravel

Reaction: pH 5.6 to 6.5

E and Bt horizons

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Coarse sandy loam or sandy loam

Clay content: 5 to 10 percent

Content of rock fragments: 5 to 35 percent—0 to 15 percent stones or boulders; 0 to 15 percent cobbles; 5 to 20 percent gravel

Reaction: pH 5.6 to 6.5

BC horizon

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Coarse sandy loam, sandy loam, or loamy coarse sand

Clay content: 0 to 5 percent

Content of rock fragments: 5 to 35 percent—5 to 15 percent stones or boulders; 0 to 15 percent cobbles; 5 to 20 percent gravel

Reaction: pH 5.6 to 6.5

Ellena Series

Depth class: Moderately deep (20 to 40 inches) (20 to 40 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Footslopes and side slopes of hills and mountains

Parent material: Local colluvium and residuum from granite

Slope range: 35 to 60 percent

Elevation range: 6,400 to 7,000 feet

Annual precipitation: 15 to 25 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Eutrocrypts

Typical Pedon

Ellena very cobbly sandy loam, in an area of Ellena very cobbly sandy loam, in an area of Kurrie, very bouldery-Ellena, very bouldery-Rock outcrop complex, 25 to 60 percent slopes, in an area of forestland, 350 feet north and 1,700 feet west of the southeast corner of sec. 18, T. 9 N., R. 3 W.; Jefferson County, Montana.

Oi—0 to 2 inches; partially decomposed needles, leaves, and twigs.

A—2 to 7 inches; grayish brown (10YR 5/2) very cobbly sandy loam, dark brown (10YR 3/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; few medium, common fine, and many very fine roots; many very fine and fine tubular pores; 30 percent cobbles; 10 percent granite gravel; neutral; clear smooth boundary.

E—7 to 22 inches; light brownish gray (2.5Y 6/2) very cobbly coarse sandy loam, grayish brown (2.5Y 5/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; few fine and medium and many very fine roots; many very fine and fine tubular pores; 5 percent stones; 25 percent cobbles; 10 percent granite gravel; slightly acid; clear wavy boundary.

E/Bw—22 to 35 inches; E part (85 percent) is light brownish gray (2.5Y 6/2) very cobbly coarse sandy loam, grayish brown (2.5Y 5/2) moist; B part (15 percent) is light olive brown (2.5Y 5/4) very cobbly sandy clay loam, olive brown (2.5Y 4/4) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, nonplastic; few fine and medium and many very fine roots; few fine and many very fine tubular pores; 5 percent stones; 35 percent cobbles; 10 percent granite gravel; slightly acid; clear wavy boundary.

Cr—35 to 38 inches; light brownish gray (2.5Y 6/2) decomposing granite bedrock (grus) that crushes to very gravelly coarse sand.

R—38 inches, hard granite bedrock.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 8 and 24 inches

Depth to the Cr horizon: 20 to 38 inches

Depth to bedrock: 23 to 40 inches

Surface fragments: 0 to 3 percent boulders

A horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Coarse sandy loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 0 to 45 percent—0 to 30 percent stones and cobbles; 0 to 15 percent gravel

Reaction: pH 6.1 to 7.3

E horizon

Hue: 10YR or 2.5Y

Value: 6 to 8 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Coarse sandy loam, sandy loam, or loam

Clay content: 10 to 18 percent

Content of rock fragments: 20 to 60 percent—0 to 45 percent stones and cobbles; 5 to 25 percent gravel
 Reaction: pH 6.1 to 7.3

E/Bw horizon

Hue: 10YR or 2.5Y
 Value: E part: 6 to 8 dry; 4 to 6 moist; B part: 4 to 6 dry; 3 to 5 moist
 Chroma: E part: 1 to 4; B part: 2 to 4
 Texture: Coarse sandy loam or sandy loam
 Clay content: 10 to 18 percent
 Content of rock fragments: 35 to 60 percent—0 to 40 percent stones and cobbles; 10 to 30 percent gravel
 Reaction: pH 6.1 to 7.3

Elliston Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains

Parent material: Loamy alluvium

Slope range: 0 to 4 percent

Elevation range: 3,800 to 5,000 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 37 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aquic Haplustepts

Typical Pedon

Elliston loam, 0 to 4 percent slopes, rarely flooded, in an area of woodland, 2,600 feet south and 1,200 feet west of the northeast corner of sec. 26, T. 14 N., R. 11 W.; Powell County, Montana.

Oi—0 to 1 inch; undecomposed and slightly decomposed forest litter.

A—1 to 8 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; strong medium granular structure; slightly hard, friable, nonsticky, slightly plastic; few very coarse and many very fine and fine roots; many very fine and fine interstitial pores; moderately alkaline; clear smooth boundary.

Bw—8 to 13 inches; pale brown (10YR 6/3) loam, dark brown (10YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bk—13 to 45 inches; light gray (10YR 7/2) loam, grayish brown (10YR 5/2) moist; many fine distinct yellowish red (5YR 5/8) redox concentrations; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

2C—45 to 60 inches; light gray (10YR 7/2) very gravelly loam; grayish brown (10YR 5/2) moist; many fine distinct yellowish red (5YR 5/8) redox concentrations; massive; soft, friable, slightly sticky, nonplastic; few fine roots; many very fine and fine interstitial pores; 40 percent gravel; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 39 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 6 to 24 inches

Depth to the seasonal high water table: 24 to 42 inches

A horizon

Value: 4 or 5 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Reaction: pH 7.9 to 8.4

Bw horizon

Value: 5 or 6 dry; 3 or 4 moist

Clay content: 18 to 27 percent

Reaction: pH 7.9 to 8.4

Bk horizon

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

2C horizon

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Loam or sandy loam

Clay content: 8 to 20 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent gravel

Reaction: pH 7.9 to 8.4

Elve Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountains

Parent material: Colluvium

Slope range: 4 to 85 percent

Elevation range: 5,000 to 8,600 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Eutrocrypts

Typical Pedon

Elve gravelly loam, 35 to 60 percent slopes, in an area of woodland, 1,700 feet south and 1,800 feet west of the northeast corner of sec. 24, T. 11 N., R. 8 W.; Powell County, Montana.

Oe—0 to 2 inches; partially decomposed forest litter.

A—2 to 7 inches; light gray (10YR 7/2) gravelly loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; few

coarse, common medium, and many very fine and fine roots; many very fine and fine interstitial pores; 15 percent cobbles; 20 percent gravel; moderately acid; clear wavy boundary.

- E—7 to 18 inches; very pale brown (10YR 7/3) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few coarse, common medium, and many very fine and fine roots; many very fine and fine interstitial pores; 15 percent cobbles; 35 percent gravel; strongly acid; clear wavy boundary.
- Bw1—18 to 28 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few coarse and common very fine and fine roots; many very fine and fine interstitial pores; 25 percent cobbles; 55 percent gravel; slightly acid; clear wavy boundary.
- Bw2—28 to 42 inches; very pale brown (10YR 8/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; 25 percent cobbles; 65 percent gravel; slightly acid; clear wavy boundary.
- BC—42 to 60 inches; very pale brown (10YR 8/3) extremely gravelly sandy loam; brown (10YR 5/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and fine roots; common very fine and fine interstitial pores; 20 percent cobbles; 50 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Surface fragments: 0 to 3 percent stones; boulders

A horizon

Hue: 7.5YR or 10YR

Value: 4 to 7 dry; 2 to 5 moist

Chroma: 2 to 4

Texture: Sandy loam, coarse sandy loam, or loam

Clay content: 10 to 27 percent

Content of rock fragments: 15 to 60 percent—5 to 30 percent stones and cobbles; boulders; 10 to 30 percent gravel

Reaction: pH 5.1 to 6.5

E horizon

Hue: 7.5YR or 10YR

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 35 to 85 percent—10 to 40 percent cobbles; 20 to 35 percent gravel

Reaction: pH 5.1 to 6.5

Bw1 horizon

Hue: 7.5YR or 10YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4 or 6

Texture: Loam or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 60 to 85 percent—25 to 40 percent cobbles; 25 to 55 percent gravel
 Reaction: pH 5.1 to 6.5

Bw2 and BC horizons

Hue: 7.5YR or 10YR
 Value: 6 to 8 dry; 4 or 5 moist
 Chroma: 3, 4, or 6
 Texture: Loam or sandy loam
 Clay content: 10 to 20 percent
 Content of rock fragments: 60 to 85 percent—20 to 40 percent cobbles; 35 to 65 percent gravel
 Reaction: pH 5.1 to 6.5

Eremis Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains and hills
Parent material: Colluvium from welded tuff and rhyolite
Slope range: 2 to 35 percent
Elevation range: 5,500 to 7,800 feet
Annual precipitation: 20 to 30 inches
Annual air temperature: 30 to 37 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Ashy, glassy Vitrandic Eutrocryepts

Typical Pedon

Eremis gravelly ashy loam, in an area of Bendoh-Eremis-Karloff complex, 2 to 15 percent slopes moderately impacted, in an area of forestland, 1,500 feet east and 2,100 feet north of the southwest corner of sec. 16, T. 3 N., R. 11 W.

- Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.
- A—1 to 3 inches; dark grayish brown (2.5Y 4/2) gravelly ashy loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and common very fine and fine roots; common very fine and fine tubular pores; 20 percent gravel; strongly acid; clear wavy boundary.
- Bw—3 to 12 inches; light brownish gray (10YR 6/2) gravelly ashy loam, dark brown (10YR 3/3) moist; moderate medium prismatic structure; slightly hard, very friable, slightly sticky, nonplastic; common medium and many very fine and fine roots; many very fine and fine tubular pores; 20 percent gravel; strongly acid; gradual wavy boundary.
- BC—12 to 25 inches; light gray (2.5Y 7/2) gravelly ashy sandy clay loam, dark grayish brown (2.5Y 4/2) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine, fine, and medium roots; common fine tubular pores; 25 percent gravel; moderately acid; gradual irregular boundary.
- C1—25 to 36 inches; light brownish gray (2.5Y 6/2) gravelly ashy sandy clay loam, olive (5Y 4/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; few very fine tubular pores; 20 percent gravel; slightly acid; gradual irregular boundary.

C2—36 to 60 inches; light gray (N 7/) ashy sandy clay loam, olive (5Y 4/3) moist; massive; slightly hard, firm, slightly sticky, slightly plastic; 10 percent gravel; neutral.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F

Mean summer soil temperature: 40 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

A horizon

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 45 percent—0 to 15 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.1 to 6.0

Bw horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 1 to 3

Texture: Ashy loam or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.1 to 6.0

BC horizon

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy loam or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.6 to 6.5

C horizons

Hue: 2.5Y, 5Y, or N

Value: 6 to 8 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 10 to 25 percent

Content of rock fragments: 10 to 35 percent—0 to 10 percent stones and cobbles; 10 to 25 percent gravel

Reaction: pH 6.1 to 7.3

Evapo Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountains

Parent material: Volcanic ash over colluvium

Slope range: 4 to 60 percent
Elevation range: 5,400 to 9,200 feet
Annual precipitation: 20 to 40 inches
Annual air temperature: 37 to 43 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lamellic Eutrocryepts

Typical Pedon

Evapo gravelly ashy loam, in an area of Evapo gravelly loam, dry, 15 to 35 percent slopes, in an area of woodland, 700 feet north and 300 feet east of the southwest corner of sec. 6, T. 12 N., R. 13 W.; Powell County, Montana.

- Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.
- A—2 to 8 inches; pale brown (10YR 6/3) gravelly ashy loam, brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; few coarse and many very fine, fine, and medium roots; many very fine and fine irregular pores; 5 percent cobbles; 25 percent gravel; moderately acid; clear smooth boundary.
- 2E—8 to 23 inches; light gray (10YR 7/2) extremely gravelly loam, light brownish gray (10YR 6/2) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; few medium and coarse and common very fine and fine roots; many very fine and fine irregular pores; 10 percent cobbles; 50 percent gravel; slightly acid; gradual wavy boundary.
- 2E and Bt1—23 to 42 inches; E part (75 percent) is very pale brown (10YR 7/3) extremely gravelly loam, pale brown (10YR 6/3) moist; B part (25 percent) is pale brown (10YR 6/3) extremely gravelly loam lamellae $\frac{1}{16}$ - to $\frac{1}{4}$ -inch thick, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; few very fine and fine roots; many very fine and fine irregular pores; 5 percent cobbles; 65 percent gravel; neutral; gradual wavy boundary.
- 2E and Bt2—42 to 60 inches; E part (80 percent) is very pale brown (10YR 7/3) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; B part (20 percent) is pale brown (10YR 6/3) extremely gravelly loam lamellae $\frac{1}{16}$ - to $\frac{1}{4}$ -inch thick, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine and fine irregular pores; 5 percent cobbles; 65 percent gravel; neutral.

Range in Characteristics

Soil temperature: 39 to 45 degrees F
Moisture control section: Between 8 and 24 inches
Thickness of the volcanic ash-influenced A horizon: 3 to 6 inches

A horizon

Hue: 10YR or 7.5YR
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 3 to 5
 Clay content: 5 to 15 percent
 Content of rock fragments: 15 to 50 percent—0 to 25 percent stones and cobbles; 15 to 25 percent gravel
 Reaction: pH 5.6 to 6.5

2E horizon

Hue: 10YR or 7.5YR
 Value: 6 to 8 dry; 5 to 7 moist
 Chroma: 2 or 3

Texture: Loam or sandy loam
 Clay content: 5 to 15 percent
 Content of rock fragments: 40 to 80 percent—5 to 30 percent cobbles; 35 to 50 percent gravel
 Reaction: pH 5.6 to 7.3

2E and Bt horizons

Hue: 10YR or 7.5YR
 Value: E part: 6 or 7 dry; 4 to 6 moist; B part: 5 or 6 dry; 4 or 5 moist
 Chroma: E part: 2 or 3; B part: 3 or 4
 Texture: Loam or sandy loam
 Clay content: 5 to 18 percent
 Content of rock fragments: 60 to 80 percent—5 to 15 percent cobbles; 55 to 65 percent gravel
 Reaction: pH 5.6 to 7.3

Eyebow Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 2 to 35 percent

Elevation range: 5,800 to 6,600 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Abruptic Argicryolls

Typical Pedon

Eyebow gravelly loam, 2 to 4 percent slopes, in an area of rangeland, 1,320 feet north and 1,150 feet west of the southeast corner of sec. 29, T. 1 N., R. 14 W.

A—0 to 5 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; few fine tubular pores; 20 percent gravel; slightly acid; abrupt smooth boundary.

E—5 to 8 inches; light brownish gray (10YR 6/2) gravelly loam, brown (10YR 5/3) moist; moderate fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine interstitial pores; 20 percent gravel; neutral; abrupt smooth boundary.

Bt—8 to 19 inches; brown (7.5YR 5/2) clay, brown (7.5YR 4/2) moist; strong coarse columnar structure parting to moderate medium angular blocky; extremely hard, very firm, very sticky, very plastic; few fine roots between peds; common very fine and fine tubular pores; many distinct clay films on faces of peds; slightly alkaline; clear smooth boundary.

Bk1—19 to 22 inches; pale brown (10YR 6/3) silty clay, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few fine roots; common fine tubular pores; strongly effervescent; common fine and medium soft masses of lime; moderately alkaline; clear smooth boundary.

Bk2—22 to 60 inches; light brown (7.5YR 6/4) silty clay loam, brown (7.5YR 5/4) moist; weak medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few fine roots; few fine tubular pores; strongly effervescent; disseminated lime; few fine masses of lime; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Note: The surface layer meets the requirements of a mollic epipedon when mixed to 7 inches.

A horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 20 to 25 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent gravel

Reaction: pH 5.6 to 7.8

E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 10 to 18 percent

Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent gravel

Reaction: pH 6.6 to 7.3

Bt horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Clay or silty clay

Clay content: 45 to 60 percent

Content of rock fragments: 0 to 35 percent—0 to 20 percent cobbles; 0 to 15 percent gravel

Reaction: pH 7.4 to 8.4

Bk horizons

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Texture: Silty clay or silty clay loam

Clay content: 35 to 45 percent

Content of rock fragments: 0 to 35 percent—0 to 20 percent cobbles; 0 to 15 percent gravel

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.9 to 8.4

Figaro Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Alluvial fans, mountains, and hills

Parent material: Alluvium and slope alluvium

Slope range: 8 to 25 percent

Elevation range: 6,200 to 6,800 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 30 to 37 degrees F

Frost-free period: 30 to 60 days

Taxonomic Class: Ashy, glassy Vitrandic Haplocryalfs

Typical Pedon

Figaro cobbly ashy loam, in an area of Karloff-Figaro-Bendoh complex, 8 to 25 percent slopes, moderately impacted, in an area of forestland, 1,950 feet east and 1,300 feet north of the southwest corner of sec. 16, T. 3 N., R. 11 W.

Oi—0 to 1/2 inch; partially decomposed needles, twigs, and leaves.

Oe—1/2 to 2 inches; decomposed needles, twigs, and leaves.

A—2 to 7 inches; dark grayish brown (2.5Y 4/2) cobbly ashy loam, very dark brown (10YR 2/2) moist; moderate very fine and fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and many very fine and fine roots; 10 percent cobbles; 15 percent gravel; strongly acid; clear wavy boundary.

Bt/E—7 to 18 inches; B part (60 percent) grayish brown (2.5Y 5/2) cobbly ashy clay loam, brown (10YR 5/3) moist; E part (40 percent) light brownish gray (2.5Y 6/2) cobbly loam, pale brown (10YR 6/3) moist; moderate medium prismatic structure; slightly hard, friable, moderately sticky, moderately plastic; few medium and many very fine and fine roots; few faint clay films bridging sand grains and on faces of peds in B part; 10 percent cobbles; 15 percent gravel; slightly acid; gradual wavy boundary.

Bt—18 to 30 inches; grayish brown (2.5Y 5/2) ashy clay loam, olive gray (5Y 5/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, moderately sticky, moderately plastic; few medium and many very fine and fine roots; many medium tubular pores; common distinct clay films on faces of peds; 10 percent gravel; slightly acid; gradual wavy boundary.

BC—30 to 43 inches; light gray (2.5Y 7/2) ashy clay loam, light olive gray (5Y 6/2) moist; moderate coarse prismatic structure; hard, firm, moderately sticky, moderately plastic; few medium and coarse and many very fine and fine roots; common medium tubular pores; 10 percent gravel; slightly acid; gradual wavy boundary.

C—43 to 60 inches; light gray (2.5Y 7/2) ashy clay loam, olive (5Y 5/3) moist; massive; slightly hard, friable, moderately sticky, moderately plastic; few very fine and medium roots; 5 percent gravel; neutral.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F

Mean summer soil temperature: 40 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Depth to the argillic horizon: 6 to 16 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 35 percent—0 to 15 percent stones and cobbles; 15 to 20 percent gravel

Reaction: pH 5.1 to 6.5

Bt/E horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Ashy loam, ashy clay loam, or ashy sandy clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent stones and cobbles; 5 to 25 percent gravel

Reaction: pH 5.1 to 7.3

Bt horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Ashy clay loam or ashy sandy clay

Clay content: 35 to 40 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent stones and cobbles; 5 to 25 percent gravel

Reaction: pH 6.1 to 7.3

BC and C horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Ashy loam or ashy clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent stones and cobbles; 5 to 25 percent gravel

Reaction: pH 6.1 to 7.8

Finn Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Flood plains, closed depressions, and drainageways

Parent material: Alluvium

Slope range: 0 to 25 percent

Elevation range: 5,400 to 7,800 feet

Annual precipitation: 15 to 30 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Typic Cryaquolls

Typical Pedon

Finn gravelly loam, dry, 0 to 4 percent slopes, in an area of rangeland, 1,500 feet north and 700 feet west of the southeast corner of sec. 5, T. 2 N., R. 12 W.

Oi—0 to 2 inches; partially decomposed organic matter.

A—2 to 12 inches; black (10YR 2/1) gravelly loam, grayish brown (10YR 5/2) dry; moderate fine granular structure; slightly hard, very friable, nonsticky, slightly

plastic; common medium and many very fine and fine roots; many very fine and fine discontinuous tubular pores; 5 percent cobbles; 15 percent gravel; strongly acid; clear smooth boundary.

Bw1—12 to 18 inches; dark yellowish brown (10YR 3/4) very gravelly loam, yellowish brown (10YR 5/4) dry; common fine distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine and fine roots; many very fine and fine discontinuous tubular pores; 5 percent cobbles; 35 percent gravel; strongly acid; clear smooth boundary.

Bw2—18 to 24 inches; dark brown (10YR 3/3) very gravelly sandy clay loam, brown (10YR 5/3) dry; common fine distinct yellowish brown (10YR 5/8), brownish yellow (10YR 6/8) dry redox concentrations; weak fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few very fine and fine roots; many very fine and fine discontinuous tubular pores; 10 percent cobbles; 40 percent gravel; moderately acid; gradual wavy boundary.

2C—24 to 60 inches; dark yellowish brown (10YR 4/4) very gravelly sandy clay loam, light yellowish brown (10YR 6/4) dry; many medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; massive; hard, firm, slightly sticky, slightly plastic; few very fine and fine roots; many very fine and fine discontinuous tubular pores; 15 percent cobbles; 40 percent gravel; moderately acid.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 15 inches

Depth to the seasonal high water table: Ponded to 12 inches

A horizon

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent gravel

Reaction: pH 5.1 to 7.3

Bw1 horizon

Redox concentrations: 10YR 5/8 and 10YR 6/8

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—5 to 15 percent cobbles; 30 to 45 percent gravel

Reaction: pH 5.1 to 7.3

Bw2 horizon

Redox concentrations: 10YR 5/8 and 10YR 6/8

Texture: Sandy clay loam, loam, or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent gravel

Reaction: pH 5.6 to 7.3

2C horizon

Redox concentrations: 10YR 5/8 and 10YR 6/8

Texture: Sandy clay loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 70 percent—15 to 25 percent cobbles; 20 to 45 percent gravel

Calcium carbonate equivalent: 0 to 5 percent
 Reaction: pH 5.6 to 7.3

Fluvaquentic Endoaquolls

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Rapid (6 to 20 inches/hour)

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 4,600 to 5,000 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fluvaquentic Endoaquolls

Typical Pedon

Fluvaquentic Endoaquolls, in an area of Fluvaquentic Endoaquolls-Slickens complex, 0 to 2 percent slopes, severely impacted, in an area of pasture, 1,200 feet west and 1,700 feet south of the northeast corner of sec. 18, T. 5 N., R. 9 W.

Oi—0 to 2 inches; partially decomposed organic matter.

C—2 to 8 inches; strong brown (7.5YR 5/6) fine sandy loam, light yellowish brown (10YR 6/4) dry; massive; soft, very friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; 1 percent gravel; very strongly acid; abrupt smooth boundary.

Ab1—8 to 14 inches; very dark brown (10YR 2/2) loam, dark grayish brown (10YR 4/2) dry; moderate fine granular structure; slightly hard, very friable, moderately sticky, slightly plastic; common very fine, fine, medium, and coarse roots; few very fine irregular pores; 1 percent gravel; neutral; clear wavy boundary.

Ab2—14 to 22 inches; very dark grayish brown (2.5Y 3/2) loam, grayish brown (2.5Y 5/2) dry; few fine distinct reddish yellow (7.5YR 6/8) redox concentrations; weak medium granular structure; hard, friable, moderately sticky, slightly plastic; few medium and coarse and common very fine and fine roots; few fine and common very fine discontinuous irregular pores; 1 percent gravel; disseminated lime; slightly effervescent; slightly alkaline; abrupt wavy boundary.

C'—22 to 26 inches; dark brown (10YR 3/3) very fine sandy loam; light yellowish brown (10YR 6/4) dry; single grain; loose, slightly sticky, nonplastic; common very fine and fine roots; 1 percent gravel; slightly alkaline; abrupt wavy boundary.

Abg—26 to 38 inches; very dark gray (2.5Y 3/1) silty clay loam; gray (2.5Y 5/1) dry; common coarse black (2.5Y N/) redox depletions; massive; very hard, firm, moderately sticky, moderately plastic; common very fine roots; few fine and medium and common very fine discontinuous irregular pores; 1 percent gravel; slightly alkaline; abrupt smooth boundary.

2C—38 to 60 inches; brown (10YR 5/3) gravelly coarse sand, pale brown (10YR 6/3) dry; single grain; loose, nonsticky, nonplastic; 15 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Depth to the 2C horizon: 20 to 40 inches

Depth to the seasonal high water table: 12 to 24 inches

C horizon

Hue: 10YR or 7.5YR
Value: 5 or 6 dry; 4 or 5 moist
Chroma: 4 or 6
Clay content: 10 to 20 percent
Content of rock fragments: 0 to 5 percent gravel
Reaction: pH 4.5 to 7.3

Ab horizons

Hue: 10YR or 2.5Y
Value: 4 or 5 dry; 2 or 3 moist
Chroma: 1 or 2
Texture: Loam or fine sandy loam
Clay content: 18 to 27 percent
Content of rock fragments: 0 to 15 percent gravel
Reaction: pH 6.6 to 7.8

C' horizon

Hue: 10YR or 2.5Y
Value: 4 to 6 dry; 3 to 5 moist
Chroma: 3 or 4
Texture: Fine sandy loam or very fine sandy loam
Clay content: 10 to 20 percent
Content of rock fragments: 0 to 15 percent gravel
Reaction: pH 7.4 to 8.4

Abg horizon

Hue: 10YR, 2.5Y, or N
Value: 4 to 6 dry; 2 or 3 moist
Clay content: 27 to 35 percent
Content of rock fragments: 0 to 15 percent gravel
Reaction: pH 7.4 to 8.4

2C horizon

Hue: 10YR or 2.5Y
Value: 5 to 7 dry; 4 to 6 moist
Chroma: 3 or 4
Texture: Coarse sand or sand
Clay content: 0 to 10 percent
Content of rock fragments: 15 to 60 percent—0 to 10 percent cobbles; 15 to 50 percent gravel
Reaction: pH 7.4 to 8.4

Foolhen Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains, closed depressions, and drainageways

Parent material: Alluvium

Slope range: 0 to 8 percent

Elevation range: 4,740 to 8,800 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy, mixed, superactive Typic Cryaquolls

Typical Pedon

Foolhen loam, 0 to 4 percent slopes, in an area of rangeland, 700 feet north and 1,600 feet west of the southeast corner of sec. 31, T. 1 N., R. 14 W.

Oi—0 to 6 inches; partially decomposed organic matter.

Oe—6 to 11 inches; gray (10YR 4/1) mucky peat, dark gray (10YR 5/1) dry.

A—11 to 19 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; neutral; clear smooth boundary.

Bg—19 to 24 inches; very dark gray (10YR 3/1) sandy loam, gray (10YR 5/1) dry; many medium distinct light olive brown (2.5Y 5/6) and olive yellow (2.5Y 6/6) dry redox concentrations; weak fine subangular blocky structure; soft, friable, nonsticky, nonplastic; many very fine and fine roots; common very fine tubular pores; slightly alkaline; clear smooth boundary.

Cg1—24 to 34 inches; gray (5Y 5/1) loam with lenses of very fine sandy loam 1- to 2-inches thick, gray (5Y 6/1) dry; many medium distinct light olive brown (2.5Y 5/6) and olive yellow (2.5Y 6/6) dry redox concentrations; massive; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; moderately alkaline; gradual wavy boundary.

Cg2—34 to 46 inches; gray (5Y 5/1) gravelly sandy clay loam, gray (5Y 6/1) dry; many medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; common very fine tubular pores; 20 percent gravel; moderately alkaline; gradual wavy boundary.

Cg3—46 to 60 inches; olive (5Y 5/3) silt loam, light gray (5Y 7/2) dry; many medium distinct yellowish brown (10YR 5/8) and brownish yellow (10YR 6/8) dry redox concentrations; massive; slightly hard, friable, slightly sticky, moderately plastic; few very fine and fine roots; few fine irregular tubular pores; 40 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 19 inches

Depth to the seasonal high water table: Ponded to 12 inches

A horizon

Value: 2 to 5 dry

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.6 to 7.3

Bg horizon

Texture: Loam or sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.6 to 7.8

Cg1 horizon

Value: 4 or 5 moist; 6 or 7 dry

Texture: Loam, silt loam, or sandy loam

Clay content: 18 to 27 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel
 Reaction: pH 7.4 to 8.4

Cg2 and Cg3 horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 4 to 6 moist; 6 or 7 dry
 Chroma: 1 to 4 or 6
 Texture: Loam, silt loam, sandy clay loam, or sandy loam
 Clay content: 18 to 27 percent
 Content of rock fragments: 0 to 45 percent—0 to 5 percent cobbles; 0 to 40 percent gravel
 Calcium carbonate equivalent: 0 to 15 percent
 Reaction: pH 7.4 to 8.4

Gregson Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to the 2C horizon, rapid (6 to 20 inches/hour) below
Landform: Stream terraces, flood plains, drainageways, and depressions
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 4,600 to 6,000 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, frigid Aquic Haplustolls

Typical Pedon

Gregson loam, 0 to 4 percent slopes, in an area of pasture, 2,100 feet south and 3,600 feet west of the northeast corner of sec. 27, T. 4 N., R. 10 W.

- Oi—0 to 2 inches; partially decomposed organic matter.
- A1—2 to 12 inches; gray (10YR 5/1) loam, very dark gray (10YR 3/1) moist; moderate fine and medium platy structure; slightly hard, friable, slightly sticky, slightly plastic; few coarse and many very fine, fine, and medium roots; many fine tubular pores; 5 percent gravel; slightly alkaline; gradual smooth boundary.
- A2—12 to 17 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure parting to moderate thin platy; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine and fine tubular pores; 5 percent gravel; slightly alkaline; clear smooth boundary.
- Bw—17 to 31 inches; light brownish gray (10YR 6/2) fine sandy loam, grayish brown (10YR 5/2) moist; common medium distinct strong brown (7.5YR 5/6) redox concentrations; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few medium and common very fine and fine roots; common fine tubular pores; 5 percent cobbles; 5 percent gravel; neutral; clear smooth boundary.
- 2C1—31 to 43 inches; light gray (10YR 7/1) extremely cobbly loamy sand, light brownish gray (10YR 6/2) moist; single grain; loose, nonsticky, nonplastic; few

very fine and fine roots; many very fine and fine interstitial pores; 30 percent cobbles; 40 percent gravel; neutral; clear wavy boundary.
 2C2—43 to 60 inches; light gray (10YR 7/1) extremely cobbly loamy sand, gray (10YR 6/1) moist; single grain; loose, nonsticky, nonplastic; many very fine and fine interstitial pores; 30 percent cobbles; 40 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to sand and gravel: 20 to 40 inches

A horizons

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Loam or fine sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 5 percent gravel

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Fine sandy loam, loam, or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.6 to 7.8

2C horizons

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 1 to 3

Texture: Loamy sand or sand

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 75 percent—5 to 30 percent cobbles; 30 to 45 percent gravel

Reaction: pH 6.6 to 7.8

Hackney Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills

Parent material: Residuum or colluvium from semiconsolidated shale

Slope range: 4 to 50 percent

Elevation range: 5,500 to 6,000 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy, mixed, superactive, frigid, shallow Typic Haplustolls

Typical Pedon

Hackney loam, in an area of Tewfel-Hackney complex, 4 to 15 percent slopes, in an area of rangeland, 1,900 feet east and 1,600 feet north of the southwest corner of sec. 34, T. 11 N., R. 12 W.; Granite County, Montana.

A1—0 to 3 inches; dark gray (10YR 4/1) loam, very dark gray (10YR 3/1) moist; moderate fine granular structure; soft, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine tubular pores; neutral; clear smooth boundary.

A2—3 to 8 inches; dark gray (10YR 4/1) clay loam, very dark gray (10YR 3/1) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

Bw—8 to 13 inches; dark grayish brown (2.5Y 4/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate coarse subangular blocky structure; hard, firm, moderately sticky, moderately plastic; many very fine roots; many very fine tubular pores; neutral; clear smooth boundary.

Cr—13 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 15 inches

Depth to the Cr horizon: 10 to 20 inches

A1 horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 1 to 3

Clay content: 18 to 27 percent

Reaction: pH 6.6 to 7.3

A2 horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 1 or 2

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Reaction: pH 6.6 to 7.3

Bw horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 1 or 2

Clay content: 27 to 35 percent

Reaction: pH 6.6 to 7.3

Hanson Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountain side slopes

Parent material: Colluvium from limestone

Slope range: 15 to 60 percent

Elevation range: 5,700 to 7,800 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 36 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, carbonatic Calcic Haplocryolls

Typical Pedon

Hanson gravelly loam, 35 to 60 percent slopes, in an area of rangeland, 750 feet north and 900 feet west of the southeast corner of sec. 14, T. 5 N., R. 12 W.

- A1—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many fine interstitial pores; 15 percent gravel; neutral; gradual wavy boundary.
- A2—6 to 12 inches; brown (10YR 4/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many fine interstitial pores; 35 percent gravel; slightly alkaline; clear wavy boundary.
- Bk1—12 to 17 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many fine interstitial pores; 10 percent cobbles; 30 percent gravel; common soft masses of lime; strongly effervescent; slightly alkaline; clear wavy boundary.
- Bk2—17 to 26 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many fine interstitial pores; 15 percent cobbles; 35 percent gravel; disseminated lime; many fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk3—26 to 60 inches; light brownish gray (10YR 6/2) very cobbly loam, grayish brown (10YR 5/2) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and fine roots; many fine interstitial pores; 25 percent cobbles; 35 percent gravel; disseminated lime; many fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the calcic horizon: 10 to 16 inches

A1 horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 27 percent

Content of rock fragments: 5 to 35 percent—0 to 15 percent stones and cobbles;
0 to 20 percent gravel

Reaction: pH 6.6 to 7.8

A2 horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 15 to 32 percent

Content of rock fragments: 5 to 55 percent—0 to 25 percent stones and cobbles;
5 to 30 percent gravel

Reaction: pH 6.6 to 7.8

Bk1 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 15 to 25 percent

Content of rock fragments: 35 to 60 percent—10 to 30 percent cobbles; 20 to 30 percent gravel

Calcium carbonate equivalent: 40 to 60 percent

Reaction: pH 7.4 to 8.4

Bk2 horizon

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 15 to 32 percent

Content of rock fragments: 35 to 80 percent—15 to 45 percent cobbles; 20 to 35 percent gravel

Calcium carbonate equivalent: 40 to 60 percent

Reaction: pH 7.4 to 8.4

Bk3 horizon

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 15 to 32 percent

Content of rock fragments: 35 to 80 percent—15 to 45 percent cobbles; 20 to 35 percent gravel

Calcium carbonate equivalent: 40 to 60 percent

Reaction: pH 7.9 to 8.4

Helmville Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Moderately slow (0.2 to 0.6 inch/hour)*Landform:* Mountains*Parent material:* Slope alluvium and colluvium from limestone*Slope range:* 2 to 60 percent*Elevation range:* 5,470 to 8,600 feet*Annual precipitation:* 20 to 40 inches*Annual air temperature:* 36 to 39 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Loamy-skeletal, mixed, superactive Eutric Haplocryalfs**Typical Pedon**

Helmville cobbly loam, 15 to 35 percent slopes, in an area of woodland, 900 feet south and 800 feet east of the northwest corner of sec. 35, T. 6 N., R. 11 W.

Oi—0 to 1 inch; partially decomposed organic matter.

E—1 to 12 inches; brown (7.5YR 5/3) cobbly loam, brown (7.5YR 4/4) moist; weak fine granular structure; soft, friable, nonsticky, nonplastic; many very fine, fine, and medium roots; many very fine and fine discontinuous irregular pores; 10 percent cobbles; 10 percent gravel; neutral; clear smooth boundary.

Bt1—12 to 20 inches; yellowish brown (10YR 5/4) very gravelly clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure;

slightly hard, friable, slightly sticky, moderately plastic; few coarse, common medium, and many very fine and fine roots; many very fine and fine discontinuous irregular pores; many faint continuous clay films on faces of peds; 10 percent cobbles; 30 percent gravel; neutral; gradual wavy boundary.

Bt2—20 to 38 inches; brownish yellow (10YR 5/4) very cobbly clay loam; yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; common very fine, fine, and medium roots; many very fine and fine discontinuous irregular pores; many faint clay films on faces of peds; 30 percent cobbles; 25 percent gravel; slightly alkaline; clear smooth boundary.

Bk—38 to 60 inches; pale brown (10YR 6/3) very cobbly clay loam; yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine and common medium roots; common very fine and fine discontinuous irregular pores; 30 percent cobbles; 30 percent gravel; disseminated lime; many distinct lime casts on undersides of rock fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 15 to 40 inches

E horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 20 percent stones and cobbles; 5 to 30 percent gravel

Reaction: pH 5.6 to 7.3

Bt1 horizon

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 4 or 6

Clay content: 27 to 35 percent

Content of rock fragments: 30 to 60 percent—10 to 35 percent stones and cobbles; 15 to 40 percent gravel

Reaction: pH 6.1 to 7.8

Bt2 horizon

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 4 or 6

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 60 percent—10 to 35 percent stones and cobbles; 15 to 40 percent gravel

Reaction: pH 6.1 to 7.8

Bk horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 40 to 80 percent—20 to 35 percent cobbles; 20 to 45 percent gravel

Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.4 to 8.4

Holloway Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat excessively drained
Permeability: Moderately rapid (2 to 6 inches/hour)
Landform: Mountains
Parent material: Volcanic ash over colluvium
Slope range: 15 to 60 percent
Elevation range: 6,000 to 8,720 feet
Annual precipitation: 25 to 40 inches
Annual air temperature: 37 to 43 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Eutrocryepts

Typical Pedon

Holloway gravelly ashy silt loam, 15 to 35 percent slopes, in an area of woodland, 1,600 feet west and 1,800 feet south of the northeast corner of sec. 28, T. 6 N., R. 11 W.

Oi—0 to 3 inches; decomposed and undecomposed forest litter.

A—3 to 12 inches; light yellowish brown (10YR 5/4) gravelly ashy silt loam; dark yellowish brown (10YR 4/4) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; common very fine and fine irregular pores; 5 percent cobbles; 20 percent gravel; strongly acid; clear smooth boundary.

2E—12 to 28 inches; light gray (10YR 7/2) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; common very fine and fine irregular pores; 15 percent cobbles; 55 percent gravel; slightly acid; gradual smooth boundary.

2E and Bt—28 to 56 inches; E part (75 percent) pinkish gray (10YR 7/2) extremely gravelly sandy loam, brown (10YR 5/3) moist; B part (25 percent) is brown (7.5YR 5/2) fine sandy loam lamellae 1/8- to 1/2-inch thick, dark brown (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; common very fine and fine irregular pores; 15 percent cobbles; 55 percent gravel; slightly acid; gradual smooth boundary.

2C—56 to 60 inches; light yellowish brown (2.5Y 6/3) extremely gravelly sandy loam, light olive brown (2.5Y 4/4) moist; massive; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; common very fine and fine irregular pores; 15 percent cobbles; 55 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 39 to 45 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry: 4 or 5 moist

Chroma: 4 or 6

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent gravel

Glass content: 5 to 10 percent

Acid-oxalate extractable Al + $\frac{1}{2}$ Fe: 1 to 2 percent

Moist bulk density: 1 g/cm³ or less

Reaction: pH 5.1 to 6.5

2E horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 or 3

Texture: Loam, sandy loam, or fine sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 45 to 75 percent—0 to 15 percent cobbles; 45 to 60 percent gravel

Reaction: pH 5.1 to 6.5

2E and Bt horizon

Hue: 10YR or 7.5YR

Value: E part: 6 or 7 dry; 5 or 6 moist; B part: 5 or 6 dry; 4 or 5 moist

Chroma: E part: 2 or 3; B part: 2 to 4

Texture: Sandy loam or fine sandy loam

Clay content: 5 to 15 percent; lamellae has less than 3 percent clay increase

Content of rock fragments: 60 to 80 percent—5 to 15 percent cobbles; 55 to 70 percent gravel

Reaction: pH 5.1 to 6.5

2C horizon

Hue: 2.5Y, 10YR, or 7.5YR

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Fine sandy loam, sandy loam, or loamy sand

Clay content: 5 to 15 percent

Content of rock fragments: 60 to 80 percent—5 to 20 percent cobbles; 55 to 70 percent gravel

Reaction: pH 5.1 to 6.5

Illiano Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountains and hills

Parent material: Residuum from welded tuff or rhyolite

Slope range: 15 to 70 percent

Elevation range: 5,400 to 7,800 feet

Annual precipitation: 18 to 30 inches

Annual air temperature: 30 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Ashy-skeletal, glassy Lithic Eutrocryepts

Typical Pedon

Illiano very flaggy ashy sandy loam, in an area of Karloff-Coslaw-Illiano association, 35 to 70 percent slopes, moderately impacted, in an area of nonstocked forest, 100 feet east and 2,350 feet north of the southwest corner of sec. 14, T. 3 N., R. 11 W.

- A—0 to 4 inches; grayish brown (10YR 5/2) very flaggy ashy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine roots; 25 percent flagstones; 30 percent gravel; slightly acid; clear wavy boundary.
- Bw—4 to 11 inches; light brownish gray (10YR 6/2) very flaggy ashy sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; 25 percent flagstones; 30 percent gravel; neutral; abrupt smooth boundary.
- R—11 inches; light gray (5Y 7/1) fractured hard welded tuff bedrock.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F
Mean summer soil temperature: 40 to 46 degrees F
Moisture control section: Between 8 inches and the lithic contact
Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction
Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent
Depth to bedrock: 10 to 20 inches

A horizon

Hue: 10YR or 2.5Y
 Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 1 or 2
 Clay content: 10 to 20 percent
 Content of rock fragments: 35 to 60 percent—15 to 25 percent flagstones; 20 to 35 percent gravel
 Reaction: pH 5.6 to 6.5

Bw horizon

Hue: 10YR, 2.5Y, or 5Y
 Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 1 to 3
 Texture: Ashy loam, ashy sandy loam, or ashy coarse sandy loam
 Clay content: 5 to 18 percent
 Content of rock fragments: 35 to 60 percent—15 to 25 percent flagstones; 20 to 35 percent gravel
 Reaction: pH 5.6 to 7.3

Judco Series

Depth class: Deep (40 to 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, hills, and mountains
Parent material: Colluvium and residuum from welded tuff or rhyolite
Slope range: 15 to 70 percent
Elevation range: 5,300 to 7,600 feet
Annual precipitation: 20 to 30 inches

Annual air temperature: 30 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Vitrandic Eutrocryepts

Typical Pedon

Judco very gravelly ashy sandy loam, in an area of Karloff-Judco-Illiano complex, 35 to 70 percent slopes, in an area of forestland, 400 feet east and 2,100 feet south of the northwest corner of sec. 14, T. 3 N., R. 11 W.

Oi—0 to 1/2 inch; partially decomposed needles, twigs, and leaves.

Oe—1/2 to 2 inches; well decomposed needles, twigs, and leaves.

A1—2 to 4 inches; dark gray (10YR 4/1) very gravelly ashy sandy loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; 10 percent cobbles; 30 percent gravel; strongly acid; clear wavy boundary.

A2—4 to 6 inches; gray (10YR 5/1) very gravelly ashy sandy loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and coarse and many very fine and fine roots; many very fine tubular pores; 10 percent cobbles; 30 percent gravel; moderately acid; clear wavy boundary.

Bw—6 to 12 inches; yellowish brown (10YR 5/4) very gravelly ashy sandy loam, dark yellowish brown (10YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky, nonplastic; few medium and coarse and many very fine and fine roots; many very fine tubular pores; 10 percent cobbles; 30 percent gravel; moderately acid; clear wavy boundary.

BC1—12 to 23 inches; light gray (2.5Y 7/2) very gravelly ashy sandy loam, dark grayish brown (2.5Y 4/2) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common very fine and fine roots; common fine tubular pores; 10 percent cobbles; 45 percent gravel; slightly acid; gradual wavy boundary.

BC2—23 to 40 inches; light gray (2.5Y 7/2) very gravelly ashy sandy clay loam, grayish brown (2.5Y 5/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; few medium and common very fine and fine roots; common fine tubular pores; 5 percent cobbles; 45 percent gravel; neutral; gradual wavy boundary.

C—40 to 58 inches; light gray (10YR 7/2) very gravelly ashy sandy clay loam, grayish brown (2.5Y 5/2) moist; massive; slightly hard, very friable, slightly sticky, nonplastic; few very fine, fine, and medium roots; 5 percent cobbles; 45 percent gravel; neutral; clear wavy boundary.

Cr—58 to 60 inches; light gray (10YR 7/2) decomposing welded tuff bedrock that crushes to very gravelly ashy sandy loam; neutral.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F

Mean summer soil temperature: 40 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 20 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Depth to the Cr horizon: 50 to 60 inches

A1 horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2
 Texture: Ashy sandy loam or ashy sandy clay loam
 Clay content: 10 to 27 percent
 Content of rock fragments: 15 to 60 percent—0 to 30 percent stones and cobbles; 15 to 30 percent gravel
 Reaction: pH 5.1 to 6.5

A2 horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 3 to 5 moist
 Chroma: 1 or 2
 Texture: Ashy loam, ashy sandy loam, or ashy sandy clay loam
 Clay content: 18 to 27 percent
 Content of rock fragments: 35 to 60 percent—5 to 15 percent stones and cobbles; 30 to 45 percent gravel
 Reaction: pH 5.1 to 6.5

Bw horizon

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Ashy loam, ashy sandy loam, or ashy sandy clay loam
 Clay content: 18 to 27 percent
 Content of rock fragments: 35 to 55 percent—5 to 15 percent stones and cobbles; 30 to 40 percent gravel
 Reaction: pH 5.6 to 7.3

BC and C horizons

Hue: 10YR, 2.5Y, or 5Y
 Value: 6 or 7 dry; 4 to 6 moist
 Chroma: 1 or 2
 Texture: Ashy loam, ashy sandy loam, or ashy sandy clay loam
 Clay content: 15 to 27 percent
 Content of rock fragments: 35 to 60 percent—5 to 15 percent stones and cobbles; 30 to 45 percent gravel
 Reaction: pH 5.6 to 7.3

Julius Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 2 to 60 percent

Elevation range: 5,180 to 6,200 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid Alfic Argiustolls

Typical Pedon

Julius loam, 4 to 8 percent slopes, in an area of hayland, 2,800 feet west and 1,800 feet south of the northeast corner of sec. 34, T. 6 N., R. 14 W.; Granite County, Montana.

- Ap1—0 to 4 inches; dark gray (10YR 4/1) loam, black (10YR 2/1) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine roots; many very fine tubular pores; neutral; clear wavy boundary.
- Ap2—4 to 8 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many fine and medium roots; many very fine tubular pores; neutral; clear wavy boundary.
- Bt/E—8 to 11 inches; B part (65 percent) is brown (7.5YR 5/4) clay loam, dark brown (10YR 4/4) moist; E part (35 percent) is pinkish gray (7.5YR 6/2) loam, dark brown (7.5YR 3/2) moist; moderate medium subangular blocky structure; soft, friable, slightly sticky, slightly plastic; many fine and medium roots; common fine tubular pores; slightly alkaline; abrupt smooth boundary.
- Bt1—11 to 17 inches; brown (7.5YR 5/4) clay, dark brown (7.5YR 4/4) moist; strong medium columnar structure; very hard, very firm, very sticky, very plastic; common fine and medium roots; few very fine tubular pores; many distinct clay films on faces of peds; strongly alkaline; clear wavy boundary.
- Bt2—17 to 23 inches; brown (7.5YR 5/4) clay loam, dark brown (7.5YR 4/4) moist; moderate medium prismatic structure; hard, firm, moderately sticky, moderately plastic; common fine and medium and many very fine roots; common very fine tubular pores; common faint clay films on faces of peds; slightly alkaline; abrupt wavy boundary.
- Bk—23 to 33 inches; very pale brown (10YR 8/3) loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine tubular pores; disseminated lime; common fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.
- Cr—33 to 60 inches; very pale brown (10YR 8/4) semiconsolidated tuff.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 12 inches

Depth to the calcic horizon: 19 to 32 inches

Depth to the Cr horizon: 20 to 40 inches

Ap horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent gravel

Reaction: pH 6.6 to 7.3

Bt/E horizon

Hue: 7.5YR or 10YR

Value: B part: 4 or 5 dry; 3 or 4 moist; E part: 5 or 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam (mixed)

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.6 to 7.8

Bt1 horizon

Hue: 7.5YR or 10YR
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Clay or clay loam
 Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel
 Reaction: pH 7.9 to 9.0

Bt2 horizon

Hue: 7.5YR or 10YR
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 3 or 4
 Texture: Clay or clay loam
 Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 5 percent gravel
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 7.5YR or 10YR
 Value: 6 to 8 dry; 5 or 6 moist
 Chroma: 2 to 4
 Texture: Clay loam or loam
 Clay content: 18 to 35 percent
 Content of rock fragments: 0 to 5 percent gravel
 Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.9 to 8.6

Karloff Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountains and hills

Parent material: Colluvium and residuum from welded tuff or rhyolite

Slope range: 4 to 70 percent

Elevation range: 5,200 to 8,000 feet

Annual precipitation: 18 to 30 inches

Annual air temperature: 30 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Ashy-skeletal, glassy Vitrandic Eutrocryepts

Typical Pedon

The Karloff soil in map unit 865F is a taxadjunct to the Series. It classifies as Loamy-skeletal, mixed, superactive, frigid Vitrandic Haplustepts.

Typical Pedon

Karloff very cobbly ashy sandy loam, in an area of Elve, stony-Karloff-Worock complex, 4 to 15 percent slopes, in an area of forestland, 950 feet south and 1,000 feet west of the northeast corner of sec. 13, T. 3 N., R. 11 W.

Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.

- A—1 to 3 inches; dark gray (10YR 4/1) very cobbly ashy sandy loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; 15 percent cobbles; 25 percent gravel; neutral; clear wavy boundary.
- E—3 to 9 inches; light brownish gray (2.5Y 6/2) gravelly ashy sandy loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure; slightly hard, very friable, nonsticky, nonplastic; few medium and coarse and many very fine and fine roots; many very fine tubular pores; 20 percent gravel; moderately acid; clear wavy boundary.
- Bw—9 to 16 inches; light gray (2.5Y 7/2) very gravelly ashy sandy loam, grayish brown (2.5Y 5/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky, nonplastic; few medium and coarse and many very fine and fine roots; many very fine tubular pores; 5 percent cobbles; 35 percent gravel; slightly acid; clear wavy boundary.
- BC—16 to 27 inches; light gray (2.5Y 7/2) very gravelly ashy sandy loam, grayish brown (2.5Y 5/2) moist; weak coarse prismatic structure; slightly hard, very friable, nonsticky, nonplastic; common very fine and fine roots; common fine tubular pores; 10 percent cobbles; 40 percent gravel; slightly acid; gradual wavy boundary.
- Cr—27 to 35 inches; light gray (5Y 7/1) decomposing welded tuff bedrock that crushes to very gravelly ashy sandy loam; neutral.
- R—35 inches; light gray (5Y 7/1) hard fractured welded tuff bedrock.

Range in Characteristics

Mean annual soil temperature: 32 to 40 degrees F

Mean summer soil temperature: 40 to 46 degrees F

Moisture control section: Between 8 and 24 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Surface fragments: 0 to 0.1 percent stones

Depth to the Cr horizon: 20 to 38 inches

Depth to bedrock: 25 to 40 inches

A horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Ashy sandy loam or ashy loam

Clay content: 10 to 20 percent

Content of rock fragments: 15 to 45 percent—0 to 15 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.6 to 7.3

E horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 1 or 2

Texture: Ashy sandy loam, ashy loam, or ashy loamy sand

Clay content: 5 to 18 percent

Content of rock fragments: 15 to 45 percent—0 to 15 percent stones and cobbles; 15 to 30 percent gravel

Reaction: pH 5.6 to 7.3

Bw and BC horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 or 2
 Texture: Ashy coarse sandy loam, ashy sandy loam, or ashy loam
 Clay content: 10 to 20 percent
 Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and cobbles; 30 to 40 percent gravel
 Reaction: pH 5.6 to 7.3

Kilgore Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Very poorly drained
Permeability: Moderate (0.6 to 2.0 inches/hour) to 29 inches, rapid (6 to 20 inches/hour) below
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 4,740 to 8,800 feet
Annual precipitation: 15 to 22 inches
Annual air temperature: 36 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive
 Cumulic Cryaquolls

Typical Pedon

Kilgore loam, in an area of Kilgore-Mooseflat complex, 0 to 2 percent slopes, in an area of pasture, 300 feet east and 1,950 feet south of the northwest corner of sec. 8, T. 1 S., R. 14 W.

- Oe—0 to 2 inches; decomposed organic mat.
- A1—2 to 4 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; few fine and common very fine tubular pores; neutral; clear smooth boundary.
- A2—4 to 10 inches; black (10YR 2/1) loam, dark gray (10YR 4/1) dry; common medium prominent dark yellowish brown (10YR 3/4) redox concentrations; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; neutral; clear smooth boundary.
- A3—10 to 15 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; neutral; clear wavy boundary.
- C1—15 to 27 inches; very dark grayish brown (10YR 3/2) loam, dark grayish brown (10YR 4/2) dry; massive; slightly hard, friable, moderately sticky, moderately plastic; common very fine and fine roots; common very fine and fine tubular pores; neutral; clear wavy boundary.
- C2—27 to 31 inches; dark grayish brown (10YR 4/2) fine sandy loam, grayish brown (10YR 5/2) dry; common fine dark grey (10YR 4/1) moist redox depletions; massive; soft, friable, slightly sticky, nonplastic; few fine and common very fine roots; common very fine and fine tubular pores; neutral; clear wavy boundary.
- 2C3—31 to 60 inches; brown (10YR 5/3) very gravelly sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky, nonplastic; common irregular pores; 5 percent cobbles; 40 percent gravel; neutral.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 20 to 34 inches

Depth to the seasonal high water table: 0 to 12 inches

Depth to the 2C3 horizon: 20 to 40 inches

A horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Reaction: pH 6.1 to 7.3

C1 horizon

Value: 4 or 5 dry

Chroma: 1 or 2

Texture: Loam, fine sandy loam, or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.1 to 7.3

C2 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 1 or 2

Texture: Loam, fine sandy loam, or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.1 to 7.3

2C3 horizon

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 1 to 3

Texture: Loamy sand or sand

Clay content: 5 to 15 percent

Content of rock fragments: 40 to 60 percent—0 to 20 percent cobbles; 0 to 40 percent gravel

Reaction: pH 6.1 to 7.3

Kleinschmidt Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, and flood plains

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,800 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Oxyaquic Haplustolls

Typical Pedon

Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes, in an area of hayland, 2,600 feet south and 2,200 feet west of the northeast corner of sec. 34, T. 14 N., R. 11 W.; Powell County, Montana.

- Ap—0 to 7 inches; dark grayish brown (10YR 4/2) gravelly loam, black (10YR 2/1) moist; moderate fine granular structure; slightly hard, friable, slightly sticky and moderately plastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; 25 percent gravel; neutral; abrupt smooth boundary.
- A—7 to 14 inches; dark grayish brown (10YR 4/2) very gravelly loam, black (10YR 2/1) moist; weak fine subangular blocky structure parting to moderate fine granular; slightly hard, friable, slightly sticky and moderately plastic; few medium and many very fine and fine roots; many very fine and fine tubular pores; 5 percent cobbles; 30 percent gravel; neutral; clear smooth boundary.
- Bw1—14 to 28 inches; pale brown (10YR 6/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate fine and medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, medium, and coarse and many fine roots; many very fine and fine tubular pores; 5 percent cobbles; 40 percent gravel; slightly alkaline; gradual wavy boundary.
- Bw2—28 to 37 inches; brown (10YR 5/3) very gravelly sandy loam, dark brown (10YR 4/3) moist; few fine distinct reddish yellow (7.5YR 6/6) redox concentrations; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few coarse, common very fine, and many fine roots; many very fine and fine tubular pores; 10 percent cobbles; 40 percent gravel; few thin lime casts on undersides of coarse fragments; slightly alkaline; clear wavy boundary.
- 2Bk—37 to 60 inches; brown (10YR 5/3) extremely cobbly loamy sand, dark brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; few very fine and fine roots; 35 percent cobbles; 35 percent gravel; disseminated lime; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the 2Bk horizon: 30 to 48 inches

Ap horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 25 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent cobbles; 15 to 30 percent gravel

Reaction: pH 6.6 to 7.8

A horizon

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 2 to 4 moist

Chroma: 1 or 2

Clay content: 15 to 25 percent

Content of rock fragments: 20 to 50 percent—0 to 20 percent cobbles; 20 to 30 percent gravel

Reaction: pH 6.6 to 7.8

Bw horizons

Value: 4 to 7 dry; 2 to 5 moist

Chroma: 2 to 4

Texture: Loam, sandy loam, or silty clay loam

Clay content: 15 to 35 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent cobbles; 30 to 40 percent gravel
 Reaction: pH 6.6 to 8.4

2Bk horizon

Hue: 10YR or 7.5YR
 Value: 5 to 7 dry; 3 to 5 moist
 Chroma: 1 to 4 or 6
 Texture: Sandy loam, loamy sand, or sand
 Clay content: 5 to 10 percent
 Content of rock fragments: 40 to 85 percent—15 to 35 percent cobbles; 25 to 50 percent gravel
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Lap Series

Depth class: Shallow (10 to 20 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains
Parent material: Residuum from limestone
Slope range: 4 to 60 percent
Elevation range: 5,300 to 6,200 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Lithic Calcicustolls

Typical Pedon

Lap gravelly loam, in an area of Windham-Lap gravelly loams, 15 to 35 percent slopes, in an area of rangeland, 1,700 feet north and 500 feet east of the southwest corner of sec. 12, T. 10 N., R. 7 W.; Powell County, Montana.

- A1—0 to 4 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium granular structure; soft, very friable, nonsticky, slightly plastic; common coarse and many very fine, fine, and medium roots; many very fine interstitial pores; 5 percent stones; 10 percent cobbles; 20 percent gravel; slightly effervescent; mildly alkaline; clear smooth boundary.
- A2—4 to 9 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; common coarse and many very fine, fine, and medium roots; many very fine interstitial pores; 5 percent stones; 5 percent cobbles; 15 percent gravel; slightly effervescent; slightly alkaline; abrupt smooth boundary.
- Bk1—9 to 14 inches; brown (10YR 5/3) very gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few coarse and common very fine, fine, and medium roots; common very fine interstitial pores; 5 percent stones; 15 percent cobbles; 35 percent gravel; disseminated lime; strongly effervescent; moderately alkaline; clear smooth boundary.
- Bk2—14 to 18 inches; pale brown (10YR 6/3) very cobbly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; few very fine, fine, and medium roots; common very fine

interstitial pores; 5 percent stones; 25 percent cobbles; 30 percent gravel; disseminated lime; violently effervescent; moderately alkaline; abrupt smooth boundary.

R—18 inches; fractured limestone bedrock.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 10 inches

Clay content: 20 to 27 percent

Surface fragments: 0 to 3 percent stones

Depth to bedrock: 10 to 20 inches

A horizons

Clay content: 20 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent stones; 5 to 10 percent cobbles; 10 to 20 percent gravel

Reaction: pH 7.4 to 7.8

Bk1 horizon

Clay content: 20 to 27 percent

Content of rock fragments: 40 to 70 percent—5 to 10 percent stones; 15 to 20 percent cobbles; 30 to 40 percent gravel

Reaction: pH 7.9 to 8.4

Calcium carbonate equivalent: 30 to 40 percent

Bk2 horizon

Clay content: 20 to 27 percent

Content of rock fragments: 50 to 70 percent—5 to 10 percent stones; 20 to 25 percent cobbles; 25 to 35 percent gravel

Reaction: pH 7.9 to 8.4

Calcium carbonate equivalent: 40 to 50 percent

Levengood Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Slope alluvium over colluvium from limestone

Slope range: 4 to 60 percent

Elevation range: 5,800 to 7,800 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 36 to 45 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Calcic Pachic Haplocryolls

Typical Pedon

Levengood gravelly loam, in an area of Tibson-Levengood gravelly loams, 15 to 35 percent slopes, in an area of rangeland, 2,100 feet east and 400 feet south of the northwest corner of sec. 19, T. 6 N., R. 14 W.; Granite County, Montana.

A—0 to 6 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine interstitial pores; 5 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.

- Bw**—6 to 12 inches; brown (10YR 5/3) very gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 5 percent cobbles; 30 percent gravel; neutral; clear smooth boundary.
- Bk1**—12 to 19 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; 10 percent cobbles; 35 percent gravel; disseminated lime; few fine masses of lime; strongly effervescent; moderately alkaline; gradual wavy boundary.
- Bk2**—19 to 30 inches; pale yellow (2.5Y 7/4) very gravelly fine sandy loam, light yellowish brown (2.5Y 6/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; 10 percent cobbles; 35 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual smooth boundary.
- Bk3**—30 to 60 inches; very pale brown (10YR 7/4) very cobbly loam, light yellowish brown (10YR 6/4) moist; weak coarse prismatic structure; soft, very friable, nonsticky, nonplastic; few very fine roots; 25 percent cobbles; 20 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 30 inches

Depth to the calcic horizon: 12 to 18 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 30 percent—0 to 5 percent cobbles; 15 to 25 percent gravel

Reaction: pH 6.6 to 7.3

Bw horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 to 3

Texture: Clay loam or loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 55 percent—5 to 15 percent cobbles; 30 to 40 percent gravel

Reaction: pH 6.6 to 7.3

Bk1 horizon

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 1 to 3

Texture: Clay loam or loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 50 percent—5 to 10 percent cobbles; 30 to 40 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 3 or 4

Texture: Clay loam, loam, or fine sandy loam

Clay content: 15 to 30 percent

Content of rock fragments: 35 to 50 percent—5 to 10 percent cobbles; 30 to 40 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Bk3 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 3 or 4

Texture: Clay loam, loam, or sandy loam

Clay content: 15 to 30 percent

Content of rock fragments: 35 to 60 percent—15 to 30 percent cobbles; 20 to 30 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Liart Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Very poorly drained*Permeability:* Moderate (0.6 to 2.0 inches/hour)*Landform:* High mountain valleys and flood plains*Parent material:* Alluvium*Slope range:* 0 to 4 percent*Elevation range:* 5,500 to 7,500 feet*Annual precipitation:* 15 to 25 inches*Annual air temperature:* 37 to 43 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Ashy, glassy Aquandic Cryaquolls**Typical Pedon**

Liart mucky silt loam, in an area of Liart-Mooseflat-Tibkey complex, 0 to 4 percent slopes, moderately impacted, in an area of rangeland, 2,500 feet north and 1,900 feet east of the southwest corner of sec. 16, T. 3 N., R. 11 W.

Oe—0 to 2 inches; very dark grayish brown (10YR 3/2) mucky silt loam, dark gray (10YR 4/1) dry; strongly acid.

A1—2 to 18 inches; black (10YR 2/1) ashy loam, dark gray (10YR 4/1) dry; moderate coarse angular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; 5 percent gravel; many very fine roots; moderately acid; clear wavy boundary.

A2g—18 to 33 inches; very dark brown (10YR 2/2) ashy sandy clay loam, gray (10YR 5/1) dry; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; 5 percent gravel; slightly acid; gradual wavy boundary.

ACg—33 to 40 inches; very dark gray (10YR 3/1) gravelly ashy coarse sandy loam, gray (10YR 5/1) dry; moderate coarse prismatic structure; hard, friable, slightly sticky, nonplastic; 20 percent gravel; slightly acid; gradual wavy boundary.

Cg1—40 to 46 inches; very dark gray (5Y 3/1) stratified ashy silt loam and ashy coarse sandy loam, gray (2.5Y 5/1) dry; massive; hard, friable, slightly sticky, slightly plastic; 5 percent gravel; slightly acid; gradual wavy boundary.

Cg2—46 to 60 inches; olive (5Y 5/3) gravelly ashy coarse sandy loam, gray (2.5Y 5/1) dry; massive; hard, friable, nonsticky, nonplastic; 5 percent cobbles; 20 percent gravel; slightly acid.

Range in Characteristics

Mean annual soil temperature: 39 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 0 to 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Thickness of the mollic epipedon: 20 to 47 inches

A1 horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Mucky silt loam, ashy loam, or ashy silt loam

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 5.6 to 6.5

A2g horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Ashy sandy clay loam, ashy clay loam, or ashy loam

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 5.6 to 6.5

ACg horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Ashy coarse sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent gravel

Reaction: pH 5.6 to 6.5

Cg1 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Stratified ashy coarse sandy loam, ashy silt loam, or ashy loam

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent gravel

Reaction: pH 5.6 to 6.5

Cg2 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4 to 6 dry; 4 or 5 moist

Chroma: 1 to 3

Texture: Ashy coarse sandy loam, ashy silt loam, or ashy loam

Clay content: 18 to 27 percent
 Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent gravel
 Reaction: pH 5.6 to 6.5

Libeg Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, stream terraces, and hills
Parent material: Colluvium
Slope range: 2 to 85 percent
Elevation range: 5,200 to 8,400 feet
Annual precipitation: 15 to 30 inches
Annual air temperature: 34 to 43 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Argicryolls

Typical Pedon

Libeg gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 800 feet west and 200 feet south of the northeast corner of sec. 29, T. 3 N., R. 11 W.

- A—0 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 5 percent cobbles; 20 percent gravel; moderately acid; clear smooth boundary.
- Bt1—8 to 16 inches; light brownish gray (10YR 6/2) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine interstitial pores; 15 percent cobbles; 30 percent gravel; slightly acid; gradual wavy boundary.
- Bt2—16 to 30 inches; pale brown (10YR 6/3) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; very hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; many very fine and fine interstitial pores; 15 percent cobbles; 35 percent gravel; neutral; gradual wavy boundary.
- C—30 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; massive; hard, friable, slightly sticky, moderately plastic; few very fine and fine roots; common very fine and fine interstitial pores; 15 percent cobbles; 30 percent gravel; neutral.

Range in Characteristics

Soil temperature: 36 to 45 degrees F
Moisture control section: Between 4 and 12 inches
Thickness of the mollic epipedon: 7 to 15 inches
Surface fragments: 0 to 3 percent stones

A horizon

Value: 4 or 5 dry; 2 or 3 moist
 Chroma: 1 to 3
 Clay content: 10 to 27 percent

Content of rock fragments: 15 to 60 percent—0 to 50 percent cobbles; 15 to 50 percent gravel
 Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 10YR or 7.5YR
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Loam, clay loam, or sandy clay loam
 Clay content: 15 to 35 percent
 Content of rock fragments: 35 to 60 percent—10 to 25 percent cobbles; 25 to 35 percent gravel
 Reaction: pH 5.6 to 7.3

C horizon

Hue: 10YR or 7.5YR
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Loam or sandy loam
 Clay content: 10 to 20 percent
 Content of rock fragments: 35 to 60 percent—10 to 25 percent cobbles; 25 to 35 percent gravel
 Reaction: pH 5.6 to 7.3

Litag Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, mountains, and hills
Parent material: Residuum and colluvium from welded tuff or rhyolite
Slope range: 4 to 60 percent
Elevation range: 5,200 to 6,400 feet
Annual precipitation: 18 to 24 inches
Annual air temperature: 36 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Ashy-skeletal, glassy, frigid Vitrandic Haplustepts

Typical Pedon

Litag mucky loam, in an area of Pax-Nivean-Litag complex, 35 to 60 percent slopes, moderately impacted, in an area of forestland, 1,450 feet west and 2,500 feet north of the southeast corner of sec. 35, T. 4 N., R. 11 W.

Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.

A—1 to 3 inches; very dark gray (10YR 3/1) mucky loam, black (10YR 2/1) moist; weak very fine granular structure; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine roots; 5 percent gravel; neutral; clear wavy boundary.

E1—3 to 9 inches; light brownish gray (2.5Y 6/2) gravelly ashy sandy clay loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few coarse, common medium, and many very fine and fine roots; many medium tubular pores; 5 percent cobbles; 20 percent gravel; neutral; clear wavy boundary.

E2—9 to 20 inches; light brownish gray (2.5Y 6/2) gravelly ashy sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky

- structure; slightly hard, very friable, slightly sticky, slightly plastic; few coarse, common medium, and many very fine and fine roots; many medium tubular pores; 5 percent cobbles; 25 percent gravel; neutral; gradual wavy boundary.
- Bw—20 to 35 inches; light brownish gray (2.5Y 6/2) very gravelly ashy sandy clay loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky, nonplastic; few coarse, common medium, and many very fine and fine roots; many medium tubular pores; 10 percent cobbles; 30 percent gravel; slightly acid; gradual wavy boundary.
- BC—35 to 54 inches; grayish brown (2.5Y 5/2) very gravelly ashy sandy clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and coarse and many very fine and fine roots; common medium tubular pores; 10 percent cobbles; 35 percent gravel; slightly acid; gradual irregular boundary.
- C—54 to 60 inches; light yellowish brown (2.5Y 6/4) very cobbly ashy loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky, nonplastic; few medium and coarse and many very fine and fine roots; common medium tubular pores; 20 percent cobbles; 30 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent.

A horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Mucky loam, ashy sandy loam, or ashy sandy clay loam

Clay content: 18 to 25 percent

Content of rock fragments: 5 to 25 percent—0 to 5 percent stones and cobbles;
5 to 20 percent gravel

Reaction: pH 5.6 to 7.3

E horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Ashy sandy loam or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 45 percent—5 to 15 percent stones and
cobbles; 10 to 30 percent gravel

Reaction: pH 5.6 to 7.3

Bw horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Ashy loam or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and
cobbles; 30 to 40 percent gravel

Reaction: pH 5.6 to 7.3

BC horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Ashy loam, ashy sandy loam, or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—10 to 25 percent stones and cobbles; 25 to 35 percent gravel

Reaction: pH 5.6 to 7.3

C horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 6 to 8 dry; 4 to 6 moist

Chroma: 1 to 4

Texture: Ashy sandy loam, ashy loam, or ashy sandy clay loam

Clay content: 12 to 25 percent

Content of rock fragments: 35 to 60 percent—10 to 40 percent stones and cobbles; 15 to 50 percent gravel

Reaction: pH 5.6 to 7.3

Loberg Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Slow (0.06 to 0.20 inch/hour)*Landform:* Mountains*Parent material:* Colluvium*Slope range:* 4 to 60 percent*Elevation range:* 5,000 to 8,100 feet*Annual precipitation:* 20 to 30 inches*Annual air temperature:* 36 to 39 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Clayey-skeletal, mixed, superactive Ustic Glossocryalfs**Typical Pedon**

Loberg gravelly loam, 15 to 35 percent slopes, in an area of woodland, 1,200 feet south and 200 feet east of the northwest corner of sec. 36, T. 6 N., R. 11 W.

Oi—0 to 1 inch; undecomposed needles and twigs.

Oe—1 to 3 inches; partially decomposed forest litter.

E—3 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium and coarse roots; many fine irregular pores; 5 percent cobbles; 15 percent gravel; moderately acid; clear wavy boundary.

E/Bt—6 to 21 inches; E part (75 percent) is light brownish gray (10YR 6/2) very gravelly clay loam, dark grayish brown (10YR 4/2) moist tongues; B part (25 percent) is pale brown (10YR 6/3) very gravelly clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine and common medium and coarse roots; common very fine, fine, and medium tubular pores; 15 percent cobbles; 30 percent gravel; slightly acid; clear wavy boundary.

Bt1—21 to 28 inches; brown (10YR 5/3) very gravelly clay loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, moderately

sticky, moderately plastic; few medium and coarse, common fine, and many very fine roots; common very fine and fine tubular pores; continuous faint clay films on faces of peds; 15 percent cobbles; 30 percent gravel; slightly acid; clear wavy boundary.

Bt2—28 to 38 inches; pale brown (10YR 6/3) very cobbly clay loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few coarse and common very fine, fine, and medium roots; common very fine tubular pores; continuous faint clay films on faces of peds; 20 percent cobbles; 35 percent gravel; slightly acid; gradual wavy boundary.

BC—38 to 60 inches; pale brown (10YR 6/3) very cobbly clay loam; brown (10YR 5/3) moist; weak coarse subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few very fine and fine roots; few fine and common very fine tubular pores; 20 percent cobbles; 35 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 10 to 60 percent—0 to 20 percent cobbles; 10 to 45 percent gravel

Reaction: pH 5.6 to 7.3

E/Bt horizon

Hue: 10YR or 7.5YR

Value: E part: 5 to 7 dry; 3 to 5 moist; B part: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent (mixed)

Content of rock fragments: 35 to 60 percent—5 to 20 percent cobbles; 30 to 40 percent gravel

Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4 or 6

Texture: Clay loam or clay

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 60 percent—0 to 20 percent stones and cobbles; 25 to 40 percent gravel

Reaction: pH 5.6 to 7.8

BC horizon

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Clay loam or clay

Clay content: 35 to 45 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones; 5 to 20 percent cobbles; 30 to 40 percent gravel
 Reaction: pH 6.1 to 7.8

Lolon Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Excessively drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 28 inches, rapid (6 to 20 inches/hour) below

Landform: Glacial moraines and alluvial fans

Parent material: Alluvium

Slope range: 4 to 25 percent

Elevation range: 5,200 to 6,300 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Pachic Haplocryolls

Typical Pedon

Lolon gravelly loam, 4 to 25 percent slopes, in an area of rangeland, 500 feet west and 300 feet south of the northeast corner of sec. 26, T. 1 N., R. 15 W.

A1—0 to 4 inches; very dark brown (10YR 2/2) gravelly loam, very dark grayish brown (10YR 3/2) dry; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 1 percent boulders; 5 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.

A2—4 to 12 inches; very dark brown (10YR 2/2) gravelly loam, dark grayish brown (10YR 4/2) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few fine tubular pores; 1 percent boulders; 5 percent cobbles; 20 percent gravel; neutral; clear wavy boundary.

Bw—12 to 17 inches; dark brown (10YR 3/3) cobbly loam, dark brown (10YR 4/3) dry; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; common fine and medium tubular pores; 1 percent boulders; 15 percent cobbles; 20 percent gravel; neutral; clear wavy boundary.

BC—17 to 27 inches; brown (10YR 5/3) very cobbly loam, pale brown (10YR 6/3) dry; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and common very fine and fine roots; common fine tubular pores; 1 percent boulders; 15 percent cobbles; 25 percent gravel; neutral; clear wavy boundary.

2C—27 to 60 inches; pale brown (10YR 6/3) very cobbly sand, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; few fine and medium and common very fine roots; common very fine interstitial pores; 1 percent boulders; 20 percent cobbles; 20 percent gravel; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 17 to 24 inches

Surface fragments: 0 to 0.1 percent boulders

Note: The particle-size control section has more than 50 percent fine sand or coarser.

A horizons

Value: 3 or 4 dry

Chroma: 1 to 3

Clay content: 20 to 25 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent boulders; 5 to 15 percent cobbles; 10 to 20 percent gravel

Reaction: pH 6.1 to 7.3

Bw horizon

Value: 3 or 4 moist; 4 or 5 dry

Chroma: 2 or 3

Clay content: 20 to 25 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent boulders; 20 to 35 percent cobbles; 15 to 25 percent gravel

Reaction: pH 6.1 to 7.8

BC horizon

Chroma: 2 or 3

Clay content: 20 to 25 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent boulders; 20 to 35 percent cobbles; 15 to 25 percent gravel

Reaction: pH 6.1 to 7.8

2C horizon

Value: 5 or 6 moist; 6 or 7 dry

Chroma: 2 or 3

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 70 percent—0 to 5 percent boulders; 20 to 35 percent cobbles; 15 to 35 percent gravel

Reaction: pH 6.1 to 7.8

Lowland Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Moderate (0.6 to 2.0 inches/hour)*Landform:* Hills and mountains*Parent material:* Colluvium from tuffaceous volcanic rocks*Slope range:* 4 to 15 percent*Elevation range:* 6,600 to 7,000 feet*Annual precipitation:* 20 to 30 inches*Annual air temperature:* 36 to 39 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Loamy-skeletal, mixed, superactive Vitrandic Haplocryolls**Typical Pedon**

Lowland ashy loam, in an area of Elve-Worock-Lowland complex, 4 to 15 percent slopes, 100 feet west and 500 feet north of the southeast corner of sec. 15, T. 3 N., R. 11 W.

A1—0 to 6 inches; dark gray (10YR 4/1) ashy loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly acid; clear wavy boundary.

- A2—6 to 13 inches; gray (10YR 5/1) ashy loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly acid; gradual wavy boundary.
- Bw1—13 to 21 inches; light brownish gray (10YR 6/2) very cobbly ashy loam, dark brown (10YR 3/3) moist; moderate fine prismatic structure parting to moderate fine and medium subangular blocky; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 20 percent cobbles; 25 percent gravel; neutral; gradual wavy boundary.
- Bw2—21 to 29 inches; pale brown (10YR 6/3) very cobbly ashy sandy clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine and fine interstitial pores; 20 percent cobbles; 20 percent gravel; neutral; gradual irregular boundary.
- BC—29 to 42 inches; light brownish gray (10YR 6/2) very gravelly ashy sandy loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine interstitial pores; 10 percent cobbles; 35 percent gravel; neutral; gradual irregular boundary.
- C—42 to 60 inches; light yellowish brown (2.5Y 6/3) very cobbly ashy sandy loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; 20 percent cobbles; 25 percent gravel; neutral.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 8 to 16 inches

Volcanic glass: 25 to 30 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.11 to 0.20 percent

A horizons

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 23 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent stones and cobbles;
0 to 10 percent gravel

Reaction: pH 6.1 to 7.3

Bw horizons

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 1 to 3

Texture: Ashy loam, ashy sandy clay loam, ashy sandy loam, or ashy coarse sandy loam

Clay content: 12 to 23 percent

Content of rock fragments: 25 to 50 percent—5 to 20 percent stones and cobbles; 20 to 30 percent gravel

Reaction: pH 6.1 to 7.3

BC horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 or 2

Texture: Ashy loam, ashy sandy loam, or ashy coarse sandy loam

Clay content: 12 to 20 percent
 Content of rock fragments: 35 to 60 percent—10 to 25 percent stones and cobbles; 25 to 35 percent gravel
 Reaction: pH 6.1 to 7.8

C horizon

Hue: 10YR or 2.5Y
 Value: 6 to 8 dry; 4 to 6 moist
 Chroma: 1 to 3
 Texture: Ashy coarse sandy loam, ashy sandy loam, ashy loam, or ashy loamy sand
 Clay content: 5 to 18 percent
 Content of rock fragments: 35 to 60 percent—10 to 40 percent stones and cobbles; 15 to 50 percent gravel
 Reaction: pH 6.1 to 7.8

Macabre Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Mountains and hills
Parent material: Residuum and colluvium from welded tuff or rhyolite
Slope range: 8 to 60 percent
Elevation range: 5,200 to 6,600 feet
Annual precipitation: 15 to 24 inches
Annual air temperature: 36 to 39 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Vitrandic Argiustolls

Typical Pedon

Macabre very cobbly ashy sandy clay loam, in an area of Macabre-Nivean-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted, in an area of nonstocked forest, 1,300 feet west and 1,800 feet south of the northeast corner of sec. 35, T. 4 N., R. 11 W.

- A—0 to 9 inches; gray (10YR 5/1) very cobbly ashy sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate very fine and fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; 15 percent cobbles; 25 percent gravel; slightly alkaline; clear wavy boundary.
- Bt—9 to 17 inches; grayish brown (2.5Y 5/2) very cobbly ashy sandy clay loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few coarse, common medium, and many very fine and fine roots; many medium tubular pores; common distinct clay films on faces of peds; 15 percent cobbles; 25 percent gravel; slightly alkaline; gradual wavy boundary.
- BC—17 to 27 inches; light brownish gray (2.5Y 6/2) very cobbly ashy sandy clay loam, light olive brown (2.5Y 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and coarse and many very fine and fine roots; common medium tubular pores; 20 percent cobbles; 25 percent gravel; slightly alkaline; gradual irregular boundary.

Cr—27 to 41 inches; light gray (N 7/) decomposing welded tuff bedrock.

R—41 inches; light gray (5Y 7/1) fractured hard welded tuff bedrock.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 6 and 18 inches

Volcanic glass: 23 to 30 percent in the coarse silt and sand fraction of one or more horizons within 30 inches

Acid oxalate extractable Fe + Al: 0.11 to 0.20 percent

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the argillic horizon: 6 to 12 inches

Depth to the Cr horizon: 20 to 40 inches

Depth to bedrock: 40 to 60 inches

A horizon

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Texture: Ashy loam or ashy sandy clay loam

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 45 percent—5 to 15 percent stones and cobbles; 10 to 30 percent gravel

Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Ashy loam, ashy clay loam, or ashy sandy clay loam

Clay content: 23 to 30 percent

Content of rock fragments: 35 to 60 percent—5 to 25 percent stones and cobbles; 25 to 35 percent gravel

Reaction: pH 5.6 to 7.8

BC horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 4

Texture: Ashy loam, ashy sandy loam, or ashy sandy clay loam

Clay content: 15 to 25 percent

Content of rock fragments: 35 to 60 percent—10 to 25 percent stones and cobbles; 25 to 35 percent gravel

Reaction: pH 5.6 to 7.8

Maciver Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, hills, and mountains

Parent material: Colluvium or slope alluvium

Slope range: 2 to 35 percent

Elevation range: 5,400 to 7,200 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Argicryolls

Typical Pedon

Maciver gravelly loam, 8 to 15 percent slopes, moderately impacted, in an area of rangeland, 2,100 feet west and 950 feet south of the northeast corner of sec. 10, T. 4 N., R. 11 W.

- A1—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate medium granular structure; soft, very friable, slightly sticky, moderately plastic; common fine and medium roots; common fine irregular pores; common faint organic films on faces of peds; 30 percent gravel; very strongly acid; clear wavy boundary.
- A2—4 to 9 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular structure; slightly hard, very friable, slightly sticky, moderately plastic; few coarse and many fine and medium roots; common fine tubular pores; common faint organic films on faces of peds; 30 percent gravel; neutral; clear wavy boundary.
- Bt—9 to 23 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; hard, friable, moderately sticky, moderately plastic; few medium and coarse and common very fine and fine roots; common fine tubular pores; many faint clay films on faces of peds; 5 percent cobbles; 50 percent gravel; neutral; clear wavy boundary.
- Bk1—23 to 35 inches; very pale brown (10YR 7/3) very gravelly clay loam, light yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, moderately plastic; few medium and common fine roots; many very fine tubular pores; 5 percent cobbles; 45 percent gravel; many medium masses of lime and many distinct lime casts on coarse fragments; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk2—35 to 60 inches; very pale brown (10YR 7/4) very gravelly clay loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, slightly plastic; few fine and medium roots; many very fine tubular pores; 5 percent cobbles; 45 percent gravel; many medium masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the Bk horizon: 11 to 24 inches

Note: The surface has a $\frac{1}{4}$ - to $\frac{1}{2}$ -inch gravel lag in some pedons.

A horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent gravel

Reaction: pH 4.5 to 7.3

Bt horizon

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 27 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent gravel
 Reaction: pH 6.6 to 7.3

Bk horizons

Hue: 2.5Y or 10YR
 Value: 6 to 8 dry; 5 or 6 moist
 Chroma: 3 or 4
 Texture: Loam, clay loam, or sandy clay loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 40 to 60 percent—5 to 15 percent cobbles; 35 to 45 percent gravel
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.9 to 8.4

Mannixlee Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Poorly drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Stream terraces, flood plains, and depressions
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 4,600 to 5,800 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Cumulic Endoaquolls

Typical Pedon

Mannixlee clay loam, 0 to 2 percent slopes, in an area of pasture, 1,100 feet north and 300 feet east of the southwest corner of sec. 28, T. 10 N., R. 13 W.; Granite County, Montana.

- A1—0 to 7 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; common medium distinct dark brown (7.5YR 4/4) redox concentrations; moderate medium granular structure; hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine tubular and discontinuous irregular pores; neutral; gradual smooth boundary.
- A2—7 to 14 inches; very dark gray (10YR 3/1) clay loam, dark gray (10YR 4/1) dry; moderate medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular and many very fine discontinuous irregular pores; neutral; gradual smooth boundary.
- A3—14 to 23 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; common medium distinct dark brown (7.5YR 4/4) redox concentrations; moderate medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; few fine tubular and very fine and fine discontinuous irregular pores; neutral; gradual smooth boundary.
- Bw—23 to 43 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; many medium distinct dark brown (7.5YR 4/4) redox concentrations; weak medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; few fine tubular and common very fine and fine discontinuous irregular pores; neutral; abrupt smooth boundary.

2Cg—43 to 60 inches; grayish brown (10YR 5/2) extremely cobbly loamy coarse sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky, nonplastic; 30 percent cobbles; 30 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 12 to 24 inches

Thickness of the mollic epipedon: 25 to 43 inches

Depth to the 2Cg horizon: 40 to 60 inches

A horizons

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Reaction: pH 6.6 to 7.3

Bw horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 2 or 3 moist; 3 to 5 dry

Chroma: 1 or 2

Texture: Loam, clay loam, silty clay loam, or silt loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 30 percent—0 to 10 percent cobbles; 0 to 20 percent gravel

Reaction: pH 6.6 to 7.3

2Cg horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 moist; 6 to 8 dry

Chroma: 1 to 3

Texture: Loamy coarse sand or coarse sand with thin layers of loam, sandy loam, or silt loam

Clay content: 5 to 25 percent

Content of rock fragments: 15 to 70 percent—5 to 40 percent cobbles; 10 to 30 percent gravel

Reaction: pH 6.6 to 7.3

Marcott Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 5,060 to 5,200 feet

Annual precipitation: 12 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine, smectitic, frigid Aquertic Haplustolls

Typical Pedon

Marcott silty clay loam, 0 to 4 percent slopes, in an area of hayland, 200 feet east and 1,700 feet south of the northwest corner of sec. 27, T. 9 N., R. 13 W.; Granite County, Montana.

Az—0 to 8 inches; very dark gray (10YR 3/1) silty clay loam, black (10YR 2/1) moist; moderate fine subangular blocky structure parting to strong fine granular; very hard, very firm, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine random interstitial pores; few medium seams of salt; neutral; clear smooth boundary.

Bz—8 to 14 inches; light gray (10YR 7/1) silty clay loam, dark gray (10YR 4/1) moist; moderate fine subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; few very fine and fine roots; many very fine and fine random interstitial pores; many medium seams of salt; neutral; clear wavy boundary.

Bzg—14 to 26 inches; gray (10YR 5/1) silty clay, gray (10YR 5/1) moist; moderate fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine roots; few very fine tubular pores; many medium seams and masses of salt; neutral; gradual wavy boundary.

Bkz—26 to 60 inches; grayish brown (10YR 5/2) silty clay, gray (10YR 5/1) moist; few fine distinct strong brown (7.5YR 5/6) redox concentrations; weak fine subangular blocky structure; very hard, very firm, slightly sticky, moderately plastic; common fine masses of salt and lime; strongly effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

Az horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 30 to 40 percent

Content of rock fragments: 0 to 5 percent gravel

Electrical conductivity: 2 to 4 mmhos/cm

Sodium adsorption ratio: 0 to 15

Reaction: pH 6.6 to 7.3

Bz and Bzg horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 1 to 3

Texture: Silty clay loam or silty clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 5 percent gravel

Electrical conductivity: 2 to 8 mmhos/cm

Sodium adsorption ratio: 0 to 15

Reaction: pH 6.6 to 7.3

Bkz horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 4 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Silty clay or clay
 Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 10 percent gravel
 Electrical conductivity: 2 to 8 mmhos/cm
 Sodium adsorption ratio: 0 to 20
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 7.8

Martinsdale Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Alluvium
Slope range: 0 to 60 percent
Elevation range: 4,400 to 6,600 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Martinsdale loam, 0 to 4 percent slopes, in an area of rangeland, 2,350 feet east and 1,450 feet north of the southwest corner of sec. 22, T. 8 N., R. 10 W.; Powell County, Montana.

- A—0 to 5 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many fine irregular pores; neutral; clear smooth boundary.
- Bt—5 to 13 inches; brown (10YR 5/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium prismatic structure parting to weak fine and medium subangular blocky; hard, friable, slightly sticky, moderately plastic; few coarse and many very fine and fine roots; many very fine and fine tubular pores; common faint dark grayish brown (10YR 4/2) clay films on faces of peds; neutral; clear wavy boundary.
- Bk1—13 to 18 inches; light gray (10YR 7/2) loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine and medium tubular pores; 5 percent gravel; common fine and medium masses of lime; strongly effervescent; slightly alkaline; gradual wavy boundary.
- Bk2—18 to 33 inches; white (10YR 8/2) loam, very pale brown (10YR 7/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; 5 percent gravel; common fine and medium masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk3—33 to 60 inches; white (10YR 8/2) loam; pale brown (10YR 6/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few very fine roots; common fine irregular pores; 10 percent gravel; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the Bk horizon: 11 to 30 inches

A horizon

Hue: 7.5YR or 10YR

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 25 percent—0 to 10 percent cobbles; 0 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bt horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 to 4

Texture: Sandy clay loam, loam, or clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.6 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 2 to 4

Texture: Loam, clay loam, sandy clay loam, or sandy loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 25 percent—0 to 5 percent cobbles; 0 to 20 percent gravel

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.4 to 9.0

Maurice Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively well drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Stream terraces and outwash plains

Parent material: Alluvium

Slope range: 2 to 35 percent

Elevation range: 5,700 to 8,400 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Haplocryolls

Typical Pedon

Maurice cobbly loam, 8 to 15 percent slopes, in an area of rangeland, 100 feet east and 200 feet south of the northwest corner of sec. 30, T. 1 N., R. 14 W.

- A—0 to 7 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, slightly plastic; many very fine and fine roots; many fine irregular pores; 20 percent cobbles; 10 percent gravel; slightly acid; clear smooth boundary.
- Bw—7 to 12 inches; yellowish brown (10YR 5/4) gravelly loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; few very fine irregular pores; 10 percent cobbles; 10 percent gravel; slightly acid; clear smooth boundary.
- BC—12 to 21 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine irregular pores; 20 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.
- C—21 to 60 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; single grain; soft, loose, nonsticky, nonplastic; few very fine and fine roots; few very fine irregular pores; 30 percent cobbles; 30 percent gravel; neutral.

Range in Characteristics

Thickness of the mollic epipedon: 10 to 15 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 10 to 27 percent

Content of rock fragments: 10 to 35 percent—5 to 20 percent cobbles; 5 to 15 percent gravel

Reaction: pH 5.1 to 7.3

Bw horizon

Hue: 10YR or 7.5YR

Value: 3 to 5 moist; 5 or 6 dry

Chroma: 2 to 4

Texture (less than 2 mm): Loam, fine sandy loam, or sandy loam

Clay content: 10 to 27 percent

Content of rock fragments: 20 to 75 percent—10 to 35 percent cobbles; 10 to 35 percent gravel

Reaction: pH 6.1 to 7.3

BC and C horizons

Hue: 10YR or 7.5YR

Value: 4 to 6 moist; 5 to 7 dry

Chroma: 2 to 4

Texture (less than 2 mm): Loam, sandy loam, loamy sand, or sand

Clay content: 5 to 27 percent

Content of rock fragments: 35 to 75 percent—10 to 35 percent cobbles; 20 to 35 percent gravel. (Some pedons have stones.)

Reaction: pH 6.1 to 7.3

Mishakal Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Mountains and hills

Parent material: Residuum from argillite

Slope range: 35 to 60 percent

Elevation range: 5,200 to 6,600 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Mishakal channery loam, in an area of Mishakal-Tolbert complex, 35 to 60 percent slopes, moderately impacted, in an area of woodland, 350 feet east and 700 feet north of the southwest corner of sec. 28, T. 5 N., R. 11 W.

A1—0 to 3 inches; brown (10YR 4/3) channery loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, moderately sticky, slightly plastic; few fine and medium and many very fine roots; 5 percent flagstones; 10 percent channers; neutral; clear smooth boundary.

A2—3 to 10 inches; brown (10YR 4/3) clay loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, very sticky, very plastic; few fine and medium and common very fine roots; few fine and common very fine tubular pores; 5 percent channers; neutral; clear smooth boundary.

Bt1—10 to 17 inches; light olive brown (2.5Y 5/4) channery clay, olive brown (2.5Y 4/3) moist; weak fine prismatic structure parting to strong fine subangular blocky; very hard, firm, very sticky, very plastic; few fine and medium and common very fine roots; few fine and common very fine tubular pores; common distinct clay films on faces of peds; 15 percent channers; neutral; gradual smooth boundary.

Bt2—17 to 28 inches; light olive brown (2.5Y 5/4) clay loam, olive brown (2.5Y 4/3) moist; weak medium subangular blocky structure; hard, firm, moderately sticky, very plastic; few very fine roots; few very fine tubular pores; few distinct clay films on faces of peds; 10 percent channers; slightly alkaline; abrupt smooth boundary.

Cr—28 to 60 inches; fractured argillite.

Range in Characteristics

Soil temperature: 39 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 8 to 15 inches

Depth to the Cr horizon: 20 to 40 inches

A1 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent flagstones; 0 to 25 percent channers

Reaction: pH 6.1 to 7.3

A2 horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 27 to 40 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent flagstones; 0 to 25 percent channers
 Reaction: pH 6.1 to 7.3

Bt horizons

Hue: 10YR or 2.5Y
 Value: 5 or 6 dry; 3 or 4 moist
 Chroma: 3 or 4
 Texture: Clay loam or clay
 Clay content: 35 to 50 percent
 Content of rock fragments: 0 to 20 percent channers
 Reaction: pH 6.6 to 7.8

Mohaggin Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately rapid (2 to 6 inches/hour) above the 2C horizon, rapid (6 to 20 inches/hour) below

Landform: Mountains

Parent material: Volcanic ash over granite colluvium

Slope range: 8 to 80 percent

Elevation range: 5,600 to 9,200 feet

Annual precipitation: 20 to 40 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Dystrocryepts

Typical Pedon

Mohaggin bouldery ashy very fine sandy loam, 35 to 60 percent slopes, in an area of woodland, 400 feet east and 1,300 feet south of the northwest corner of sec. 35, T. 4 N., R. 12 W.

Oi—0 to 2 inches; largely undecomposed lodgepole pine needles and twigs.

Oe—2 to 5 inches; partially decomposed needles and twigs.

A—5 to 14 inches; light yellowish brown (10YR 6/4) bouldery ashy very fine sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; common very fine tubular pores; 10 percent boulders; 5 percent cobbles; 15 percent gravel; slightly acid; clear wavy boundary.

2Bw—14 to 22 inches; dark brown (10YR 4/3) very gravelly sandy loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; common fine and medium tubular pores; 1 percent boulders; 15 percent cobbles; 30 percent gravel; slightly acid; clear wavy boundary.

2BC—22 to 32 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few medium and common very fine and fine roots; common fine tubular pores; 1 percent boulders; 15 percent cobbles; 30 percent gravel; slightly acid; clear wavy boundary.

2C—32 to 60 inches; pale brown (10YR 6/3) very cobbly loamy sand, very pale brown (10YR 7/3) dry; weak medium subangular blocky structure; soft, friable, nonsticky, nonplastic; few fine and medium and common very fine roots; common

very fine interstitial pores; 1 percent boulders; 20 percent cobbles; 20 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 39 to 45 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Value: 5 or 6 dry; 3 or 4 moist

Clay content: 5 to 10 percent

Content of rock fragments: 15 to 35 percent—5 to 10 percent boulders or stones;
0 to 5 percent cobbles; 15 to 25 percent gravel

Reaction: pH 5.1 to 6.5

2Bw horizon

Value: 3 or 4 moist; 4 or 5 dry

Chroma: 2 or 3

Clay content: 3 to 6 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones or boulders;
5 to 15 percent cobbles; 30 to 50 percent gravel

Reaction: pH 5.1 to 6.5

2BC horizon

Chroma: 2 or 3

Clay content: 3 to 6 percent

Content of rock fragments: 35 to 60 percent—0 to 5 percent stones or boulders;
5 to 15 percent cobbles; 30 to 50 percent gravel

Reaction: pH 5.1 to 6.5

2C horizon

Value: 5 or 6 moist; 6 or 7 dry

Chroma: 2 or 3

Texture: Loamy sand or coarse sand

Clay content: 0 to 5 percent

Content of rock fragments: 35 to 70 percent—0 to 5 percent stones or boulders;
20 to 35 percent cobbles; 15 to 35 percent gravel

Reaction: pH 5.1 to 6.5

Mollet Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Alluvial fans, stream terraces, and mountain slopes

Parent material: Alluvium

Slope range: 2 to 60 percent

Elevation range: 5,200 to 7,800 feet

Annual precipitation: 15 to 23 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Ustic Argicryolls

Typical Pedon

Mollet loam, 8 to 15 percent slopes, in an area of irrigated hayland, 1,700 feet west and 400 feet north of the southeast corner of sec. 23, T. 2 N., R. 13 W.

- A—0 to 10 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; clear smooth boundary.
- Bt1—10 to 16 inches; light brownish gray (10YR 6/2) clay loam, grayish brown (10YR 5/2) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; common very fine and fine interstitial pores; few faint clay films on faces of peds; 5 percent gravel; slightly alkaline; clear smooth boundary.
- Bt2—16 to 26 inches; grayish brown (10YR 5/2) clay, dark grayish brown (10YR 4/2) moist; strong medium prismatic structure; very hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; common very fine and fine interstitial pores; common distinct clay films on faces of peds; 10 percent gravel; slightly alkaline; gradual smooth boundary.
- Bt3—26 to 36 inches; brown (10YR 5/3) clay, dark brown (10YR 4/3) moist; moderate medium prismatic structure; very hard, firm, moderately sticky, moderately plastic; common fine roots; few very fine and fine interstitial pores; common distinct clay films on faces of peds; 10 percent gravel; slightly alkaline; gradual smooth boundary.
- Bt4—36 to 60 inches; brown (10YR 5/3) gravelly clay, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine interstitial pores; few faint clay films on faces of peds; 5 percent cobbles; 10 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Thickness of the mollic epipedon: 10 to 16 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent boulders; 0 to 15 percent cobbles; 0 to 20 percent gravel

Reaction: pH 5.6 to 7.3

Bt1 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Clay loam or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 5 to 10 percent gravel

Reaction: pH 5.6 to 7.8

Bt2 horizon

Value: 4 or 5 dry; 4 moist

Chroma: 2 or 3

Clay content: 35 to 50 percent

Content of rock fragments: 5 to 15 percent—0 to 5 percent cobbles; 5 to 10 percent gravel

Reaction: pH 5.6 to 7.8

Bt3 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 35 to 45 percent
 Content of rock fragments: 0 to 35 percent—0 to 20 percent cobbles; 0 to 15 percent gravel
 Reaction: pH 5.6 to 7.8

Bt4 horizon

Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Clay content: 35 to 45 percent
 Content of rock fragments: 15 to 35 percent—5 to 10 percent cobbles; 10 to 25 percent gravel
 Reaction: pH 5.6 to 7.8

Monad Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Stream terraces
Parent material: Alluvium from fine-grained extrusive igneous rocks
Slope range: 2 to 60 percent
Elevation range: 5,300 to 7,400 feet
Annual precipitation: 15 to 23 inches
Annual air temperature: 34 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy, mixed, superactive Alfic Argicryolls

Typical Pedon

Monad loam, 8 to 15 percent slopes, in an area of rangeland, 1,600 feet west and 600 feet north of the southeast corner of sec. 1, T. 2 N., R. 12 W.

A1—0 to 6 inches; very dark grayish brown (10YR 3/2) loam, black (10YR 2/1) moist; strong fine granular structure; soft, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; few very fine tubular pores; moderately acid; clear wavy boundary.

A2—6 to 14 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; strong fine granular structure; soft, very friable, slightly sticky, slightly plastic; few medium and common very fine and fine roots; few very fine tubular pores; slightly acid; clear wavy boundary.

E/Bt—14 to 21 inches; E part (80 percent) is very pale brown (10YR 7/3) loam, brown (10YR 5/3) moist; B part: (20 percent) is pale brown (10YR 6/3) sandy clay loam, dark brown (10YR 4/3) moist; texture mixed is sandy clay loam; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; few fine and many very fine tubular pores; few faint clay films on faces of peds; slightly acid; gradual wavy boundary.

Bt/E—21 to 38 inches; B part: (60 percent) is light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; E part (40 percent) is light gray (10YR 7/2) sandy loam, dark brown (10YR 4/3) moist; texture mixed is sandy clay loam; moderate fine and medium subangular blocky structure; very hard, friable, moderately sticky, moderately plastic; few very fine and fine roots; few fine and many very fine tubular pores; few faint clay films on faces of peds; 5 percent gravel; slightly acid; gradual wavy boundary.

Bt1—38 to 47 inches; light yellowish brown (10YR 6/4) clay loam, yellowish brown (10YR 5/4) moist; moderate coarse prismatic structure parting to strong fine and

medium subangular blocky; extremely hard, firm, moderately sticky, moderately plastic; few very fine roots; common very fine tubular pores; 5 percent light gray (10YR 7/2) skeletal patches; many faint clay films on faces of peds; 5 percent gravel; slightly acid; clear wavy boundary.

Bt₂—47 to 60 inches; light yellowish brown (10YR 6/4) sandy clay loam; yellowish brown (10YR 5/4) moist; weak fine and medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; common very fine tubular pores; 5 percent light gray (10YR 7/2) skeletal patches; common faint clay films on faces of peds; 10 percent gravel; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 11 to 15 inches

A horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 5.6 to 7.3

E/Bt and Bt/E horizons

Value: E part: 6 or 7 dry; 4 or 5 moist; B part: 4 to 6 dry; 4 or 5 moist

Chroma: E part: 1 to 3; B part: 2 to 4

Texture: Sandy clay loam or clay loam (mixed)

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 10 percent gravel

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Sandy clay loam or clay loam

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 10 percent gravel

Reaction: pH 6.1 to 7.8

Mooseflat Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Very poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 21 inches, rapid (6 to 20 inches/hour) below

Landform: Flood plains, drainageways, and mountain bases

Parent material: Alluvium

Slope range: 0 to 50 percent

Elevation range: 4,740 to 9,000 feet

Annual precipitation: 15 to 25 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive
Typic Cryaquolls

Typical Pedon

Mooseflat loam, 0 to 2 percent slopes, in an area of pasture, 450 feet north and 3,000 feet west of the southeast corner of sec. 1, T. 1 S., R. 15 W.

Oe—0 to 1 inch; decomposed organic matt

A1—1 to 4 inches; black (10YR 2/1) loam, dark grayish brown (10YR 4/2) dry; common fine faint redox concentrations; moderate fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; common very fine tubular pores; slightly acid; clear smooth boundary.

A2—4 to 9 inches; very dark grayish brown (10YR 3/2) loam dark gray (10YR 4/1) dry; common fine faint redox concentrations; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine and fine tubular pores; slightly acid; clear smooth boundary.

Bw—9 to 14 inches; very dark grayish brown (10YR 3/2) sandy loam, grayish brown (10YR 5/2) dry; common fine prominent redox concentrations; weak coarse subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common very fine and fine roots; neutral; clear wavy boundary.

BC—14 to 22 inches; dark grayish brown (10YR 4/2) sandy loam, grayish brown (10YR 5/2) dry; common fine prominent redox concentrations; weak coarse subangular blocky structure; soft, very friable, slightly sticky, nonplastic; common very fine roots; few fine and common very fine tubular pores; neutral; clear wavy boundary.

2C—22 to 60 inches; brown (10YR 5/3) very gravelly sand, pale brown (10YR 6/3) dry; many large prominent redox concentrations; single grain; loose, nonsticky, nonplastic; few fine irregular pores; 10 percent cobbles; 40 percent gravel; neutral.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 16 inches

Depth to the seasonal high water table: 0 to 12 inches

Surface stones and boulders: 0 to 0.1 percent

Note: Some pedons have a Bg horizon.

A horizons

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 5 percent gravel

Reaction: pH 5.6 to 7.3

Bw and BC horizons

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 1 or 2

Texture: Fine sandy loam, sandy loam, or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 5 percent gravel

Reaction: pH 6.1 to 7.8

2C horizon

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Loamy sand or sand

Clay content: 2 to 12 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent gravel
 Reaction: pH 5.6 to 7.8

Nana Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour) above 20 inches, rapid (6 to 20 inches/hour) below

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 5,800 to 6,100 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 36 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive
 Typic Cryaqualfs

Typical Pedon

Nana loam, in an area of Zelda-Nana-Foolhen complex, 0 to 2 percent slopes, in an area of rangeland, 250 feet east and 2,200 feet south of the northwest corner of sec. 33, T. 1 N., R. 14 W.

- A—0 to 6 inches; very dark grayish brown (10YR 3/2) loam, light brownish gray (10YR 6/1) dry; weak fine granular structure; slightly hard, very friable, nonsticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; strongly alkaline; clear smooth boundary.
- E—6 to 8 inches; grayish brown (10YR 5/2) fine sandy loam, light gray (10YR 7/2) dry; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; slightly effervescent; very strongly alkaline; abrupt smooth boundary.
- Btn1—8 to 16 inches; very dark gray (10YR 3/1) clay loam, grayish brown (10YR 5/2) dry; strong medium columnar structure parting to strong medium angular blocky; very hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; many very fine tubular pores; common faint clay films on faces of peds; common grayish brown (10YR 5/2) and light gray (10YR 7/2) dry tongues of albic materials on upper vertical faces of peds; very strongly alkaline; clear smooth boundary.
- Btn2—16 to 20 inches; dark grayish brown (10YR 4/2) clay loam, grayish brown (10YR 5/2) dry; strong medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; common faint clay films on faces of peds; very strongly alkaline; clear smooth boundary.
- 2Cn1—20 to 26 inches; brown (10YR 5/3) loamy fine sand, light brownish gray (10YR 6/2) dry; single grain; loose, slightly sticky, nonplastic; common very fine roots; few medium tubular pores; 10 percent gravel; very strongly alkaline; clear smooth boundary.
- 2Cn2—26 to 60 inches; dark grayish brown (10YR 4/2) gravelly coarse sand, light brownish gray (10YR 6/2) dry; single grain; loose, nonsticky, nonplastic; few very fine roots; common interstitial pores; 5 percent cobbles; 20 percent gravel; very strongly alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 12 to 24 inches

Depth to the 2C horizon: 20 to 40 inches

A horizon

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 13 to 30

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 9.0 to 9.6

E horizon

Value: 6 to 8 dry; 5 or 6 moist

Chroma: 1 or 2

Texture: Fine sandy loam or sandy loam

Clay content: 10 to 15 percent

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 30 to 40

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 9.0 to 9.6

Btn1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 3 to 6 moist

Chroma: 1 or 2

Texture: Clay loam or sandy clay loam

Clay content: 27 to 35 percent

Calcium carbonate equivalent: 0 to 5 percent

Sodium adsorption ratio: 13 to 30

Reaction: pH 9.0 to 9.6

Btn2 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 3 to 6 moist

Chroma: 1 to 3

Texture: Clay loam or sandy clay loam

Clay content: 27 to 35 percent

Calcium carbonate equivalent: 0 to 5 percent

Sodium adsorption ratio: 13 to 30

Reaction: pH 9.0 to 9.6

2Cn1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 1 to 3

Texture: Loamy fine sand, sandy loam, or loam

Clay content: 10 to 18 percent

Calcium carbonate equivalent: 0 to 5 percent

Sodium adsorption ratio: 13 to 30

Reaction: pH 9.0 to 9.6

2Cn2 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Texture: Coarse sand, sand, or loamy coarse sand

Clay content: 0 to 10 percent

Content of rock fragments: 20 to 60 percent—5 to 20 percent cobbles; 15 to 40 percent gravel

Sodium adsorption ratio: 13 to 30

Reaction: pH 9.0 to 9.6

Nivean Series*Depth class:* Shallow (10 to 20 inches)*Drainage class:* Well drained*Permeability:* Moderate (0.6 to 2.0 inches/hour)*Landform:* Ridges, hills, and mountains*Parent material:* Residuum from welded tuff or rhyolite*Slope range:* 4 to 60 percent*Elevation range:* 5,100 to 6,400 feet*Annual precipitation:* 15 to 24 inches*Annual air temperature:* 36 to 43 degrees F*Frost-free period:* 70 to 90 days**Taxonomic Class:** Loamy-skeletal, mixed, superactive, frigid Lithic Haplustolls**Typical Pedon**

Nivean flaggy sandy loam, in an area of Macabre-Nivean-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted, in an area of nonstocked forest, 1,200 feet west and 1,500 feet south of the northeast corner of sec. 35, T. 4 N., R. 11 W.

A1—0 to 2 inches; dark gray (10YR 4/1) flaggy sandy loam, very dark brown (10YR 2/2) moist; weak very fine and fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; many very fine and fine roots; 20 percent flagstones; 15 percent gravel; slightly alkaline; clear wavy boundary.

A2—2 to 7 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate very fine and fine granular; slightly hard, very friable, slightly sticky, nonplastic; few coarse and many very fine and fine roots; 10 percent cobbles; 30 percent gravel; slightly alkaline; clear wavy boundary.

Bw—7 to 13 inches; grayish brown (2.5Y 5/2) very gravelly coarse sandy loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few medium and many very fine and fine roots; many medium tubular pores; 5 percent cobbles; 35 percent gravel; moderately alkaline; clear wavy boundary.

Cr—13 to 18 inches; light gray (2.5Y 7/2) semiconsolidated welded tuff.

R—18 inches; light gray (5Y 7/1), fractured hard welded tuff bedrock.

Range in Characteristics*Soil temperature:* 38 to 45 degrees F*Moisture control section:* Between 4 and 12 inches*Volcanic glass:* Greater than 30 percent in the coarse silt and sand fraction of one or more horizons within 30 inches*Thickness of the mollic epipedon:* 7 to 10 inches

Depth to the Cr horizon: 10 to 18 inches

Depth to bedrock: 12 to 20 inches

A horizons

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 10 to 20 percent

Content of rock fragments: 15 to 45 percent—5 to 25 percent flagstones or cobbles; 10 to 30 percent gravel

Reaction: pH 6.1 to 7.8

Bw horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Loam, sandy loam, sandy clay loam, or coarse sandy loam

Clay content: 18 to 27 percent

Content of rock fragments: 35 to 60 percent—5 to 25 percent stones and cobbles; 30 to 35 percent gravel

Reaction: pH 6.1 to 7.8

Pax Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Ridges, hills, and mountains

Parent material: Colluvium from welded tuff or rhyolite

Slope range: 4 to 60 percent

Elevation range: 5,300 to 6,900 feet

Annual precipitation: 18 to 24 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Ashy, glassy, frigid Vitrandic Haplustalfs

Typical Pedon

Pax very cobbly ashy sandy loam, in an area of Pax-Karloff-Illiano complex, 15 to 35 percent slopes, in an area of forestland, 1,300 feet east and 1,350 feet south of the northwest corner of sec. 1, T. 3 N., R. 11 W.

Oi—0 to 1/2 inch; partially decomposed needles, twigs, and leaves.

E—1/2 to 8 inches; brown (7.5YR 5/2) very cobbly ashy sandy loam, brown (7.5YR 4/2) moist; moderate very fine and fine granular structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and many very fine and fine roots; 25 percent cobbles; 20 percent gravel; neutral; clear wavy boundary.

Bt—8 to 15 inches; brown (7.5YR 5/2) gravelly ashy sandy clay loam, dark brown (7.5YR 4/2) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; many medium tubular pores; few faint clay films on faces of peds; 5 percent cobbles; 15 percent gravel; slightly alkaline; gradual wavy boundary.

BC—15 to 27 inches; pinkish gray (5YR 6/2) ashy coarse sandy loam, reddish brown (5YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable,

nonsticky, nonplastic; few medium and coarse and many very fine and fine roots; common medium tubular pores; 5 percent gravel; slightly alkaline; gradual wavy boundary.

Cr—27 to 60 inches; pinkish gray (5YR 7/2) decomposing welded tuff bedrock.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Volcanic glass: 30 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

Depth to the argillic horizon: 4 to 10 inches

Depth to the Cr horizon: 20 to 40 inches

E horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry; 2 to 4 moist

Chroma: 1 or 2

Clay content: 15 to 20 percent

Content of rock fragments: 35 to 50 percent—20 to 30 percent stones and cobbles; 15 to 20 percent gravel

Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Ashy loam, ashy clay loam, or ashy sandy clay loam

Clay content: 23 to 30 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent stones and cobbles; 5 to 25 percent gravel

Reaction: pH 6.1 to 7.8

BC horizon

Hue: 5YR, 7.5YR, 10YR, or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Ashy loam, ashy sandy loam, ashy coarse sandy loam, or ashy sandy clay loam

Clay content: 15 to 25 percent

Content of rock fragments: 5 to 35 percent—0 to 10 percent stones and cobbles; 5 to 25 percent gravel

Reaction: pH 6.1 to 7.8

Perma Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to the BC horizon, moderately rapid (2 to 6 inches/hour) below

Landform: Mountains, glacial moraines, outwash plains, alluvial fans, and stream terraces

Parent material: Alluvium or colluvium

Slope range: 2 to 60 percent

Elevation range: 3,500 to 6,900 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Perma cobbly loam, 15 to 35 percent slopes, in an area of rangeland, 650 feet south and 300 feet east of the northwest corner of sec. 10, T. 9 N., R. 14 W.; Granite County, Montana.

A—0 to 7 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark brown (10YR 2/2) moist; weak fine subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; 10 percent cobbles; 10 percent gravel; slightly acid; clear smooth boundary.

Bw1—7 to 12 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many very fine tubular pores; 10 percent cobbles; 40 percent gravel; neutral; clear wavy boundary.

Bw2—12 to 20 inches; brown (10YR 5/3) very cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; common very fine and fine tubular pores; 30 percent cobbles; 25 percent gravel; neutral; clear wavy boundary.

BC1—20 to 40 inches; reddish brown (5YR 5/4) extremely stony coarse sandy loam, reddish brown (5YR 4/4) moist; moderate fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; common fine and medium roots; 25 percent stones; 20 percent cobbles; 25 percent gravel; neutral; clear wavy boundary.

BC2—40 to 60 inches; reddish brown (5YR 5/3) extremely cobbly coarse sandy loam; reddish brown (5YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and medium roots; 10 percent stones; 35 percent cobbles; 30 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 10 to 15 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 7 to 20 percent

Content of rock fragments: 15 to 60 percent—0 to 10 percent stones and cobbles; 10 to 55 percent gravel

Reaction: pH 6.1 to 7.3

Bw horizons

Hue: 2.5Y, 10YR, or 7.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 7 to 20 percent

Content of rock fragments: 35 to 75 percent—10 to 35 percent cobbles; 25 to 40 percent gravel

Reaction: pH 6.6 to 7.8

BC1 horizon

Hue: 2.5Y, 10YR, 7.5YR, or 5YR

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam, loamy sand, or coarse sandy loam

Clay content: 0 to 15 percent

Content of rock fragments: 60 to 85 percent—10 to 50 percent stones and cobbles; 25 to 50 percent gravel

Reaction: pH 6.6 to 7.8

BC2 horizon

Hue: 2.5Y, 10YR, 7.5YR, or 5YR

Value: 4 to 7 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam, loamy sand, or coarse sandy loam

Clay content: 0 to 15 percent

Content of rock fragments: 60 to 75 percent—0 to 10 percent stones; 10 to 35 percent cobbles; 25 to 40 percent gravel

Reaction: pH 6.6 to 7.8

Phillcher Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Somewhat excessively drained*Permeability:* Moderately rapid (2 to 6 inches/hour)*Landform:* Mountains*Parent material:* Volcanic ash over colluvium*Slope range:* 4 to 80 percent*Elevation range:* 5,600 to 9,100 feet*Annual precipitation:* 26 to 40 inches*Annual air temperature:* 34 to 36 degrees F*Frost-free period:* 20 to 40 days**Taxonomic Class:** Loamy-skeletal, mixed, superactive Andic Eutrocryepts**Typical Pedon**

Phillcher gravelly ashy silt loam, 4 to 15 percent slopes, in an area of woodland, 1,800 feet south and 1,000 feet east of the northwest corner of sec. 7, T. 5 N., R. 11 W.

Oi—0 to 1 inch; undecomposed forest litter.

Oe—1 to 3 inches; decomposed forest litter.

Bw1—3 to 10 inches; yellowish brown (10YR 5/4) gravelly ashy silt loam, dark yellowish brown (10YR 4/4) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many fine, medium, and coarse roots; many very fine discontinuous irregular pores; 10 percent cobbles; 20 percent gravel; strongly acid; clear smooth boundary.

2Bw2—10 to 26 inches; light yellowish brown (10YR 6/4) extremely gravelly sandy loam, yellowish brown (10YR 5/4) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; many very fine and fine discontinuous irregular pores; 20 percent cobbles; 60 percent gravel; strongly acid; gradual smooth boundary.

2C—26 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, friable, nonsticky, nonplastic; few medium and coarse and common very fine and fine roots; common very fine and

fine discontinuous irregular pores; 20 percent cobbles; 60 percent gravel; strongly acid.

Range in Characteristics

Soil temperature: 36 to 38 degrees F

Moisture control section: Between 8 and 24 inches

Bw1 horizon

Hue: 10YR or 7.5YR

Value: 4 to 6 dry; 2 to 4 moist

Chroma: 2 to 4

Clay content: 5 to 10 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 35 percent gravel

Acid oxalate extractable Fe + Al: More than 1 percent

Moist bulk density: 1 g/cm³ or less

Reaction: pH 5.1 to 6.0

2Bw2 horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Sandy loam or loamy sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 80 percent—0 to 20 percent cobbles; 35 to 60 percent gravel

Reaction: pH 5.1 to 6.0

2C horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Sandy loam or loamy sand

Clay content: 0 to 10 percent

Content of rock fragments: 60 to 80 percent—5 to 20 percent cobbles; 55 to 60 percent gravel

Reaction: pH 5.1 to 6.0

Poronto Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Flood plains, stream terraces, and depressions

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,800 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Endoaquolls

Typical Pedon

Poronto loam, 0 to 4 percent slopes, in an area of pasture, 1,900 feet south and 350 feet east of the northwest corner of sec. 11, T. 6 N., R. 10 W.; Powell County, Montana.

Oi—0 to 3 inches; slightly decomposed organic matter.

A—3 to 13 inches; very dark gray (10YR 3/1) loam, grayish brown (10YR 5/2) dry; common fine distinct strong brown (7.5YR 5/8) redox concentrations; moderate medium granular structure; very hard, firm, moderately sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; slightly effervescent; slightly alkaline; clear smooth boundary.

Bg1—13 to 19 inches; dark gray (5YR 4/1) very gravelly silty clay loam, light gray (5YR 7/1) dry; many medium distinct strong brown (7.5YR 5/8) redox concentrations; weak medium subangular blocky structure; very hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 40 percent gravel; slightly alkaline; gradual wavy boundary.

Bg2—19 to 31 inches; dark gray (5YR 4/1) very gravelly clay loam, light gray (5YR 7/1) dry; many fine distinct yellowish red (5YR 4/6) redox concentrations; weak medium subangular blocky structure; hard, friable, slightly sticky, moderately plastic; common very fine and fine roots; many very fine and fine interstitial pores; 40 percent gravel; neutral; gradual wavy boundary.

Bg3—31 to 60 inches; dark gray (5YR 4/1) very gravelly sandy loam; light gray (5YR 6/1) dry; few fine distinct strong brown (7.5YR 5/8) redox concentrations; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and fine roots; many very fine and fine irregular pores; 45 percent gravel; neutral.

Range in Characteristics

Soil temperature: 41 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 14 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Hue: 10YR or 2.5Y

Value: 2 or 3 moist; 2 to 5 dry

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel

Reaction: pH 6.6 to 7.8

Bg horizons

Hue: 5YR, 7.5YR, 10YR, 2.5Y, or 5Y

Value: 3 to 5 moist; 4 to 7 dry

Chroma: 1 to 3

Texture: Loam, clay loam, sandy clay loam, sandy loam, or silty clay loam

Clay content: 15 to 35 percent

Content of rock fragments: 35 to 60 percent—0 to 15 percent cobbles; 35 to 45 percent gravel

Reaction: pH 6.6 to 7.8

Pozega Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Low stream terraces and glacial outwash plains

Parent material: Calcareous alluvium

Slope range: 0 to 4 percent

Elevation range: 4,600 to 5,000 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Coarse-loamy, carbonatic, frigid Aquic Calcustepts

Typical Pedon

Pozega silty clay loam, 0 to 4 percent slopes, in an area of rangeland, 200 feet north and 1,800 feet west of the southeast corner of sec. 7, T. 5 N., R. 9 W.

- Az1—0 to 2 inches; grayish brown (10YR 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; hard, firm, moderately sticky, moderately plastic; many very fine, fine, and medium roots; many fine tubular pores; strongly effervescent; slightly alkaline; clear smooth boundary.
- Az2—2 to 5 inches; pale brown (10YR 6/3) loam, dark grayish brown (10YR 4/2) moist; moderate fine subangular blocky structure; soft, very friable, moderately sticky, slightly plastic; many very fine, fine, and medium roots; many fine tubular pores; violently effervescent; slightly alkaline; clear smooth boundary.
- Bk1—5 to 11 inches; light brownish gray (10YR 6/2) very fine sandy loam, brown (10YR 5/3) moist; few fine faint light brown (7.5YR 6/4) redox concentrations; moderate medium subangular blocky structure; soft, very friable, moderately sticky, slightly plastic; common very fine, fine, and medium roots; common fine tubular pores; disseminated lime; few fine masses of lime; violently effervescent; slightly alkaline; clear smooth boundary.
- Bk2—11 to 22 inches; light gray (10YR 7/2) very fine sandy loam, light brownish gray (10YR 6/2) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; common very fine, fine, and medium roots; common fine tubular pores; 5 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; slightly alkaline; clear smooth boundary.
- Bk3—22 to 29 inches; light gray (10YR 7/2) silt loam, gray (10YR 6/1) moist; weak medium subangular blocky structure; soft, very friable, slightly sticky, nonplastic; common very fine, fine, and medium roots; common fine tubular pores; 5 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.
- Ckg—29 to 54 inches; white (10YR 8/1) silt loam, light gray (10YR 7/1) moist; massive; soft, very friable, slightly sticky, slightly plastic; few very fine and fine roots; common fine tubular pores; 10 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.
- 2Ck—54 to 60 inches; light gray (10YR 7/2) very gravelly loam, light brownish gray (2.5Y 6/2) moist; few fine distinct dark brown (7.5YR 4/3) redox concentrations; massive; soft, very friable, slightly sticky, slightly plastic; few very fine and fine roots; 15 percent cobbles; 35 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 8 and 24 inches

Depth to the calcic horizon: 3 to 10 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the 2C horizon: Greater than 40 inches

Az1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 2 to 4 moist

Chroma: 1 or 2

Clay content: 27 to 40 percent

Content of rock fragments: 0 to 15 percent gravel

Sodium adsorption ratio: 5 to 30

Electrical conductivity: 4 to 25 mmhos/cm

Calcium carbonate equivalent: 5 to 35 percent

Reaction: pH 7.4 to 8.4

Az2 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 or 4 moist

Chroma: 1 to 3

Texture: Silt loam, loam, or silty clay loam

Clay content: 18 to 40 percent

Content of rock fragments: 0 to 15 percent gravel

Sodium adsorption ratio: 10 to 20

Electrical conductivity: 4 to 16 mmhos/cm

Calcium carbonate equivalent: 5 to 35 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 10YR or 2.5Y

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 1 to 3

Texture: Silty clay loam, clay loam, loam, silt loam, or very fine sandy loam

Clay content: 15 to 30 percent

Content of rock fragments: 0 to 15 percent gravel

Calcium carbonate equivalent: 10 to 60 percent

Reaction: pH 7.4 to 8.4

Bk2 and Bk3 horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 7 or 8 dry; 5 or 6 moist

Chroma: 1 or 2

Texture: Loam, very fine sandy loam, or silt loam

Clay content: 10 to 18 percent

Content of rock fragments: 5 to 30 percent—0 to 10 percent cobbles; 5 to 20 percent gravel

Calcium carbonate equivalent: 40 to 60 percent

Reaction: pH 7.4 to 8.4

Ckg horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 7 or 8 dry; 6 or 7 moist

Texture: Very fine sandy loam, loam, or silt loam

Clay content: 10 to 25 percent

Content of rock fragments: 10 to 35 percent—0 to 10 percent cobbles; 10 to 25 percent gravel

Calcium carbonate equivalent: 40 to 60 percent

Reaction: pH 7.4 to 8.4

2Ck horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 6 to 8 dry; 5 or 6 moist

Chroma: 1 or 2

Texture: Loamy sand, sand, sandy loam, or loam

Clay content: 5 to 15 percent

Content of rock fragments: 35 to 70 percent—10 to 30 percent cobbles; 25 to 40 percent gravel

Calcium carbonate equivalent: 10 to 30 percent

Reaction: pH 7.4 to 8.4

Quigg Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Stream terraces and alluvial fans

Parent material: Alluvium

Slope range: 2 to 35 percent

Elevation range: 5,700 to 6,400 feet

Annual precipitation: 15 to 22 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine, mixed, superactive Abruptic Argicryolls

Typical Pedon

Quigg loam, in an area of Quigg-Mollet complex, 2 to 8 percent slopes, in an area of rangeland, 1,500 feet west and 1,150 feet south of the northeast corner of sec. 31, T. 1 N., R. 14 W.

A—0 to 7 inches; grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; moderate fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common fine interstitial pores; slightly acid; clear smooth boundary.

E/Bt—7 to 17 inches; E part (85 percent) light gray (10YR 7/2) sandy loam, grayish brown (10YR 5/2) moist; B part: (15 percent) light yellowish brown (10YR 6/4) sandy clay loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; common fine interstitial pores; slightly acid; abrupt wavy boundary.

Bt—17 to 29 inches; light yellowish brown (10YR 6/4) sandy clay, yellowish brown (10YR 5/4) moist; strong very coarse columnar structure; extremely hard, very firm, moderately sticky, moderately plastic; common very fine and fine roots; common tongues of albic materials on upper vertical faces of peds, light gray (2.5Y 7/2) and light brownish gray (2.5Y 6/2) moist; continuous prominent clay films on faces of peds, yellowish brown (10YR 5/4) and dark brown (10YR 3/3) moist; slightly acid; gradual wavy boundary.

BC—29 to 38 inches; brown (10YR 5/3) silty clay, dark brown (10YR 4/3) moist; moderate thick platy structure; extremely hard, very firm, moderately sticky,

moderately plastic; few very fine roots; few very fine interstitial pores; slightly acid; gradual wavy boundary.

C1—38 to 45 inches; light gray (10YR 7/2) silty clay, light brownish gray (10YR 6/2) moist; strong thick platy structure; extremely hard, very firm, moderately sticky, moderately plastic; few very fine roots; few very fine interstitial pores; slightly acid; gradual wavy boundary.

C2—45 to 60 inches; light gray (10YR 7/2) silty clay, light brownish gray (10YR 6/2) moist; strong thick platy structure; extremely hard, very firm, moderately sticky, moderately plastic; few very fine interstitial pores; slightly acid.

Range in Characteristics

Mean annual soil temperature: 35 to 40 degrees F

Mean summer soil temperature: 55 to 59 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the argillic horizon: 8 to 19 inches

Thickness of the mollic epipedon: 7 to 9 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.1 to 7.3

E/Bt horizon

Hue: 10YR or 2.5Y

Value: E part: 6 or 7 dry; 5 or 6 moist; B part: 5 or 6 dry; 4 or 5 moist

Chroma: B part: 3 or 4

Clay content: 15 to 25 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 1 to 4

Texture: Sandy clay, silty clay, or clay

Clay content: 35 to 60 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.1 to 7.3

BC horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Silty clay or clay

Clay content: 40 to 60 percent

Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.1 to 7.3

C horizons

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4
 Texture: Silty clay, clay, or sandy clay loam
 Clay content: 30 to 50 percent
 Content of rock fragments: 0 to 15 percent—0 to 10 percent cobbles; 0 to 5 percent gravel
 Reaction: pH 6.1 to 7.3

Quigley Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Alluvial fans, stream terraces, outwash plains, and moraines
Parent material: Calcareous alluvium or till
Slope range: 0 to 35 percent
Elevation range: 3,800 to 6,400 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 110 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Quigley loam, 0 to 4 percent slopes, in an area of rangeland, 350 feet west and 100 feet south of the northeast corner of sec. 35, T. 7 N., R. 9 W.; Powell County, Montana.

- A—0 to 3 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak thin platy structure parting to weak fine granular; slightly hard, very friable, slightly sticky, slightly plastic; many very fine roots; many very fine and fine tubular pores; 5 percent gravel; neutral; clear wavy boundary.
- Bw—3 to 10 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate fine and medium subangular blocky; hard, friable, moderately sticky, moderately plastic; many fine roots; many very fine and fine tubular pores; 5 percent gravel; neutral; clear wavy boundary.
- Bk1—10 to 13 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; moderate fine and medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many fine roots; few fine tubular and common fine irregular pores; 5 percent gravel; many fine and medium masses of lime; strongly effervescent; moderately alkaline; clear wavy boundary.
- Bk2—13 to 23 inches; white (10YR 8/1) gravelly loam; light gray (10YR 7/2) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine roots; many fine tubular and irregular pores; 5 percent cobbles; 10 percent gravel; disseminated lime; continuous faint lime coats on rock fragments; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk3—23 to 45 inches; light gray (2.5Y 7/2) gravelly loam; light yellowish brown (2.5Y 6/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine roots; common fine tubular and many very fine and fine irregular pores; 5 percent cobbles; 15 percent gravel; disseminated lime; continuous faint lime coats on rock fragments; violently effervescent; moderately alkaline; gradual wavy boundary.
- 2Bk4—45 to 60 inches; very pale brown (10YR 7/3) very cobbly sandy loam; pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, very

friable, nonsticky, slightly plastic; many fine irregular pores; 20 percent cobbles; 20 percent gravel; disseminated lime; continuous faint lime coats on undersides of rock fragments; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 40 to 46 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the Bk horizon: 7 to 15 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 40 percent—0 to 25 percent cobbles; 0 to 15 percent gravel

Calcium carbonate equivalent: 0 to 10 percent

Reaction: pH 6.6 to 7.3

Bw horizon

Value: 4 to 6 dry

Chroma: 2 or 3

Texture (less than 2 mm): Loam or clay loam

Clay content: 18 to 33 percent

Content of rock fragments: 5 to 25 percent—0 to 10 percent cobbles; 5 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bk1 horizon

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 18 to 33 percent

Content of rock fragments: 5 to 25 percent—0 to 10 percent cobbles; 5 to 15 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Value: 7 or 8 dry; 5 to 7 moist

Chroma: 1 to 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 10 to 25 percent—5 to 10 percent cobbles; 5 to 15 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 9.0

Bk3 horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or sandy loam

Clay content: 18 to 33 percent

Content of rock fragments: 10 to 30 percent—5 to 15 percent cobbles; 5 to 15 percent gravel

Calcium carbonate equivalent: 15 to 40 percent
 Reaction: pH 7.9 to 9.0

2Bk4 horizon

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry; 5 or 6 moist
 Chroma: 2 or 3
 Texture: Loam, clay loam, or sandy loam
 Clay content: 10 to 30 percent
 Content of rock fragments: 30 to 50 percent—15 to 25 percent cobbles; 15 to 25 percent gravel
 Calcium carbonate equivalent: 10 to 20 percent
 Reaction: pH 7.9 to 9.0

Redchief Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Mountains and hills

Parent material: Colluvium from igneous bedrock

Slope range: 2 to 60 percent

Elevation range: 5,200 to 8,400 feet

Annual precipitation: 15 to 24 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Clayey-skeletal, smectitic Ustic Argicryolls

Typical Pedon

Redchief cobbly loam, 8 to 15 percent slopes, in an area of rangeland, 3,200 feet west and 2,900 feet south of the northeast corner of sec. 1, T. 2 N., R. 12 W.

- A1—0 to 5 inches; brown (10YR 5/3) cobbly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 15 percent cobbles; 10 percent gravel; strongly acid; clear smooth boundary.
- A2—5 to 10 inches; grayish brown (10YR 5/2) very cobbly loam, very dark grayish brown (10YR 3/2) moist; strong medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; 25 percent cobbles; 20 percent gravel; moderately acid; clear smooth boundary.
- Bt1—10 to 16 inches; pale brown (10YR 6/3) very cobbly clay, brown (10YR 4/3) moist; strong medium subangular blocky structure; extremely hard, very firm, moderately sticky, moderately plastic; few very fine roots; many very fine and fine interstitial pores; 25 percent cobbles; 15 percent gravel; moderately acid; clear smooth boundary.
- Bt2—16 to 22 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, yellowish brown (10YR 5/6) moist; weak medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few very fine roots; many very fine and fine interstitial pores; 25 percent cobbles; 15 percent gravel; moderately acid; clear smooth boundary.
- C—22 to 60 inches; very pale brown (10YR 7/4) clay loam, yellowish brown (10YR 5/6) moist; massive; hard, firm, moderately sticky, moderately plastic; few very

fine roots; common very fine and fine interstitial pores; 10 percent cobbles; moderately acid.

Range in Characteristics

Soil temperature: 36 to 45 degrees F

Thickness of the mollic epipedon: 10 to 15 inches

A horizons

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 20 to 27 percent

Content of rock fragments: 15 to 40 percent—10 to 30 percent boulders, stones, and cobbles; 5 to 25 percent gravel

Reaction: pH 5.1 to 7.3

Bt horizons

Hue: 10YR or 7.5YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4 or 6

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 35 to 60 percent—15 to 30 percent cobbles; 15 to 30 percent gravel

Reaction: pH 5.1 to 7.3

C horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry

Chroma: 4 or 6

Texture: Clay or clay loam

Clay content: 35 to 60 percent

Content of rock fragments: 10 to 60 percent—10 to 30 percent cobbles; 0 to 30 percent gravel

Reaction: pH 5.1 to 7.3

Redfern Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills and mountains

Parent material: Residuum from hard fine-grained sandstone or fine-grained igneous rock

Slope range: 15 to 45 percent

Elevation range: 6,400 to 7,800 feet

Annual precipitation: 18 to 24 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 60 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Lithic Haplocryalfs

Typical Pedon

Redfern very cobbly loam, in an area of Redfern-Copenhaver-Rock outcrop complex, 15 to 45 percent slopes, in an area of forestland, 650 feet east and 1,600 feet south of the northwest corner of sec. 20, T. 3 N., R. 10 W.

- Oi—0 to 1 inch; partially decomposed needles, twigs, and leaves.
- A—1 to 4 inches; dark grayish brown (10YR 4/2) very cobbly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine interstitial pores; 20 percent cobbles; 20 percent gravel; moderately acid; clear wavy boundary.
- E—4 to 8 inches; light yellowish brown (2.5Y 6/4) very cobbly loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and many very fine and fine roots; many very fine and fine interstitial pores; 25 percent cobbles; 20 percent gravel; moderately acid; gradual wavy boundary.
- Bt—8 to 19 inches; pale yellow (2.5Y 7/3) very cobbly loam, olive brown (2.5Y 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, nonplastic; few medium and common very fine and fine roots; common very fine interstitial pores; 25 percent cobbles; 30 percent gravel; slightly acid; gradual wavy boundary.
- R—19 inches; very dark gray (5Y 3/1), hard fine-grained sandstone bedrock.

Range in Characteristics

Soil temperature: 38 to 42 degrees F

Moisture control section: Between 4 and 12 inches or between 4 inches and the lithic contact if less than 12 inches

Depth to the Bt horizon: 3 to 13 inches

Depth to bedrock: 10 to 20 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 2 to 5 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent stones and cobbles; 20 to 40 percent gravel

Reaction: pH 5.6 to 7.3

E horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 15 to 27 percent

Content of rock fragments: 35 to 65 percent—0 to 5 percent stones; 10 to 25 percent cobbles; 20 to 40 percent gravel

Reaction: pH 5.6 to 7.3

Bt horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or sandy clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 35 to 70 percent—0 to 15 percent stones; 15 to 30 percent cobbles; 20 to 45 percent gravel

Reaction: pH 5.6 to 7.3

Relyea Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Mountains

Parent material: Colluvium from limestone and calcareous argillite

Slope range: 15 to 35 percent

Elevation range: 5,700 to 7,800 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 36 to 37 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Clayey-skeletal, mixed, superactive Eutric Glossocryalfs

Typical Pedon

Relyea gravelly loam, in an area of Relyea-Helmville complex, 35 to 60 percent slopes, in an area of woodland, 1,900 feet south and 2,700 feet east of the northwest corner of sec. 2, T. 10 N., R. 9 W.; Powell County, Montana.

Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.

E—2 to 5 inches; light reddish brown (5YR 6/3) gravelly loam, reddish brown (5YR 4/3) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine and common medium and coarse roots; few very fine discontinuous tubular and many very fine and fine discontinuous irregular pores; 5 percent cobbles; 25 percent gravel; slightly acid; clear smooth boundary.

Bt/E—5 to 8 inches; B part: (80 percent) is reddish brown (5YR 4/4) very gravelly clay loam, dark reddish gray (5YR 4/2) moist; E part (20 percent) is light reddish brown (5YR 6/3) very gravelly loam, reddish brown (5YR 4/3) moist tongues; texture mixed is very gravelly clay loam; moderate fine and medium subangular blocky structure; hard, firm, slightly sticky, moderately plastic; many very fine and fine and common medium and coarse roots; many very fine and fine discontinuous irregular and many very fine discontinuous tubular pores; common distinct clay films on faces of peds; 5 percent cobbles; 35 percent gravel; slightly acid; clear smooth boundary.

Bt—8 to 17 inches; reddish brown (5YR 4/4) very gravelly clay loam, dark reddish gray (5YR 4/2) moist; moderate fine subangular blocky structure; very hard, very firm, slightly sticky, moderately plastic; common very fine, fine, and coarse and many medium roots; many very fine and fine discontinuous irregular pores and many very fine discontinuous tubular pores; many distinct clay films on faces of peds; 10 percent cobbles; 30 percent gravel; neutral; clear wavy boundary.

Btk—17 to 30 inches; brown (7.5YR 5/4) very gravelly clay loam, dark brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; few coarse and common very fine, fine, and medium roots; many very fine and fine discontinuous irregular pores; few faint clay films on faces of peds; 15 percent cobbles; 35 percent gravel; disseminated lime; continuous faint and distinct lime casts on undersides of coarse fragments; strongly effervescent; moderately alkaline; gradual wavy boundary.

Bk1—30 to 38 inches; pinkish gray (7.5YR 7/2) extremely gravelly loam; light brown (7.5YR 6/4) moist; weak medium subangular blocky structure parting to weak medium granular; slightly hard, friable, slightly sticky, slightly plastic; few very fine, fine, and medium roots; few very fine discontinuous irregular pores; 20 percent cobbles; 45 percent gravel; disseminated lime; continuous faint and

distinct lime casts coating coarse fragments; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—38 to 60 inches; pinkish gray (7.5YR 7/2) extremely cobbly loam; light brown (7.5YR 6/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; few very fine discontinuous irregular pores; 30 percent cobbles; 40 percent gravel; disseminated lime; continuous faint and distinct lime casts coating coarse fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 38 to 40 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 15 to 40 inches

Base saturation: Greater than 50 percent throughout

E horizon

Hue: 10YR, 7.5YR, or 5YR

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 or 3

Clay content: 20 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent gravel

Reaction: pH 6.1 to 7.3

Bt/E horizon

Hue: 10YR, 7.5YR, or 5YR

Value: B part: 4 or 5 dry; 3 or 4 moist; E part: 5 to 7 dry; 4 or 5 moist

Chroma: B part: 2 to 4 or 6; E part: 2 or 3

Clay content: 27 to 35 percent

Content of rock fragments: 15 to 50 percent—5 to 10 percent cobbles; 10 to 35 percent gravel

Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 10YR, 7.5YR, 5YR, or 2.5YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4 or 6

Texture: Clay loam, clay, or silty clay loam

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent cobbles; 30 to 40 percent gravel

Reaction: pH 6.1 to 7.3

Btk horizon

Hue: 10YR, 7.5YR, 5YR, or 2.5YR

Value: 4 to 7 dry; 4 to 6 moist

Chroma: 2 to 4 or 6

Texture: Clay loam, clay, or silty clay loam

Clay content: 27 to 45 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent gravel

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

Bk1 horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4 or 6
 Texture: Loam or clay loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 40 to 75 percent—15 to 30 percent cobbles; 25 to 45 percent gravel
 Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.9 to 8.4

Bk2 horizon

Hue: 10YR or 7.5YR
 Value: 6 or 7 dry; 5 or 6 moist
 Chroma: 2 to 4 or 6
 Texture: Loam or clay loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 60 to 80 percent—25 to 35 percent cobbles; 35 to 45 percent gravel
 Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.9 to 8.4

Rochester Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Excessively drained

Permeability: Rapid (6 to 20 inches/hour)

Landform: Mountains and hills

Parent material: Colluvium from granite

Slope range: 15 to 60 percent

Elevation range: 3,800 to 7,400 feet

Annual precipitation: 15 to 25 inches

Annual air temperature: 37 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Sandy-skeletal, mixed, frigid Typic Ustorthents

Typical Pedon

Rochester very stony sandy loam, in an area of Ambrant-Rochester complex, 15 to 35 percent slopes, in an area of woodland, 400 feet south and 1,200 feet east of the northwest corner of sec. 5, T. 13 N., R. 12 W.; Powell County, Montana.

Oe—0 to 2 inches; partially decomposed organic matter.

A—2 to 5 inches; grayish brown (10YR 5/2) very stony sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine and fine granular structure; soft, very friable, nonsticky, nonplastic; common very fine, fine, and medium roots; few very fine discontinuous interstitial pores; 25 percent stones; 5 percent cobbles; 15 percent gravel; neutral; clear smooth boundary.

C1—5 to 18 inches; pale brown (10YR 6/3) very stony loamy sand, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine and fine and common medium roots; few very fine discontinuous interstitial pores; 40 percent stones; 10 percent cobbles; slightly acid; gradual smooth boundary.

C2—18 to 60 inches; pale brown (10YR 6/3) very stony loamy sand; brown (10YR 4/3) moist; single grain; loose, nonsticky, nonplastic; few fine and medium roots; few very fine discontinuous interstitial pores; 40 percent stones; 15 percent cobbles; slightly acid.

Range in Characteristics

Soil temperature: 39 to 47 degrees F

Moisture control section: Between 12 and 35 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 1 to 3

Texture: Sandy loam, coarse sandy loam, or loamy sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 60 percent—15 to 25 percent boulders and stones; 0 to 20 percent cobbles; 15 to 35 percent gravel

Reaction: pH 6.6 to 7.3

C1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Loamy sand, sand, coarse sandy loam, or sandy loam

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 80 percent—30 to 40 percent boulders and stones; 0 to 40 percent cobbles; 0 to 30 percent gravel

Reaction: pH 5.6 to 7.3

C2 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 to 3

Texture: Loamy sand or sand

Clay content: 0 to 10 percent

Content of rock fragments: 35 to 80 percent—30 to 40 percent boulders and stones; 5 to 25 percent cobbles; 0 to 45 percent gravel

Reaction: pH 5.6 to 7.8

Roy Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Mountains, hills, alluvial fans, and stream terraces

Parent material: Alluvium or colluvium from igneous rock

Slope range: 2 to 70 percent

Elevation range: 3,800 to 6,800 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Clayey-skeletal, mixed, superactive, frigid Typic Argiustolls

Typical Pedon

Roy gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 400 feet north and 2,000 feet east of the southwest corner of sec. 25, T. 6 N., R. 11 W.

A1—0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable,

slightly sticky, slightly plastic; few medium and many very fine and fine roots; many very fine discontinuous irregular pores; 10 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.

A2—4 to 7 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and many very fine and fine roots; many very fine discontinuous irregular pores; 10 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.

Bt1—7 to 16 inches; brown (10YR 4/3) very cobbly clay loam, dark brown (10YR 3/3) moist; strong medium subangular blocky structure; hard, friable, moderately sticky and moderately plastic; common fine and medium and many very fine roots; common fine tubular pores; few faint clay films on faces of peds; 20 percent cobbles; 30 percent gravel; neutral; clear smooth boundary.

Bt2—16 to 27 inches; brown (10YR 5/3) very cobbly clay loam, brown (10YR 4/3) moist; strong medium subangular blocky structure; hard, firm, moderately sticky, moderately plastic; common fine and medium and many very fine roots; common fine tubular pores; many distinct clay films on faces of peds; 20 percent cobbles; 30 percent gravel; neutral; clear smooth boundary.

Bk—27 to 60 inches; pale brown (10YR 6/3) very cobbly clay loam; brown (10YR 5/3) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, slightly plastic; few fine and medium and common very fine roots; few fine tubular pores; 20 percent cobbles; 30 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 16 inches

Depth to the Bk horizon: Greater than 20 inches

A horizons

Hue: 10YR or 7.5YR

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 15 to 40 percent

Content of rock fragments: 20 to 65 percent—5 to 30 percent stones and cobbles; 15 to 35 percent gravel

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 10YR or 7.5YR

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 to 4

Texture: Clay loam or clay

Clay content: 35 to 50 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent cobbles; 30 to 50 percent gravel

Reaction: pH 6.6 to 7.8

Bk horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Clay content: 27 to 40 percent

Content of rock fragments: 40 to 65 percent—10 to 20 percent cobbles; 30 to 45 percent gravel

Calcium carbonate equivalent: 2 to 15 percent

Reaction: pH 7.4 to 8.4

Rumsey Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Volcanic ash over colluvium from limestone

Slope range: 8 to 60 percent

Elevation range: 6,400 to 7,200 feet

Annual precipitation: 20 to 40 inches

Annual air temperature: 34 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Eutrocryepts

Typical Pedon

Rumsey gravelly ashy silt loam, 15 to 35 percent slopes, in an area of woodland, 1,800 feet east and 1,800 feet south of the northwest corner of sec. 5, T. 6 N., R. 13 W.

Oi—0 to 1 inch; partially decomposed organic matter.

E—1 to 3 inches; pale brown (10YR 6/3) gravelly ashy silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, slightly plastic; many very fine and coarse roots; many very fine and fine tubular pores; 15 percent gravel; slightly alkaline; clear smooth boundary.

Bw1—3 to 8 inches; strong brown (7.5YR 5/6) ashy silt loam, strong brown (7.5YR 4/6) moist; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent gravel; slightly alkaline; clear smooth boundary.

2Bw2—8 to 15 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent cobbles; 15 percent gravel; slightly alkaline; gradual wavy boundary.

2Bk1—15 to 30 inches; light yellowish brown (10YR 6/4) very gravelly loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 15 percent cobbles; 30 percent gravel; few fine masses of lime; slightly effervescent; slightly alkaline; clear wavy boundary.

2Bk2—30 to 60 inches; light yellowish brown (10YR 6/4) very gravelly loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine and medium and common very fine roots; many very fine and fine tubular pores; 15 percent cobbles; 35 percent gravel; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Acid oxalate extractable Al + 1/2 Fe: More than 1 percent

Moist bulk density: Less than 1 g/cm³
Depth to the Bk horizon: 9 to 24 inches

E horizon

Value: 6 or 7 dry; 3 to 5 moist
Chroma: 2 to 4
Clay content: 18 to 27 percent
Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent gravel
Reaction: pH 5.6 to 7.8

Bw1 horizon

Hue: 10YR or 7.5YR
Value: 5 or 6 dry; 3 or 4 moist
Chroma: 4 or 6
Clay content: 18 to 27 percent
Content of rock fragments: 5 to 35 percent—0 to 10 percent cobbles; 5 to 25 percent gravel
Reaction: pH 5.6 to 7.8

2Bw2 horizon

Value: 5 or 6 dry; 4 or 5 moist
Chroma: 3 or 4
Clay content: 18 to 27 percent
Content of rock fragments: 15 to 60 percent—0 to 15 percent cobbles; 15 to 45 percent gravel
Reaction: pH 6.1 to 7.8

2Bk horizons

Value: 5 or 6 dry; 4 or 5 moist
Chroma: 3 or 4
Texture: Loam or sandy loam
Clay content: 18 to 27 percent
Content of rock fragments: 35 to 80 percent—10 to 20 percent cobbles; 25 to 60 percent gravel
Calcium carbonate equivalent: 15 to 30 percent
Reaction: pH 7.4 to 8.4

Saypo Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Stream terraces, alluvial fans, and flood plains
Parent material: Alluvium
Slope range: 0 to 4 percent
Elevation range: 3,800 to 5,800 feet
Annual precipitation: 10 to 19 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aquic Calciustolls

Typical Pedon

Saypo loam, 0 to 4 percent slopes, rarely flooded, in an area of pasture, 600 feet north and 1,850 feet west of the southeast corner of sec. 4, T. 7 N., R. 9 W.; Powell County, Montana.

Oe—0 to 2 inches; partially decomposed organic matter.

Ap—2 to 9 inches; very dark gray (10YR 3/1) loam, dark gray (10YR 4/1) dry; strong medium granular structure; slightly hard, friable, nonsticky, slightly plastic; many very fine and fine roots, common medium roots; many very fine irregular pores; slightly effervescent; slightly alkaline; clear smooth boundary.

Bk1—9 to 17 inches; dark grayish brown (10YR 4/2) silt loam, grayish brown (10YR 5/2) dry; strong medium granular structure; slightly hard, friable, nonsticky, slightly plastic; many very fine and fine roots, common medium roots; many very fine irregular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk2—17 to 33 inches; dark grayish brown (10YR 4/2) silt loam, light brownish gray (10YR 6/2) dry; few fine distinct brown (10YR 4/3) redox concentrations; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine irregular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—33 to 49 inches; dark grayish brown (10YR 4/2) silty clay loam, light brownish gray (10YR 6/2) dry; few fine distinct brown (10YR 4/3) redox concentrations; weak fine subangular blocky structure; slightly hard, very friable, moderately sticky, moderately plastic; few very fine and fine roots; many very fine irregular pores; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

C—49 to 60 inches; dark brown (7.5YR 4/4) loam; brown (7.5YR 5/4) dry; common fine distinct strong brown (7.5YR 4/6) redox concentrations; massive; soft, very friable, nonsticky, nonplastic; 5 percent gravel; moderately alkaline.

Range in Characteristics

Soil temperature: 42 to 46 degrees F

Thickness of the mollic epipedon: 7 to 12 inches

Depth to the seasonal high water table: 24 to 42 inches

Depth to the Bk horizon: 5 to 12 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 22 to 27 percent

Content of rock fragments: 0 to 5 percent gravel

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Silt loam, clay loam, or loam

Clay content: 22 to 35 percent

Content of rock fragments: 0 to 5 percent gravel

Calcium carbonate equivalent: 20 to 25 percent

Reaction: pH 7.9 to 8.4

Bk2 and Bk3 horizons

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Clay loam, silty clay loam, silt loam, or loam

Clay content: 22 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent gravel

Calcium carbonate equivalent: 30 to 35 percent

Electrical conductivity: 0 to 4 mmhos/cm (saline phase 2 to 4 mmhos/cm)

Reaction: pH 7.9 to 8.4

C horizon

Hue: 7.5YR, 10YR, 2.5Y, or 5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Clay loam or loam

Clay content: 22 to 40 percent

Content of rock fragments: 5 to 50 percent—0 to 10 percent cobbles; 5 to 40 percent gravel

Electrical conductivity: 0 to 2 mmhos/cm

Reaction: pH 7.9 to 8.4

Shawmut Series*Depth class:* Very deep (greater than 60 inches)*Drainage class:* Well drained*Permeability:* Moderate (0.6 to 2.0 inches/hour)*Landform:* Mountains, alluvial fans, stream terraces, and moraines*Parent material:* Alluvium or till*Slope range:* 0 to 60 percent*Elevation range:* 3,800 to 6,900 feet*Annual precipitation:* 15 to 19 inches*Annual air temperature:* 39 to 45 degrees F*Frost-free period:* 70 to 90 days**Taxonomic Class:** Loamy-skeletal, mixed, superactive, frigid Typic Argiustolls**Typical Pedon**

Shawmut gravelly loam, 4 to 8 percent slopes, in an area of rangeland, 1,700 feet north and 1,500 feet east of the southwest corner of sec. 26, T. 8 N., R. 10 W.; Powell County, Montana.

A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to strong medium granular; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common fine and many very fine and medium tubular pores; 5 percent cobbles; 15 percent gravel; neutral; clear smooth boundary.

Bt—6 to 12 inches; brown (10YR 4/3) gravelly clay loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; common medium and many very fine and fine tubular pores; common faint clay films on faces of peds; 5 percent cobbles; 25 percent gravel; neutral; clear smooth boundary.

Btk—12 to 18 inches; pale brown (10YR 6/3) very gravelly clay loam, brown (10YR 5/3) moist; weak medium subangular blocky structure parting to moderate medium granular; hard, firm, slightly sticky, slightly plastic; few very fine roots; common fine and many very fine and medium tubular pores; few faint clay films on faces of peds; 10 percent cobbles; 35 percent gravel; common medium masses of lime; strongly effervescent; moderately alkaline; gradual smooth boundary.

Bk1—18 to 29 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; few very fine, fine, and medium tubular pores; 10 percent cobbles; 35 percent gravel; common distinct lime casts on undersides of coarse fragments; violently effervescent; strongly alkaline; gradual wavy boundary.

Bk2—29 to 60 inches; white (10YR 8/2) extremely cobbly loam; light gray (10YR 7/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few very fine roots; few very fine, fine, and medium tubular pores; 25 percent cobbles; 40 percent gravel; disseminated lime; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 8 to 14 inches

Depth to the calcic horizon: 9 to 20 inches

A horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Content of rock fragments: 10 to 65 percent—0 to 40 percent stones and boulders; 0 to 25 percent cobbles; 10 to 25 percent gravel

Reaction: pH 6.6 to 7.3

Bt horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 3 to 6 dry; 2 to 4 moist

Chroma: 2 or 3

Texture: Clay loam or sandy clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 15 to 65 percent—0 to 15 percent stones; 0 to 15 percent cobbles; 15 to 40 percent gravel

Reaction: pH 6.6 to 7.3

Btk horizon

Hue: 7.5YR or 10YR

Value: 3 to 6 dry; 2 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 5 to 65 percent—0 to 20 percent stones; 5 to 15 percent cobbles; 30 to 45 percent gravel

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.9 to 8.4

Bk horizons

Hue: 10YR or 2.5Y

Value: 5 to 8 dry; 4 to 7 moist

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 10 to 25 percent

Content of rock fragments: 35 to 65 percent—0 to 20 percent stones; 5 to 25 percent cobbles; 30 to 40 percent gravel

Calcium carbonate equivalent: 10 to 25 percent

Reaction: pH 7.9 to 9.0

Shook Series*Depth class:* Moderately deep (20 to 40 inches)*Drainage class:* Well drained*Permeability:* Moderately rapid (2 to 6 inches/hour)*Landform:* Mountains*Parent material:* Colluvium or residuum from granite*Slope range:* 15 to 60 percent*Elevation range:* 5,800 to 6,600 feet*Annual precipitation:* 15 to 22 inches*Annual air temperature:* 36 to 39 degrees F*Frost-free period:* 30 to 70 days**Taxonomic Class:** Coarse-loamy, mixed, superactive Pachic Haplocryolls**Typical Pedon**

Shook loam, in an area of Sula-Shook complex, 35 to 60 percent slopes, in an area of rangeland, 2,950 feet east and 1,000 feet north of the southwest corner of sec. 18, T. 1 N., R. 13 W.

A1—0 to 2 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; common very fine and fine interstitial pores; 10 percent gravel; moderately acid; clear smooth boundary.

A2—2 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; common very fine and fine interstitial pores; 10 percent gravel; slightly acid; clear smooth boundary.

Bw1—6 to 11 inches; brown (10YR 4/3) gravelly coarse sandy loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine roots; common very fine and fine interstitial pores; 15 percent gravel; neutral; clear wavy boundary.

Bw2—11 to 28 inches; dark grayish brown (10YR 4/2) gravelly coarse sandy loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; many very fine and fine roots; few medium and coarse interstitial pores; 15 percent gravel; neutral; gradual wavy boundary.

BC—28 to 40 inches; brown (10YR 5/3) gravelly coarse sandy loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common fine interstitial pores; 20 percent gravel; neutral; gradual wavy boundary.

Cr—40 to 60 inches; brown (10YR 5/3) decomposing granite that crushes to very gravelly loamy sand; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 8 and 24 inches

Thickness of the mollic epipedon: 16 to 30 inches

Depth to the Cr horizon: 20 to 40 inches

A horizons

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 18 to 27 percent

Content of rock fragments: 10 to 15 percent gravel

Reaction: pH 5.6 to 7.3

Bw horizons

Value: 4 or 5 dry; 2 to 4 moist

Chroma: 2 or 3

Texture: Coarse sandy loam or sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 10 to 35 percent gravel

Reaction: pH 6.1 to 7.3

BC horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Clay content: 0 to 10 percent

Content of rock fragments: 15 to 35 percent gravel

Reaction: pH 6.1 to 7.3

Silverchief Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Mountains

Parent material: Slope alluvium

Slope range: 8 to 35 percent

Elevation range: 5,400 to 6,400 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, mixed, superactive, frigid Calcic Haplustalfs

Typical Pedon

Silverchief loam, in an area of Silverchief-Trapps complex, 15 to 35 percent slopes, in an area of woodland, 3,400 feet east and 300 feet north of the southwest corner of sec. 24, T. 5 N., R. 16 W.; Granite County, Montana.

Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.

E—2 to 5 inches; light brownish gray (10YR 6/2) loam, grayish brown (10YR 5/2) moist; moderate thin platy structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; few fine interstitial pores; 5 percent gravel; slightly acid; clear wavy boundary.

Bt1—5 to 14 inches; brown (10YR 5/3) clay loam, dark brown (10YR 4/3) moist; moderate fine subangular blocky structure; hard, friable, moderately sticky,

moderately plastic; few coarse, common medium, and many very fine and fine roots; common fine interstitial pores; few faint clay films on faces of peds; 10 percent gravel; slightly acid; clear wavy boundary.

Bt2—14 to 22 inches; yellowish brown (10YR 5/4) clay loam, dark yellowish brown (10YR 4/4) moist; moderate medium angular blocky structure; very hard, very firm, very sticky, very plastic; few coarse, common medium, and many very fine and fine roots; common fine tubular pores; few faint clay films on faces of peds; 10 percent gravel; neutral; clear wavy boundary.

Bt3—22 to 40 inches; pale brown (10YR 6/3) gravelly clay, brown (10YR 5/3) moist; strong medium angular blocky structure; very hard, very firm, very sticky, very plastic; few medium and coarse and common very fine and fine roots; common fine and many very fine tubular pores; few faint clay films on faces of peds; 15 percent gravel; neutral; gradual smooth boundary.

Bk—40 to 60 inches; light gray (2.5Y 7/2) gravelly clay loam; light brownish gray (2.5Y 6/2) moist; weak fine subangular blocky structure; hard, firm, moderately sticky, moderately plastic; few fine roots; common very fine and fine tubular pores; 5 percent cobbles; 25 percent gravel; common fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 40 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the calcic horizon: 20 to 40 inches

E horizon

Hue: 7.5YR or 10YR

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Clay content: 20 to 27 percent

Content of rock fragments: 0 to 10 percent—0 to 5 percent cobbles; 0 to 5 percent gravel

Reaction: pH 6.1 to 7.3

Bt horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3, 4, or 6

Texture: Clay loam or clay

Clay content: 35 to 60 percent

Content of rock fragments: 10 to 30 percent—0 to 10 percent cobbles; 10 to 20 percent gravel

Reaction: pH 6.1 to 7.3

Bk horizon

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or clay

Clay content: 20 to 45 percent

Content of rock fragments: 20 to 50 percent—5 to 20 percent cobbles; 15 to 30 percent gravel

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.4 to 8.4

Sixbeacon Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to 24 inches, rapid (6 to 20 inches/hour) below

Landform: Alluvial fans and stream terraces

Parent material: Gravelly alluvium

Slope range: 0 to 60 percent

Elevation range: 3,800 to 5,800 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Aridic Haplustolls

Typical Pedon

Sixbeacon gravelly loam, 0 to 4 percent slopes, in an area of irrigated hayland, 100 feet north and 1,000 feet west of the southeast corner of sec. 23, T. 8 N., R. 9 W.; Powell County, Montana.

Ap—0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many fine roots; many fine irregular pores; 15 percent gravel; neutral; abrupt smooth boundary.

Bw—4 to 10 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky, slightly plastic; many fine roots; many very fine and fine tubular pores; 5 percent gravel; neutral; clear wavy boundary.

Bk1—10 to 12 inches; light brownish gray (10YR 6/2) loam, brown (10YR 5/3) moist; weak fine and medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; common fine roots; many very fine and fine tubular pores; 10 percent gravel; disseminated lime; strongly effervescent; moderately alkaline; clear wavy boundary.

2Bk2—12 to 24 inches; white (10YR 8/2) very gravelly sandy loam, light gray (10YR 7/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; common fine roots; many very fine and fine tubular pores; 50 percent gravel; disseminated lime; violently effervescent; moderately alkaline; clear wavy boundary.

3Bk3—24 to 60 inches; light gray (10YR 7/2) extremely gravelly loamy sand; pale brown (10YR 6/3) moist; single grain; loose, nonsticky, nonplastic; few fine roots; many fine irregular pores; 10 percent cobbles; 60 percent gravel; disseminated lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches; dry in all parts between four tenths and five tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or higher

Thickness of the mollic epipedon: 7 to 13 inches

Depth to the calcic horizon: 8 to 13 inches

Ap horizon

Hue: 10YR or 2.5Y

Chroma: 2 or 3

Clay content: 10 to 27 percent
Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent gravel
Reaction: pH 6.1 to 7.3

Bw horizon

Hue: 10YR or 2.5Y
Value: 4 to 6 dry; 3 or 4 moist
Chroma: 2 to 4
Clay content: 20 to 27 percent
Content of rock fragments: 0 to 25 percent—0 to 5 percent cobbles; 0 to 20 percent gravel
Reaction: pH 6.6 to 7.8

Bk1 horizon

Hue: 10YR or 2.5Y
Value: 5 to 8 dry; 4 to 7 moist
Chroma: 1 to 4
Clay content: 20 to 27 percent
Content of rock fragments: 5 to 35 percent—0 to 5 percent cobbles; 5 to 30 percent gravel
Reaction: pH 7.4 to 8.4
Calcium carbonate equivalent: 5 to 15 percent

2Bk2 horizon

Hue: 10YR or 2.5Y
Value: 6 to 8 dry; 6 or 7 moist
Chroma: 2 to 4
Texture: Sandy loam or loam
Clay content: 10 to 20 percent
Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent gravel
Calcium carbonate equivalent: 20 to 40 percent
Reaction: pH 7.9 to 8.4

3Bk3 horizon

Value: 5 to 7 dry; 4 to 6 moist
Chroma: 2 to 4
Texture: Sandy loam or loamy sand
Clay content: 0 to 5 percent
Content of rock fragments: 50 to 80 percent—10 to 20 percent cobbles; 40 to 60 percent gravel
Calcium carbonate equivalent: 15 to 30 percent
Reaction: pH 7.4 to 8.4

Staad Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Drainageways and alluvial fans

Parent material: Alluvium

Slope range: 0 to 25 percent

Elevation range: 3,800 to 6,900 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Cumulic Haplustolls

Typical Pedon

Staad silty clay loam, 0 to 4 percent slopes, in an area of irrigated cropland, 1,100 feet south and 1,700 feet east of the northwest corner of sec. 36, T. 10 N., R. 13 W.

Ap—0 to 6 inches; dark grayish brown (10YR 4/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, moderately plastic; common medium and many very fine and fine roots; few very fine tubular and many discontinuous tubular pores; 5 percent cobbles; slightly alkaline; gradual wavy boundary.

A2—6 to 16 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky, moderately plastic; common very fine, fine, and medium roots; few very fine tubular and many discontinuous tubular pores; 5 percent cobbles; slightly alkaline; clear wavy boundary.

Bw1—16 to 23 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine and fine and many discontinuous tubular pores; 5 percent cobbles; slightly effervescent; moderately alkaline; gradual wavy boundary.

Bw2—23 to 60 inches; grayish brown (10YR 5/2) clay loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common very fine, fine, and medium discontinuous tubular pores; 5 percent cobbles; slightly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 16 to 25 inches

Ap horizon

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Silty clay loam or loam

Clay content: 20 to 35 percent

Content of rock fragments: 0 to 10 percent

Reaction: pH 6.6 to 7.8

A2 horizon

Hue: 10YR or 2.5Y

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 22 to 32 percent

Content of rock fragments: 0 to 10 percent

Reaction: pH 6.6 to 7.8

Bw horizons

Hue: 10YR or 2.5Y
 Value: 4 to 6 dry; 3 to 5 moist
 Chroma: 2 to 4
 Texture: Loam or clay loam
 Clay content: 22 to 35 percent
 Content of rock fragments: 0 to 10 percent
 Calcium carbonate equivalent: 0 to 10 percent
 Reaction: pH 7.8 to 8.4

Sula Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately rapid (2 to 6 inches/hour)
Landform: Alluvial fans, stream terraces, and mountains
Parent material: Colluvium and residuum from granite
Slope range: 15 to 60 percent
Elevation range: 5,800 to 6,600 feet
Annual precipitation: 15 to 22 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Coarse-loamy, mixed, superactive Ustic Haplocryolls

Typical Pedon

Sula gravelly loam, in an area of Sula-Shook complex, 35 to 60 percent slopes, in an area of rangeland, 2,300 feet east and 200 feet south of the northwest corner of sec. 35, T. 2 N., R. 13 W.

- A1—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; slightly hard, very friable, nonsticky, nonplastic; common medium and many very fine and fine roots; many very fine and fine interstitial pores; 15 percent gravel; moderately acid; clear smooth boundary.
- A2—5 to 14 inches; dark gray (10YR 4/1) gravelly sandy loam, black (10YR 2/1) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine and fine roots; many very fine and fine interstitial pores; 15 percent gravel; slightly acid; gradual smooth boundary.
- Bw—14 to 28 inches; brown (10YR 5/3) gravelly sandy loam, grayish brown (10YR 5/2) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky, slightly plastic; few fine roots; common fine interstitial pores; 20 percent gravel; neutral; gradual smooth boundary.
- BC—28 to 60 inches; brown (10YR 5/3) gravelly loamy coarse sand, gray (10YR 5/1) moist; single grain; loose, nonsticky, nonplastic; common fine interstitial pores; 25 percent gravel; neutral.

Range in Characteristics

Soil temperature: 36 to 41 degrees F
Thickness of the mollic epipedon: 7 to 15 inches

A horizons

Value: 3 or 4 dry; 2 or 3 moist
 Chroma: 1 to 3
 Texture: Loam or sandy loam

Clay content: 10 to 18 percent
 Content of rock fragments: 15 to 35 percent gravel
 Reaction: pH 6.6 to 7.3

Bw horizon

Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 1 to 3
 Texture: Coarse sandy loam or sandy loam
 Clay content: 10 to 18 percent
 Content of rock fragments: 0 to 25 percent gravel
 Reaction: pH 6.6 to 7.3

BC horizon

Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 1 to 3
 Texture: Coarse sandy loam, loamy sand, or loamy coarse sand
 Clay content: 5 to 18 percent
 Content of rock fragments: 0 to 35 percent gravel
 Reaction: pH 6.6 to 7.3

Tepecreek Series

Depth class: Moderately deep (20 to 40 inches) to weathered granite bedrock (grus) and deep (40 to 60 inches) to hard granite bedrock

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills and mountains

Parent material: Local colluvium and residuum from granite

Slope range: 35 to 60 percent

Elevation range: 6,400 to 7,000 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Ustic Haplocryalfs

Typical Pedon

Tepecreek very gravelly sandy clay loam, in an area of Bobowic, very bouldery-Rock outcrop-Tepecreek, very bouldery, complex, 25 to 60 percent slopes; in a forested area, 1,350 feet south and 1,475 feet west of the northeast corner of sec. 32, T. 9 N., R. 2 W.; Jefferson County, Montana.

Oi—0 to 1 inch; forest litter of partially decomposed needles, twigs, and leaves.

A—1 to 3 inches; grayish brown (10YR 5/2) very gravelly sandy clay loam, very dark grayish brown (10YR 3/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few fine and many very fine roots; few medium and many very fine and fine tubular pores; 35 percent granite gravel; slightly acid; clear smooth boundary.

E—3 to 9 inches; brown (10YR 5/3) very gravelly sandy clay loam, dark grayish brown (10YR 4/2) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; few fine and many very fine roots; few medium and many very fine and fine tubular pores; 40 percent granite gravel; slightly acid; clear smooth boundary.

Bt—9 to 19 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure;

slightly hard, friable, moderately sticky, slightly plastic; few fine and medium and many very fine roots; few fine and many very fine tubular pores; many faint clay films bridging sand grains; 40 percent granite gravel; slightly acid; clear wavy boundary.

BC—19 to 36 inches; olive brown (2.5Y 4/4) very gravelly sandy loam, very dark grayish brown (2.5Y 3/2) moist; weak very fine and fine subangular blocky structure; soft, very friable, slightly sticky, nonplastic; few fine and many very fine roots; few fine and many very fine tubular pores; 55 percent granite gravel; neutral; clear wavy boundary.

Cr—36 to 53 inches; light olive brown (2.5Y 5/4) decomposing granite bedrock (grus) that crushes to very gravelly loamy coarse sand.

R—53 inches; hard granite bedrock.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the argillic horizon: 5 to 12 inches

Depth to the Cr horizon: 20 to 40 inches

Depth to bedrock: 40 to 60 inches

Surface fragments: 0.1 to 3 percent boulders

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Coarse sandy loam or sandy clay loam

Clay content: 10 to 20 percent

Content of rock fragments: 5 to 35 percent gravel

Reaction: pH 6.1 to 7.3

E horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Coarse sandy loam, sandy clay loam, or sandy loam

Clay content: 10 to 20 percent

Content of rock fragments: 5 to 50 percent gravel (mostly less than 7 mm in diameter)

Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 10YR or 2.5Y

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 20 to 30 percent

Content of rock fragments: 35 to 60 percent gravel (mostly less than 7 mm in diameter)

Reaction: pH 6.1 to 7.3

BC horizon

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Coarse sandy loam or sandy loam

Clay content: 10 to 18 percent

Content of rock fragments: 35 to 60 percent gravel (mostly less than 10 mm in diameter)

Reaction: pH 6.1 to 7.3

Tetonview Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Stream terraces, flood plains, swales, and depressions

Parent material: Calcareous alluvium

Slope range: 0 to 4 percent

Elevation range: 3,800 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 110 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Aeric Calciaquolls

Typical Pedon

Tetonview loam, 0 to 4 percent slopes, in an area of rangeland, 300 feet east and 700 feet north of the southwest corner of sec. 29, T. 6 N., R. 9 W.

Oi—0 to 2 inches; partially decomposed organic mat.

A1—2 to 10 inches; very dark gray (10YR 3/1) loam, gray (10YR 5/1) dry; weak very fine and fine granular structure; hard, friable, nonsticky, slightly plastic; common medium and many very fine and fine roots; many very fine discontinuous irregular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

A2—10 to 16 inches; very dark grayish brown (2.5Y 3/2) clay loam, light brownish gray (2.5Y 6/2) dry; weak fine subangular blocky structure parting to moderate very fine and fine granular; hard, friable, slightly sticky, slightly plastic; few very fine and fine roots; few very fine discontinuous irregular pores; strongly effervescent; moderately alkaline; clear smooth boundary.

Bkg1—16 to 23 inches; grayish brown (2.5Y 5/2) clay loam, light gray (10YR 7/2) dry; weak fine and medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few very fine and fine roots; few very fine discontinuous irregular pores; common fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bkg2—23 to 60 inches; dark grayish brown (2.5Y 4/2) clay loam, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; hard, firm, slightly sticky, slightly plastic; few very fine and fine roots; few very fine discontinuous and irregular pores; common fine masses of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 16 inches

Depth to the seasonal high water table: 12 to 24 inches

Depth to the calcic horizon: 7 to 16 inches

A1 horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent
 Content of rock fragments: 0 to 5 percent gravel
 Calcium carbonate equivalent: 1 to 5 percent
 Reaction: pH 7.4 to 8.4

A2 horizon

Value: 4 to 6 dry; 2 or 3 moist
 Texture: Loam or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 0 to 5 percent gravel
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.9 to 8.4

Bkg1 horizon

Value: 5 to 7 dry; 4 to 6 moist
 Texture: Loam or clay loam
 Clay content: 20 to 30 percent
 Content of rock fragments: 0 to 10 percent gravel
 Calcium carbonate equivalent: 15 to 35 percent
 Reaction: pH 7.9 to 8.4

Bkg2 horizon

Hue: 10YR or 2.5Y
 Value: 6 or 7 dry; 4 to 6 moist
 Chroma: 1 or 2
 Texture: Loam or clay loam
 Clay content: 20 to 30 percent
 Content of rock fragments: 0 to 15 percent gravel
 Calcium carbonate equivalent: 15 to 30 percent
 Reaction: pH 7.9 to 8.4

Tewfel Series

Depth class: Moderately deep (20 to 40 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Hills

Parent material: Colluvium and slope alluvium from semiconsolidated shale

Slope range: 4 to 35 percent

Elevation range: 5,500 to 6,000 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Tewfel clay loam, in an area of Tewfel-Hackney complex, 4 to 15 percent slopes, in an area of rangeland, 1,900 feet east and 1,850 feet north of the southwest corner of sec. 34, T. 11 N., R. 12 W.; Granite County, Montana.

Ap—0 to 7 inches; grayish brown (10YR 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

A—7 to 12 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (2.5Y 3/2) moist; weak medium subangular blocky structure; hard, very friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

Bw1—12 to 21 inches; grayish brown (2.5Y 5/2) clay loam, dark grayish brown (2.5Y 4/2) moist; moderate medium subangular blocky structure; very hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; common very fine tubular pores; neutral; clear smooth boundary.

2Bw2—21 to 30 inches; grayish brown (2.5Y 5/2) silty clay, dark grayish brown (2.5Y 4/2) moist; weak fine subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few very fine and fine roots; few very fine tubular pores; neutral; clear smooth boundary.

Cr—30 to 60 inches; semiconsolidated shale.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 10 to 15 inches

Depth to the Cr horizon: 20 to 40 inches

A horizons

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 27 to 35 percent

Reaction: pH 6.6 to 7.3

Bw1 horizon

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 27 to 35 percent

Reaction: pH 6.6 to 7.3

2Bw2 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Loam, clay loam, or silty clay

Clay content: 25 to 45 percent

Content of rock fragments: 0 to 10 percent channers

Reaction: pH 6.6 to 7.3

Tibkey Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Drainageways

Parent material: Alluvium

Slope range: 1 to 4 percent

Elevation range: 6,300 to 6,800 feet

Annual precipitation: 15 to 24 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Fluvaquentic Haplocryolls

Typical Pedon

Tibkey mucky silt loam, in an area of Marcel, very bouldery-Tibkey, bouldery, complex, 2 to 8 percent slopes, in an area of rangeland, 1,700 feet north and 350 feet east of the southwest corner of sec. 1, T. 4 N., R. 4 W.; Jefferson County, Montana.

- A1—0 to 2 inches; very dark grayish brown (10YR 3/2) mucky silt loam, very dark brown (10YR 2/2) moist; massive; slightly hard, very friable, nonsticky, nonplastic; many very fine and fine roots; 10 percent gravel; slightly acid; clear wavy boundary.
- A2—2 to 8 inches; very dark gray (10YR 3/1) mucky-silt loam, black (10YR 2/1) moist; strong medium prismatic structure parting to moderate fine and medium subangular blocky; hard, firm, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 10 percent gravel; neutral; clear wavy boundary.
- Bw1—8 to 13 inches; grayish brown (10YR 5/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 40 percent gravel; neutral; clear wavy boundary.
- Bw2—13 to 25 inches; light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent cobbles; 30 percent gravel; neutral; gradual wavy boundary.
- Bw3—25 to 32 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 5/3) moist; few fine distinct yellowish brown (10YR 5/6) redox concentrations; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine tubular pores; 5 percent cobbles; 30 percent gravel; neutral; gradual irregular boundary.
- BC—32 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; common fine prominent strong brown (7.5YR 5/6) redox concentrations; massive; slightly hard, very friable, slightly sticky, nonplastic; common very fine and fine roots; common very fine and fine tubular pores; 5 percent cobbles; 40 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 38 to 42 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 8 to 15 inches

Depth to the seasonal high water table: 24 to 42 inches

A horizons

Hue: 10YR or 2.5Y

Value: 2 to 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 27 percent

Content of rock fragments: 5 to 15 percent—0 to 5 percent cobbles; 5 to 10 percent gravel

Reaction: pH 6.1 to 7.3

Bw1 and Bw2 horizons

Hue: 10YR or 2.5Y

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 or 3

Texture: Silt loam, clay loam, sandy clay loam, or loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 15 to 50 percent—0 to 15 percent boulders, stones,
 and cobbles; 15 to 40 percent gravel
 Reaction: pH 6.6 to 7.3

Bw3 horizon

Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 or 3
 Texture: Loam, clay loam, or sandy clay loam
 Clay content: 18 to 30 percent
 Content of rock fragments: 35 to 60 percent—0 to 10 percent stones and
 cobbles; 30 to 50 percent gravel
 Reaction: pH 6.6 to 7.3

BC horizon

Value: 6 or 7 dry; 5 or 6 moist
 Chroma: 2 to 4
 Texture: Loam or sandy clay loam
 Clay content: 18 to 27 percent
 Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to
 50 percent gravel
 Reaction: pH 6.6 to 7.8

Tibson Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Mountains
Parent material: Colluvium and slope alluvium
Slope range: 2 to 60 percent
Elevation range: 5,400 to 8,000 feet
Annual precipitation: 15 to 30 inches
Annual air temperature: 36 to 43 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Calcic Haplocryolls

Typical Pedon

Tibson gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 1,500 feet north and 400 feet west of the southeast corner of sec. 18, T. 5 N., R. 13 W.

- A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 15 percent gravel; neutral; clear smooth boundary.
- Bw—6 to 12 inches; grayish brown (10YR 5/2) loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to moderate medium granular; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine discontinuous interstitial pores; 10 percent gravel; neutral; clear smooth boundary.
- Bk1—12 to 18 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine

interstitial pores; 15 percent cobbles; 35 percent gravel; common soft masses of lime; strongly effervescent; moderately alkaline; clear smooth boundary.
 Bk2—18 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine roots; common very fine discontinuous interstitial pores; 15 percent cobbles; 35 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 36 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the calcic horizon: 6 to 12 inches

A horizon

Value: 3 or 4 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 60 percent—0 to 15 percent stones; 0 to 25 percent cobbles; 10 to 45 percent gravel

Reaction: pH 6.1 to 7.8

Bw horizon

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 10 to 35 percent—0 to 15 percent cobbles; 10 to 20 percent gravel

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 6.6 to 8.4

Bk1 horizon

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 30 to 60 percent—10 to 20 percent cobbles; 20 to 40 percent gravel

Calcium carbonate equivalent: 20 to 35 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 8.4

Tolbert Series

Depth class: Shallow (10 to 20 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Colluvium or residuum
Slope range: 8 to 70 percent
Elevation range: 3,500 to 6,800 feet
Annual precipitation: 15 to 23 inches
Annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Lithic Argiustolls

Typical Pedon

Tolbert very stony loam, in an area of Braziel-Tolbert complex, 15 to 35 percent slopes, in an area of rangeland, 1,500 feet east and 1,900 feet south of the northwest corner of sec. 21, T. 8 N., R. 8 W.; Powell County, Montana.

A—0 to 4 inches; brown (7.5YR 4/2) very stony loam, dark brown (7.5YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 25 percent stones; 10 percent cobbles; 10 percent gravel; neutral; clear smooth boundary.
 Bt—4 to 12 inches; dark reddish brown (5YR 3/2) very gravelly loam, dark reddish brown (5YR 2/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; few faint clay films on faces of peds and lining pores; 15 percent cobbles; 35 percent gravel; slightly alkaline.
 R—12 inches; fine-grained igneous bedrock.

Range in Characteristics

Soil temperature: 39 to 47 degrees F
Moisture control section: Between 4 and 12 inches or between 4 inches and the lithic contact if less than 12 inches
Thickness of the mollic epipedon: 7 to 14 inches
Depth to bedrock: 10 to 20 inches

A horizon

Hue: 7.5YR, 10YR, or 2.5Y
 Value: 4 or 5 dry; 3 or 4 moist
 Chroma: 2 or 3
 Texture: Loam or clay loam
 Clay content: 15 to 35 percent
 Content of rock fragments: 25 to 80 percent—0 to 25 percent stones; 0 to 10 percent cobbles; 10 to 65 percent gravel
 Reaction: pH 6.1 to 7.8

Bt horizon

Hue: 5YR, 7.5YR, 10YR, or 2.5Y
 Value: 3 to 5 dry; 2 to 4 moist
 Chroma: 2 to 4
 Texture: Loam, sandy clay loam, or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 35 to 65 percent—15 to 30 percent cobbles; 20 to 35 percent gravel
 Reaction: pH 6.1 to 7.8

Trapps Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour) to the Bk horizon, moderate (0.6 to 2.0 inches/hour) below

Landform: Mountains and moraines

Parent material: Colluvium or alluvium from limestone or till

Slope range: 8 to 60 percent

Elevation range: 4,000 to 6,500 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 37 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Trapps channery loam, 4 to 25 percent slopes, in an area of woodland, 2,100 feet east and 2,300 feet north of the southwest corner of sec. 15, T. 14 N., R. 10 W.; Powell County, Montana.

Oi—0 to 1 inch; partially decomposed forest litter.

E—1 to 7 inches; light gray (10YR 7/2) channery loam, brown (10YR 5/3) moist; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; common coarse and many very fine and fine roots; many very fine and fine irregular pores; 10 percent stones; 5 percent cobbles; 20 percent channers; neutral; gradual smooth boundary.

Bt1—7 to 16 inches; reddish yellow (7.5YR 7/6) very channery clay loam, strong brown (7.5YR 5/6) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, slightly plastic; few medium and many very fine and fine roots; many very fine and fine irregular pores; few faint clay films on faces of peds; 5 percent cobbles; 40 percent channers; slightly alkaline; clear smooth boundary.

Bt2—16 to 24 inches; reddish yellow (7.5YR 6/6) very channery clay loam, strong brown (7.5YR 5/6) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, moderately plastic; many very fine and fine roots; many very fine and fine irregular pores; many faint clay films on faces of peds; 5 percent cobbles; 45 percent channers; slightly alkaline; clear smooth boundary.

Bk—24 to 60 inches; yellow (10YR 8/8) extremely channery loam, yellowish brown (10YR 5/8) moist; moderate medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine irregular pores; 15 percent cobbles; 50 percent channers; disseminated lime; common distinct lime casts on undersides of coarse fragments; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 39 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 15 to 35 inches

E horizon

Value: 6 or 7 dry; 5 or 6 moist

Chroma: 2 to 4

Clay content: 10 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 20 percent boulders, stones, and cobbles or flagstones; 15 to 25 percent gravel or channers

Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 to 7 dry; 3 to 5 moist

Chroma: 2 to 4 or 6
 Clay content: 27 to 35 percent
 Content of rock fragments: 35 to 60 percent—0 to 10 percent cobbles; 35 to 50 percent gravel or channers
 Reaction: pH 6.6 to 8.4

Bk horizon

Hue: 7.5YR, 10YR, or 2.5Y
 Value: 6 to 8 dry; 5 or 6 moist
 Chroma: 2 to 4, 6, or 8
 Texture: Loam or sandy loam
 Clay content: 10 to 15 percent
 Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 35 to 50 percent gravel or channers
 Calcium carbonate equivalent: 15 to 40 percent
 Reaction: pH 7.9 to 8.4

Truchot Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Somewhat poorly drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Alluvial fans and stream terraces
Parent material: Calcareous alluvium
Slope range: 0 to 4 percent
Elevation range: 4,700 to 5,500 feet
Annual precipitation: 10 to 14 inches
Annual air temperature: 39 to 45 degrees F
Frost-free period: 90 to 105 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Aquic Calcicustolls

Typical Pedon

Truchot gravelly loam, 0 to 4 percent slopes, in an area of pasture, 850 feet east and 500 feet south of the northwest corner of sec. 18, T. 5 N., R. 9 W.

- A—0 to 9 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, moderately sticky, slightly plastic; few medium and many very fine and fine roots; many very fine and fine irregular pores; 15 percent gravel; violently effervescent; moderately alkaline; gradual smooth boundary.
- Bk1—9 to 18 inches; white (10YR 8/1) gravelly loam, gray (10YR 6/1) moist; weak fine subangular blocky structure parting to weak fine granular; slightly hard, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many very fine and fine irregular pores; 15 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.
- Bk2—18 to 40 inches; white (10YR 8/1) very gravelly loam, light gray (10YR 7/1) moist; weak fine subangular blocky structure; hard, friable, slightly sticky, moderately plastic; few very fine, fine, and medium roots; many very fine and fine irregular pores; 10 percent cobbles; 40 percent gravel; many distinct masses and seams of lime, many faint lime casts on rock fragments; violently effervescent; moderately alkaline; clear smooth boundary.
- Bk3—40 to 60 inches; very pale brown (10YR 7/4) very gravelly sandy loam, yellowish brown (10YR 5/4) moist; many medium and coarse distinct dark

yellowish brown (10YR 4/6) redox concentrations; single grain; loose, nonsticky, nonplastic; many very fine and fine irregular pores; 10 percent cobbles; 50 percent gravel; disseminated lime; few fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the seasonal high water table: 24 to 42 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 27 percent

Content of rock fragments: 15 to 35 percent gravel

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Value: 5 to 8 dry; 3 to 6 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 15 to 60 percent—0 to 10 percent cobbles; 15 to 50 percent gravel

Calcium carbonate equivalent: 10 to 35 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 65 percent—5 to 10 percent cobbles; 30 to 55 percent gravel

Calcium carbonate equivalent: 15 to 35 percent

Reaction: pH 7.9 to 8.4

Bk3 horizon

Value: 6 to 8 dry; 4 to 6 moist

Chroma: 1 to 4

Texture: Sandy loam, loam, or clay loam

Clay content: 15 to 30 percent

Content of rock fragments: 35 to 65 percent—5 to 10 percent cobbles; 30 to 55 percent gravel

Calcium carbonate equivalent: 10 to 30 percent

Reaction: pH 7.9 to 8.4

Turrah Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Slow (0.06 to 0.20 inch/hour)

Landform: Stream terraces

Parent material: Alluvium

Slope range: 0 to 4 percent

Elevation range: 3,800 to 5,800 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine, mixed, superactive, frigid Cumulic Endoaquolls

Typical Pedon

Turrah silty clay loam, 0 to 4 percent slopes, in an area of pasture, 2,000 feet west and 1,800 feet south of the northeast corner of sec. 31, T. 13 N., R. 10 W.; Powell County, Montana.

Oe—0 to 2 inches; partially decomposed organic matter.

A1—2 to 10 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; moderate fine granular structure; hard, firm, moderately sticky, moderately plastic; many very fine and fine roots; many very fine and fine tubular pores; neutral; clear smooth boundary.

A2—10 to 14 inches; black (10YR 2/1) silty clay loam, very dark gray (10YR 3/1) dry; common fine distinct dark yellowish brown (10YR 4/6) redox concentrations; moderate medium subangular blocky structure; hard, firm, moderately sticky, very plastic; common very fine and fine roots; common very fine and fine tubular pores; neutral; clear smooth boundary.

Bg1—14 to 27 inches; very dark gray (10YR 3/1) silty clay, dark gray (10YR 4/1) dry; common fine distinct dark yellowish brown (10YR 4/6) redox concentrations; moderate medium subangular blocky structure; very hard, very firm, moderately sticky, very plastic; common very fine and fine roots; common very fine and fine tubular pores; slightly alkaline; clear smooth boundary.

Bg2—27 to 40 inches; dark gray (10YR 4/1) silty clay; gray (10YR 5/1) dry; common fine and medium distinct dark yellowish brown (10YR 4/4) dry redox concentrations; moderate medium subangular blocky structure; very hard, very firm, moderately sticky, very plastic; common very fine and fine roots; common very fine tubular pores; slightly alkaline; abrupt smooth boundary.

2Cg—40 to 60 inches; dark grayish brown (2.5Y 4/2) very gravelly sandy clay loam; grayish brown (2.5Y 5/2) dry; common medium distinct dark yellowish brown (10YR 4/6) dry redox concentrations; massive; very hard, firm, moderately sticky, very plastic; 40 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 24 to 48 inches

Depth to the seasonal high water table: 12 to 24 inches

Depth to the 2C horizon: 24 to 48 inches

A1 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 2 to 4 dry; 2, 2.5, or 3 moist

Chroma: 1 or 2

Clay content: 27 to 40 percent

Reaction: pH 5.6 to 7.3

A2 horizon

Hue: 10YR, 2.5Y, or 5Y

Value: 2 to 4 dry; 2, 2.5, or 3 moist

Chroma: 1 or 2

Texture: Clay, silty clay loam, or silty clay

Clay content: 35 to 60 percent

Reaction: pH 5.6 to 7.3

Bg horizons

Hue: 10YR, 2.5Y, or 5Y

Value: 4 to 6 dry; 2, 2.5, 3 to 5 moist

Chroma: 1 to 3

Texture: Clay, silty clay loam, or silty clay

Clay content: 35 to 60 percent

Reaction: pH 6.6 to 7.8

2Cg horizon

Hue: 2.5Y or 5Y

Value: 4 to 6 dry; 4 or 5 moist

Chroma: 1 or 2

Texture: Sandy clay loam or clay loam

Clay content: 20 to 40 percent

Content of rock fragments: 35 to 60 percent gravel

Reaction: pH 6.6 to 7.8

Varney Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans and stream terraces

Parent material: Alluvium

Slope range: 0 to 60 percent

Elevation range: 4,000 to 5,800 feet

Annual precipitation: 10 to 14 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 90 to 105 days

Taxonomic Class: Fine-loamy, mixed, superactive, frigid Calcic Argiustolls

Typical Pedon

Varney sandy clay loam, 4 to 8 percent slopes, in an area of rangeland, 1,750 feet south and 600 feet west of the northeast corner of sec. 9, T. 5 N., R. 9 W.

A—0 to 4 inches; grayish brown (10YR 5/2) sandy clay loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; neutral; clear smooth boundary.

Bt—4 to 9 inches; brown (10YR 4/3) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine discontinuous interstitial pores; common distinct clay bridging between sand grains; 5 percent gravel; slightly alkaline; clear smooth boundary.

Bk1—9 to 19 inches; very pale brown (10YR 7/3) sandy clay loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine interstitial pores; 10 percent gravel; many medium masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—19 to 60 inches; very pale brown (10YR 7/4) gravelly sandy loam, light yellowish brown (10YR 6/4) moist; massive; soft, very friable, slightly sticky,

slightly plastic; few very fine and fine roots; few very fine and fine discontinuous interstitial pores; 15 percent gravel; many medium masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches; dry in all parts between four tenths and five tenths of the cumulative days per year when the soil temperature at 20 inches is 41 degrees F or higher

Thickness of the mollic epipedon: 7 to 10 inches

Depth to the Bk horizon: 9 to 20 inches

Note: Some pedons have a BC or C horizon.

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam, clay loam, sandy clay loam, or sandy loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 15 percent cobbles; 0 to 20 percent gravel

Reaction: pH 6.6 to 7.8

Bt horizon

Value: 4 to 6 dry; 3 to 5 moist

Hue: 2 to 4

Texture: Clay loam or sandy clay loam

Clay content: 27 to 35 percent

Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent gravel

Reaction: pH 6.6 to 7.8

Bk horizons

Value: 5 to 7 dry; 4 to 6 moist

Hue: 2 to 4

Texture: Sandy loam, loam, or sandy clay loam

Clay content: 10 to 30 percent

Content of rock fragments: 0 to 35 percent—0 to 5 percent cobbles; 0 to 30 percent gravel

Calcium carbonate equivalent: 15 to 30 percent

Reaction: pH 7.4 to 8.4

Vitroff Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountain slopes

Parent material: Colluvium from tuff or rhyolite

Slope range: 15 to 35 percent

Elevation range: 6,200 to 7,700 feet

Annual precipitation: 20 to 30 inches

Annual air temperature: 36 to 39 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy, mixed, superactive Vitrandic Haplocryalfs

Typical Pedon

Vitroff ashy loam, in an area of Vitroff-Torpy loams, 35 to 60 percent slopes, in an area of forestland, 800 feet east and 450 feet north of the southwest corner of sec. 22, T. 6 N., R. 6 W.; Jefferson County, Montana.

Oi—0 to 1 inch; forest litter of slightly decomposed needles, twigs, and roots.

E1—1 to 3 inches; light brownish gray (10YR 6/2) ashy loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common very fine tubular pores; 2 percent angular gravel; slightly acid; clear smooth boundary.

E2—3 to 8 inches; very pale brown (10YR 7/3) ashy loam, dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine, fine, medium, and coarse roots; common very fine tubular pores; 10 percent angular gravel; neutral; clear smooth boundary.

Bt and E—8 to 15 inches; B part: (65 percent) is brown (10YR 4/3) gravelly ashy clay loam, very dark grayish brown (2.5Y 3/2) moist; E part (35 percent) is very pale brown (10YR 7/3) ashy sandy clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; B part is hard, firm, moderately sticky, moderately plastic; E part is slightly hard, friable, slightly sticky, slightly plastic; few coarse and common very fine, fine, and medium roots; few fine and common very fine tubular pores; 5 percent angular cobbles; 20 percent gravel; neutral; gradual wavy boundary.

Bt—15 to 33 inches; pale brown (10YR 6/3) gravelly ashy clay loam, dark grayish brown (2.5Y 4/2) moist; weak medium subangular blocky structure; very hard, firm, moderately sticky, moderately plastic; few fine and medium and common very fine roots; few fine and common very fine tubular pores; common faint clay films on faces of peds; 10 percent angular cobbles; 20 percent gravel; neutral; diffuse wavy boundary.

BC—33 to 60 inches; light gray (10YR 7/2) extremely gravelly ashy coarse sandy loam, olive brown (2.5Y 4/3) moist; massive; loose, nonsticky, nonplastic; few very fine and fine roots in the upper 2 feet; 20 percent angular cobbles; 50 percent gravel; slightly alkaline.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to lamellae: 6 to 20 inches

Volcanic glass: 20 to 50 percent in the coarse silt and sand fraction

Acid oxalate extractable Fe + Al: 0.12 to 0.20 percent

E horizons

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 0 to 60 percent—0 to 20 percent angular cobbles; 0 to 40 percent gravel

Reaction: pH 5.6 to 7.3

Bt and E horizon

Hue: 10YR or 2.5Y

Value: B part: 4 or 5 dry; 3 or 4 moist; E part: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: B part: Ashy clay loam or ashy sandy clay loam; E part: Ashy sandy clay loam or ashy sandy loam

Clay content: B part: 20 to 35 percent; E part: 15 to 24 percent

Content of rock fragments: 5 to 35 percent—0 to 5 percent angular cobbles; 5 to 30 percent gravel

Reaction: pH 6.1 to 7.3

Bt horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Ashy clay loam or ashy sandy clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 10 to 35 percent—0 to 10 percent angular cobbles; 10 to 25 percent gravel

Reaction: pH 6.1 to 7.3

BC horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4 or 5 moist

Chroma: 2 to 4

Clay content: 5 to 15 percent

Content of rock fragments: 35 to 85 percent—5 to 20 percent angular cobbles; 30 to 65 percent gravel

Reaction: pH 6.6 to 7.8

Waldbillig Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Moraines

Parent material: Volcanic ash over till

Slope range: 2 to 50 percent

Elevation range: 5,800 to 9,000 feet

Annual precipitation: 30 to 40 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Andic Eutrocryepts

Typical Pedon

Waldbillig gravelly ashy loam, 2 to 8 percent slopes, in an area of forestland, 800 feet south and 400 feet west of the northeast corner of sec. 9, T. 4 N., R. 13 W.

Oe—0 to 2 inches; partly decomposed forest matter.

Bw—2 to 10 inches; yellowish brown (10YR 5/4) gravelly ashy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine, fine, and medium roots; many fine interstitial pores; 5 percent cobbles; 15 percent gravel; moderately acid; clear wavy boundary.

2E—10 to 21 inches; pale brown (10YR 6/3) very cobbly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine, fine, and few medium roots; common fine interstitial pores; 30 percent cobbles; 20 percent gravel; moderately acid; clear wavy boundary.

- 2E and Bt1—21 to 33 inches; E part (80 percent) is light yellowish brown (2.5Y 6/4) very cobbly sandy loam, light olive brown (2.5Y 5/4) moist; B part (20 percent) is brown (7.5YR 5/4) very cobbly very fine sandy loam lamellae 1/8- to 1/4-inch thick, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; few fine and medium and common very fine roots; common fine interstitial pores; 30 percent cobbles; 25 percent gravel; slightly acid; clear wavy boundary.
- 2E and Bt2—33 to 60 inches; E part (90 percent) is light brownish gray (2.5Y 6/2) very cobbly sandy loam, dark grayish brown (2.5Y 4/2) moist; B part (10 percent) is brown (7.5YR 5/4) very cobbly sandy loam lamellae 1/4- to 1/2-inch thick, brown (7.5YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, nonplastic; few very fine, fine, and medium roots; common fine interstitial pores; 30 percent cobbles; 25 percent gravel; slightly acid.

Range in Characteristics

Soil temperature: 39 to 45 degrees F

Moisture control section: Between 8 and 24 inches

Surface fragments: 0 to 0.1 percent boulders

Bw horizon

Hue: 7.5YR or 10YR

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 3 or 4

Texture: Ashy loam, ashy fine sandy loam, or ashy very fine sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent boulders, stones, and cobbles; 15 to 25 percent gravel

Acid oxalate extractable Al + 1/2 Fe: More than 1 percent

Moist bulk density: 1 g/cm³ or less

Reaction: pH 5.6 to 6.5

2E horizon

Hue: 5YR, 7.5YR, or 10YR

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 or 3

Texture: Fine sandy loam, sandy loam, or loam

Clay content: 7 to 18 percent

Content of rock fragments: 35 to 60 percent—5 to 30 percent boulders, stones, and cobbles; 20 to 50 percent gravel

Reaction: pH 5.6 to 6.5

2E and Bt horizons

Hue: E part: 5YR, 7.5YR, 10YR, or 2.5Y; B part: 5YR or 7.5YR

Value: E part: 5 to 7 dry; 4 to 6 moist; B part: 5 or 6 dry; 3 or 4 moist

Chroma: 2 to 4

Texture, mixed: Fine sandy loam, sandy loam, or loam

Clay content: 7 to 18 percent; lamellae has less than 3 percent clay increase

Content of rock fragments: 35 to 60 percent—5 to 30 percent boulders, stones, and cobbles; 25 to 40 percent gravel

Reaction: pH 5.6 to 7.3

Wetsand Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Poorly drained

Permeability: Moderate (0.6 to 2.0 inches/hour) to the 2C2 horizon, very rapid (greater than 20 inches/hour) below

Landform: Flood plains

Parent material: Alluvium

Slope range: 0 to 2 percent

Elevation range: 4,200 to 6,000 feet

Annual precipitation: 10 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 105 days

Taxonomic Class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive, calcareous, frigid Aeric Fluvaquents

Typical Pedon

Wetsand loam, in an area of Carten-Wetsand complex, 0 to 2 percent slopes, rarely flooded, in an area of pasture, 1,200 feet south and 2,850 feet east of the northwest corner of sec. 2, T. 7 N., R. 10 W.; Powell County, Montana.

Oe—0 to 2 inches; decomposed organic matter.

A—2 to 8 inches; gray (10YR 6/1) loam, very dark gray (10YR 3/1) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many fine irregular pores; 5 percent gravel; moderately alkaline; clear smooth boundary.

AC—8 to 15 inches; light brownish gray (10YR 6/2) gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; many very fine, fine, and medium roots; many fine irregular pores; 20 percent gravel; slightly effervescent; moderately alkaline; clear wavy boundary.

C1—15 to 20 inches; light gray (10YR 7/2) very gravelly sandy loam, grayish brown (10YR 5/2) moist; common fine prominent reddish yellow (5YR 6/6) redox concentrations; massive; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many fine irregular pores; 10 percent cobbles; 25 percent gravel; violently effervescent; moderately alkaline; clear smooth boundary.

2C2—20 to 60 inches; very pale brown (10YR 8/2) very gravelly coarse sand; light gray (10YR 7/2) moist; massive; loose, nonsticky, nonplastic; common fine and medium roots; many fine irregular pores; 15 percent cobbles; 30 percent gravel; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the 2C2 horizon: 12 to 20 inches

Depth to the seasonal high water table: 12 to 24 inches

A horizon

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 1 to 3

Clay content: 10 to 25 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 7.4 to 8.4

AC horizon

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Texture: Sandy loam or loam

Clay content: 10 to 25 percent
 Content of rock fragments: 0 to 20 percent gravel
 Reaction: pH 7.4 to 8.4

C1 horizon

Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3
 Texture: Sandy loam or loam
 Clay content: 5 to 20 percent
 Content of rock fragments: 0 to 35 percent—0 to 10 percent cobbles; 0 to 25 percent gravel
 Reaction: pH 7.4 to 8.4

2C2 horizon

Value: 5 to 8 dry; 4 to 7 moist
 Chroma: 2 or 3
 Texture: Loamy sand, sand, or coarse sand
 Clay content: 0 to 10 percent
 Content of rock fragments: 35 to 80 percent—5 to 20 percent cobbles; 30 to 60 percent gravel
 Reaction: pH 7.4 to 8.4

Whitecow Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Colluvium from limestone

Slope range: 15 to 60 percent

Elevation range: 4,000 to 8,600 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Typic Calcustepts

Typical Pedon

Whitecow gravelly loam, 35 to 60 percent slopes, in an area of woodland, 1,050 feet north of the southeast corner of sec. 22, T. 5 N., R. 12 W.

A—0 to 6 inches; light brownish gray (10YR 6/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent cobbles; 15 percent gravel; strongly effervescent; slightly alkaline; clear smooth boundary.

Bk1—6 to 16 inches; light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 10 percent cobbles; 35 percent gravel; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—16 to 32 inches; light brownish gray (10YR 6/2) very cobbly loam, grayish brown (10YR 5/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, nonplastic; many very fine and fine roots; many very fine and fine interstitial pores; 20 percent cobbles; 15 percent gravel; violently effervescent; moderately alkaline; clear smooth boundary.

Bk3—32 to 60 inches; light brownish gray (10YR 6/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine and fine interstitial pores; 15 percent cobbles; 40 percent gravel; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 39 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the calcic horizon: 5 to 20 inches

A horizon

Value: 4 to 6 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 18 to 27 percent

Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent gravel

Calcium carbonate equivalent: 0 to 45 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Value: 5 or 6 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 35 to 60 percent—5 to 20 percent cobbles; 30 to 40 percent gravel

Calcium carbonate equivalent: 40 to 50 percent

Reaction: pH 7.4 to 9.0

Bk2 horizon

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 25 to 60 percent—10 to 20 percent cobbles; 15 to 40 percent gravel

Calcium carbonate equivalent: 40 to 50 percent

Reaction: pH 7.4 to 9.0

Bk3 horizon

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 35 to 70 percent—10 to 25 percent cobbles; 25 to 45 percent gravel

Calcium carbonate equivalent: 40 to 50 percent

Reaction: pH 7.4 to 9.0

Whitore Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Colluvium from limestone
Slope range: 2 to 80 percent
Elevation range: 5,200 to 8,600 feet
Annual precipitation: 20 to 40 inches
Annual air temperature: 36 to 39 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, carbonatic Typic Eutrocryepts

Typical Pedon

Whitore cobbly loam, 35 to 60 percent slopes, in an area of woodland, 3,100 feet east and 2,300 feet south of the northwest corner of sec. 21, T. 5 N., R. 13 W.

Oi—0 to 1 inch; forest litter.

A—1 to 3 inches; grayish brown (10YR 5/2) cobbly loam, black (10YR 2/1) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine tubular pores; 10 percent cobbles; 10 percent gravel; neutral; clear smooth boundary.

Bw—3 to 7 inches; light brownish gray (10YR 6/2) very gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, nonplastic; many very fine and fine roots; common very fine tubular pores; 10 percent cobbles; 25 percent gravel; neutral; clear smooth boundary.

Bk1—7 to 10 inches; grayish brown (10YR 5/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure; soft, very friable, nonsticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 15 percent cobbles; 30 percent gravel; common soft masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.

Bk2—10 to 22 inches; light gray (10YR 7/2) very channery loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 30 percent gravel; 25 percent channers; many fine soft masses of lime; violently effervescent; moderately alkaline; gradual wavy boundary.

Bk3—22 to 60 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, nonsticky, nonplastic; few coarse and many very fine and fine roots; common very fine tubular pores; 40 percent gravel; 15 percent channers; disseminated lime; violently effervescent; slightly alkaline.

Range in Characteristics

Soil temperature: 38 to 41 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 5 to 15 inches

A horizon

Value: 4 or 5 dry; 2 to 4 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 15 to 35 percent—10 to 20 percent stones and cobbles; 5 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bw horizon

Value: 5 or 6 dry; 3 to 5 moist

Chroma: 2 to 4

Texture: Loam or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 15 to 50 percent—5 to 15 percent cobbles; 10 to 35 percent gravel
 Reaction: pH 6.6 to 8.4

Bk horizons

Value: 5 to 7 dry; 4 to 6 moist
 Chroma: 2 to 4
 Texture: Loam or clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 35 to 85 percent—0 to 40 percent stones and cobbles; 25 to 65 percent gravel or channers
 Calcium carbonate equivalent: 40 to 50 percent
 Reaction: pH 7.4 to 9.0

Wilspring Series

Depth class: Moderately deep (20 to 40 inches)
Drainage class: Well drained
Permeability: Moderate (0.6 to 2.0 inches/hour)
Landform: Hills and mountains
Parent material: Colluvium from hard brown shale or argillaceous limestone
Slope range: 15 to 75 percent
Elevation range: 4,920 to 6,600 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 37 to 45 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustepts

Typical Pedon

Wilspring very gravelly loam, in an area of Wilspring-Rubble land complex, 50 to 75 percent slopes, in an area of rangeland, 2,000 feet west and 700 feet south of the northeast corner of sec. 15, T. 5 N., R. 11 W.

- A—0 to 4 inches; light olive brown (2.5Y 5/3) very gravelly loam, very dark grayish brown (2.5Y 3/2) moist; moderate medium granular structure; slightly hard, very friable, slightly sticky, slightly plastic; few fine and medium and many very fine roots; few very fine tubular and common very fine irregular pores; 40 percent gravel; slightly effervescent; slightly alkaline; clear smooth boundary.
- Bw—4 to 7 inches; light yellowish brown (2.5Y 6/3) very channery clay loam, brown (10YR 4/3) moist; moderate medium granular structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine, fine, and medium roots; common very fine irregular pores; 45 percent channers; slightly effervescent; slightly alkaline; clear smooth boundary.
- Bk—7 to 15 inches; light yellowish brown (2.5Y 6/3) very channery loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, moderately plastic; common very fine, fine, and medium roots; common very fine irregular pores; 50 percent channers; disseminated lime; common distinct lime coats on undersides of fragments; slightly effervescent; moderately alkaline; abrupt smooth boundary.
- Bck—15 to 28 inches; light yellowish brown (2.5Y 6/3) very channery loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky, slightly plastic; common very fine, fine, and medium roots; common fine and medium

irregular pores; 60 percent channers; disseminated lime; common distinct lime coats on undersides of fragments; violently effervescent; moderately alkaline; gradual smooth boundary.

R—28 inches; brown (10YR 5/3) hard fractured shale.

Range in Characteristics

Soil temperature: 39 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the Bk horizon: 7 to 10 inches

Depth to bedrock: 20 to 40 inches

A horizon

Value: 4 or 5 dry

Chroma: 2 to 4

Clay content: 15 to 27 percent

Content of rock fragments: 15 to 45 percent—0 to 5 percent flagstones; 15 to 40 percent gravel or channers

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 7.4 to 8.4

Bw horizon

Value: 5 or 6 dry

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 15 to 45 percent—0 to 5 percent flagstones; 15 to 45 percent channers

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Bk and BCK horizons

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 3, 4 to 6

Texture: Loam or clay loam

Clay content: 18 to 30 percent

Content of rock fragments: 35 to 80 percent—0 to 10 percent flagstones; 30 to 70 percent channers

Calcium carbonate equivalent: 5 to 15 percent

Reaction: pH 7.9 to 8.4

Wimper Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Mountains

Parent material: Colluvium and alluvium

Slope range: 4 to 60 percent

Elevation range: 5,000 to 6,600 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 37 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustolls

Typical Pedon

Wimper gravelly loam, in an area of Wimper-Winspect complex, 15 to 35 percent slopes, in an area of rangeland, 2,250 feet south and 1,150 feet east of the northwest corner of sec. 15, T. 7 N., R. 15 W.; Granite County, Montana.

- A—0 to 5 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine irregular pores; 15 percent gravel; neutral; clear smooth boundary.
- Bw1—5 to 8 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; common very fine tubular pores; 15 percent gravel; neutral; clear smooth boundary.
- Bw2—8 to 13 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common fine and many very fine roots; common very fine tubular pores; 40 percent gravel; neutral; clear smooth boundary.
- Bk1—13 to 23 inches; very pale brown (10YR 7/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine roots; common fine tubular pores; 5 percent cobbles; 45 percent gravel; common fine masses of lime; violently effervescent; moderately alkaline; clear wavy boundary.
- Bk2—23 to 60 inches; very pale brown (10YR 8/3) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; 15 percent cobbles; 35 percent gravel; moderately alkaline.

Range in Characteristics

Soil temperature: 39 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

Depth to the Bk horizon: 10 to 15 inches

A horizon

Hue: 7.5YR or 10YR

Value: 3 to 5 dry; 2 or 3 moist

Chroma: 1 to 3

Clay content: 15 to 27 percent

Content of rock fragments: 0 to 15 percent gravel

Reaction: pH 6.6 to 7.8

Bw horizons

Hue: 7.5YR or 10YR

Value: 4 to 6 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 15 to 27 percent

Content of rock fragments: 15 to 50 percent—0 to 10 percent cobbles; 15 to 40 percent gravel

Reaction: pH 6.6 to 7.8

Bk horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 5 to 8 dry; 4 to 6 moist

Chroma: 2 or 3

Clay content: 15 to 27 percent

Content of rock fragments: 35 to 70 percent—0 to 15 percent cobbles; 35 to 55 percent gravel

Calcium carbonate equivalent: 5 to 25 percent

Reaction: pH 7.9 to 8.4

Windham Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderate (0.6 to 2.0 inches/hour)

Landform: Alluvial fans, stream terraces, and mountains

Parent material: Alluvium and colluvium from limestone

Slope range: 8 to 60 percent

Elevation range: 5,000 to 6,400 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, carbonatic, frigid Typic Calcicustolls

Typical Pedon

Windham gravelly loam, in an area of Winspect gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 700 feet north and 100 feet west of the southeast corner of sec. 22, T. 5 N., R. 12 W.

A—0 to 8 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine and fine roots; many very fine interstitial pores; 25 percent gravel; strongly effervescent; moderately alkaline; clear smooth boundary.

Bk1—8 to 22 inches; light gray (10YR 7/2) very gravelly loam, brown (10YR 5/3) moist; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; many very fine and fine roots; many very fine interstitial pores; 50 percent gravel; disseminated lime; common very fine masses of lime; violently effervescent; moderately alkaline; clear smooth boundary.

Bk2—22 to 60 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; many very fine and fine roots; many very fine interstitial pores; 50 percent gravel; disseminated lime; few very fine masses of lime; violently effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the calcic horizon: 7 to 10 inches

Thickness of the mollic epipedon: 7 to 10 inches

Surface fragments: 0 to 3 percent stones

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 15 to 27 percent

Content of rock fragments: 10 to 35 percent—0 to 5 percent cobbles; 10 to 30 percent gravel

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Bk1 horizon

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 10 to 75 percent—0 to 20 percent cobbles; 10 to 55 percent gravel)

Calcium carbonate equivalent: 35 to 60 percent

Reaction: pH 7.9 to 8.4

Bk2 horizon

Value: 6 to 8 dry; 5 to 7 moist

Chroma: 2 to 4

Texture: Loam, clay loam, or sandy loam

Clay content: 18 to 35 percent

Content of rock fragments: 40 to 75 percent—0 to 20 percent cobbles; 35 to 55 percent gravel

Calcium carbonate equivalent: 40 to 60 percent

Reaction: pH 7.9 to 8.4

Winkler Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Somewhat excessively drained

Permeability: Moderately rapid (2 to 6 inches/hour)

Landform: Mountains

Parent material: Colluvium

Slope range: 8 to 60 percent

Elevation range: 4,000 to 6,700 feet

Annual precipitation: 18 to 25 inches

Annual air temperature: 43 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Lamellic Haplustepts

Typical Pedon

Winkler gravelly loam, 35 to 60 percent slopes, in an area of woodland, 2,400 feet west and 1,600 feet south of the northeast corner of sec. 7, T. 12 N., R. 9 W.; Powell County, Montana.

Oi—0 to 2 inches; undecomposed and slightly decomposed forest litter.

A—2 to 5 inches; grayish brown (10YR 5/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; many fine tubular pores; 30 percent angular gravel; neutral; clear smooth boundary.

E1—5 to 15 inches; very pale brown (10YR 7/3) gravelly sandy loam, brown (10YR 5/3) moist; weak fine and medium granular structure; soft, very friable, nonsticky, nonplastic; many very fine, fine, medium, and coarse roots; many fine tubular pores; 30 percent angular gravel; moderately acid; gradual wavy boundary.

E2—15 to 28 inches; pink (7.5YR 8/4) very gravelly sandy loam, light brown (7.5YR 6/4) moist; weak fine and medium subangular blocky structure; soft, very friable, nonsticky, nonplastic; common very fine and fine roots; many fine tubular pores;

10 percent angular cobbles; 40 percent angular gravel; moderately acid; gradual wavy boundary.

E and Bt—28 to 43 inches; E part (75 percent) is pinkish white (7.5YR 8/2) extremely gravelly sandy loam, brown (7.5YR 5/4) moist; B part (25 percent) is brown (7.5YR 5/4) fine sandy loam lamellae $\frac{1}{8}$ - to $\frac{1}{4}$ -inch thick, brown (7.5YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky, nonplastic; few fine and medium roots; common very fine and fine tubular pores; 20 percent angular cobbles; 50 percent angular gravel; moderately acid; gradual wavy boundary.

C—43 to 60 inches; pinkish gray (7.5YR 7/2) extremely gravelly sandy loam, brown (7.5YR 5/2) moist; massive; soft, very friable, nonsticky, nonplastic; few fine roots; few fine tubular pores; 20 percent angular cobbles; 55 percent angular gravel; moderately acid.

Range in Characteristics

Soil temperature: 45 to 47 degrees F

Moisture control section: Between 8 and 24 inches

A horizon

Hue: 7.5YR or 10YR

Value: 5 or 6 dry; 3 or 4 moist

Chroma: 2 or 3

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 35 percent—0 to 5 percent angular cobbles;
15 to 30 percent gravel

Reaction: pH 6.1 to 7.3

E horizons

Hue: 7.5YR or 10YR

Value: 6 to 8 dry; 4 to 7 moist

Chroma: 2 to 4

Texture: Loam or sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 15 to 70 percent—0 to 10 percent angular cobbles;
15 to 60 percent angular gravel

Reaction: pH 5.6 to 7.3

E and Bt horizon

Hue: 7.5YR or 10YR

Value: E part: 6 to 8 dry; 4 to 7 moist; B part: 4 to 6 dry; 4 or 5 moist

Chroma: E part: 2 to 4; B part: 3 or 4

Texture: Loam, sandy loam, or fine sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 60 to 85 percent—10 to 25 percent angular cobbles;
50 to 60 percent angular gravel

Reaction: pH 5.6 to 6.5

C horizon

Hue: 7.5YR or 10YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 2 or 3

Texture: Sandy loam or fine sandy loam

Clay content: 5 to 15 percent

Content of rock fragments: 60 to 85 percent—10 to 25 percent angular cobbles;
50 to 60 percent angular gravel

Reaction: pH 5.6 to 6.5

Winspect Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Mountains, moraines, and alluvial fans

Parent material: Till, alluvium, or colluvium from limestone

Slope range: 4 to 60 percent

Elevation range: 5,000 to 6,600 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 39 to 45 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Calcicustolls

Typical Pedon

Winspect gravelly loam, 15 to 35 percent slopes, in an area of rangeland, 450 feet east and 600 feet north of the southwest corner of sec. 2, T. 7 N., R. 14 W.; Granite County, Montana.

- A—0 to 6 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many very fine interstitial pores; 5 percent cobbles; 15 percent gravel; slightly effervescent; slightly alkaline; clear wavy boundary.
- Ak—6 to 11 inches; grayish brown (10YR 5/2) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many very fine interstitial pores; 5 percent cobbles; 25 percent gravel; disseminated lime; few fine masses of lime; strongly effervescent; slightly alkaline; clear smooth boundary.
- Bk1—11 to 20 inches; very pale brown (10YR 7/3) very gravelly loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; common very fine and fine roots; common very fine tubular pores; 10 percent cobbles; 30 percent gravel; disseminated lime; common distinct lime casts on undersides of coarse fragments; violently effervescent; strongly alkaline; clear smooth boundary.
- Bk2—20 to 28 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, friable, moderately sticky, slightly plastic; few very fine roots; few very fine tubular pores; 10 percent cobbles; 30 percent gravel; disseminated lime; common distinct lime casts on undersides of coarse fragments; violently effervescent; strongly alkaline; gradual wavy boundary.
- BC—28 to 60 inches; pale yellow (2.5Y 7/4) very gravelly loam, light yellowish brown (2.5Y 6/4) moist; weak coarse prismatic structure; slightly hard, very friable, slightly sticky, slightly plastic; few very fine roots; common very fine interstitial pores; 10 percent cobbles; 35 percent gravel; violently effervescent; strongly alkaline.

Range in Characteristics

Soil temperature: 41 to 47 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 14 inches

A horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 or 2

Clay content: 20 to 25 percent

Content of rock fragments: 15 to 30 percent—5 to 10 percent cobbles; 15 to 20 percent gravel

Calcium carbonate equivalent: 5 to 10 percent

Reaction: pH 7.4 to 8.4

Ak horizon

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3

Texture: Loam or clay loam

Clay content: 20 to 30 percent

Content of rock fragments: 20 to 35 percent—5 to 10 percent cobbles; 15 to 25 percent gravel

Calcium carbonate equivalent: 10 to 40 percent

Reaction: pH 7.4 to 8.4

Bk1 and Bk2 horizons

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 3 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 35 to 50 percent—10 to 20 percent cobbles; 25 to 30 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 9.0

BC horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 2 to 4

Texture: Loam or clay loam

Clay content: 20 to 35 percent

Content of rock fragments: 40 to 55 percent—10 to 20 percent cobbles; 30 to 35 percent gravel

Calcium carbonate equivalent: 15 to 40 percent

Reaction: pH 7.9 to 9.0

Work Series

Depth class: Very deep (greater than 60 inches)

Drainage class: Well drained

Permeability: Moderately slow (0.2 to 0.6 inch/hour)

Landform: Hills

Parent material: Alluvium

Slope range: 2 to 60 percent

Elevation range: 4,920 to 6,400 feet

Annual precipitation: 15 to 19 inches

Annual air temperature: 37 to 43 degrees F

Frost-free period: 70 to 90 days

Taxonomic Class: Fine, smectitic, frigid Typic Argiustolls

Typical Pedon

Work cobbly loam, in an area of Work-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, severely impacted, in an area of rangeland, 1,650 feet east and 850 feet north of the southwest corner of sec. 31, T. 5 N., R. 10 W.

A—0 to 5 inches; dark grayish brown (10YR 4/2) cobbly loam, very dark gray (10YR 3/1) moist; weak very thin platy structure; soft, very friable, moderately sticky, moderately plastic; few very fine vesicular pores; 10 percent cobbles; 15 percent gravel; moderately acid; clear smooth boundary.

Bt1—5 to 15 inches; brown (10YR 4/3) cobbly clay loam, very dark grayish brown (10YR 3/2) moist; weak fine subangular blocky structure; hard, firm, moderately sticky, very plastic; few very fine dead roots; few very fine tubular pores; common distinct clay films lining pores; 10 percent cobbles; 15 percent gravel; slightly acid; clear smooth boundary.

Bt2—15 to 29 inches; yellowish brown (10YR 5/4) clay, dark brown (10YR 4/3) moist; weak medium prismatic structure parting to weak fine subangular blocky; very hard, very firm, very sticky, very plastic; few coarse and common very fine and fine dead roots; few very fine tubular pores; common distinct clay films on faces of peds; 10 percent cobbles; 2 percent gravel; neutral; clear smooth boundary.

Btk—29 to 48 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, brown (10YR 4/3) moist; weak coarse prismatic structure; hard, friable, moderately sticky, very plastic; few very fine and fine dead roots; few very fine interstitial pores; few faint clay films on faces of peds; 5 percent stones; 20 percent cobbles; 25 percent gravel; common fine seams and threads of lime; slightly effervescent; moderately alkaline; gradual smooth boundary.

Bk—48 to 60 inches; light yellowish brown (10YR 6/4) very cobbly clay loam, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, friable, moderately sticky, moderately plastic; few very fine and fine dead roots; few very fine interstitial pores; 5 percent stones; 20 percent cobbles; 25 percent gravel; common fine seams and threads of lime; strongly effervescent; moderately alkaline.

Range in Characteristics

Soil temperature: 39 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Thickness of the mollic epipedon: 7 to 15 inches

A horizon

Hue: 10YR or 2.5Y

Value: 4 or 5 dry; 2 or 3 moist

Chroma: 1 to 3

Texture: Loam or clay loam

Clay content: 18 to 35 percent

Content of rock fragments: 0 to 60 percent—0 to 30 percent cobbles; 0 to 30 percent gravel or channers

Reaction: pH 6.1 to 7.8

Bt horizons

Hue: 7.5YR, 10YR, or 2.5Y

Value: 4 or 5 dry; 2 to 4 moist

Chroma: 2 to 4

Texture: Clay loam, silty clay, or clay

Clay content: 35 to 50 percent

Content of rock fragments: 0 to 30 percent—0 to 15 percent cobbles or stones;
 0 to 15 percent gravel
 Reaction: pH 6.6 to 7.8

Btk horizon

Hue: 7.5YR, 10YR, or 2.5Y
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Clay loam or clay
 Clay content: 30 to 45 percent
 Content of rock fragments: 0 to 45 percent—0 to 25 percent stones and cobbles;
 0 to 20 percent gravel
 Calcium carbonate equivalent: 5 to 15 percent
 Reaction: pH 7.4 to 8.4

Bk horizon

Hue: 7.5YR, 10YR, or 2.5Y
 Value: 5 to 7 dry; 3 to 6 moist
 Chroma: 2 to 4
 Texture: Clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 0 to 45 percent—0 to 20 percent cobbles; 0 to
 30 percent gravel; 0 to 5 percent stones
 Calcium carbonate equivalent: 3 to 10 percent
 Reaction: pH 7.4 to 8.4

Worock Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Mountains
Parent material: Colluvium
Slope range: 4 to 85 percent
Elevation range: 5,500 to 8,600 feet
Annual precipitation: 20 to 40 inches
Annual air temperature: 36 to 45 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Loamy-skeletal, mixed, superactive Eutric Haplocryalfs

Typical Pedon

Worock gravelly loam, 15 to 35 percent slopes, in an area of woodland, 300 feet south and 730 feet west of the northeast corner of sec. 18, T. 2 N., R. 12 W.

Oe—0 to 1 inch; partially decomposed forest litter.

E—1 to 8 inches; light yellowish brown (10YR 6/4) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many very fine and fine irregular pores; 5 percent stones; 5 percent cobbles; 15 percent gravel; moderately acid; clear smooth boundary.

E/Bt—8 to 19 inches; E part (85 percent) is very pale brown (10YR 7/4) gravelly loam, yellowish brown (10YR 5/6) moist; B part (15 percent) is yellowish brown (10YR 5/4) gravelly clay loam, yellowish brown (10YR 5/6) moist; weak medium granular structure; slightly hard, friable, slightly sticky, slightly plastic; few medium

and many very fine and fine roots; many very fine irregular pores; few faint clay films on faces of peds; 5 percent stones; 5 percent cobbles; 25 percent gravel; moderately acid; clear smooth boundary.

Bt—19 to 29 inches; yellowish brown (10YR 5/6) very gravelly clay loam, dark yellowish brown (10YR 4/6) moist; weak medium subangular blocky structure parting to weak medium granular; hard, firm, moderately sticky, moderately plastic; common very fine and fine roots; common very fine irregular pores; many distinct clay films on faces of peds; 5 percent stones; 10 percent cobbles; 30 percent gravel; moderately acid; clear smooth boundary.

BC—29 to 60 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; massive; slightly hard, friable, moderately sticky, moderately plastic; few very fine and fine roots; many very fine irregular pores; 5 percent stones; 15 percent cobbles; 35 percent gravel; moderately acid.

Range in Characteristics

Soil temperature: 38 to 45 degrees F

Moisture control section: Between 4 and 12 inches

Surface fragments: 0 to 0.1 percent stones

Note: Some pedons have Bt/E horizons.

E horizon

Value: 6 or 7 dry; 3 to 5 moist

Chroma: 2 to 4

Clay content: 15 to 27 percent

Content of rock fragments: 15 to 50 percent—5 to 20 percent stones; 0 to 15 percent cobbles; 5 to 30 percent gravel

Reaction: pH 5.1 to 6.5

E/Bt horizon

Hue: 10YR or 7.5YR

Value: E part: 6 or 7 dry; 3 to 5 moist; B part: 5 or 6 dry; 4 or 5 moist

Chroma: E part: 2, 3, 4 to 6; B part: 4 to 6

Texture: E part: Loam or sandy loam; B part: Loam or clay loam (mixed)

Clay content: E part: 15 to 27 percent; B part: 27 to 30 percent; mixed 18 to 30 percent

Content of rock fragments: 20 to 60 percent—5 to 20 percent stones; 5 to 15 percent cobbles; 10 to 25 percent gravel

Reaction: pH 5.1 to 6.5

Bt horizon

Hue: 10YR or 7.5YR

Value: 5 to 7 dry; 4 or 5 moist

Chroma: 4 to 6

Texture: Loam, clay loam, or sandy clay loam

Clay content: 25 to 35 percent

Content of rock fragments: 35 to 65 percent—0 to 10 percent stones; 5 to 15 percent cobbles; 25 to 45 percent gravel

Reaction: pH 5.6 to 6.5

BC horizon

Hue: 10YR or 7.5YR

Value: 6 or 7 dry; 4 to 6 moist

Chroma: 3, 4, or 6

Texture: Loam, clay loam, or sandy clay loam

Clay content: 12 to 30 percent

Content of rock fragments: 35 to 60 percent—5 to 10 percent stones; 5 to 15 percent cobbles; 25 to 35 percent gravel
 Reaction: pH 5.6 to 6.5

Yreka Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Well drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Mountains and moraines
Parent material: Colluvium and till
Slope range: 8 to 60 percent
Elevation range: 4,000 to 6,700 feet
Annual precipitation: 18 to 25 inches
Annual air temperature: 37 to 43 degrees F
Frost-free period: 70 to 90 days

Taxonomic Class: Loamy-skeletal, mixed, superactive, frigid Typic Haplustalfs

Typical Pedon

Yreka gravelly loam, cool, 15 to 35 percent slopes, in an area of woodland, 900 feet north and 1,900 feet east of the southwest corner of sec. 2, T. 5 N., R. 11 W.

- Oi—0 to 2 inches; undecomposed and partially decomposed twigs and needles.
 E—2 to 11 inches; grayish brown (10YR 5/2) gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, friable, slightly sticky, slightly plastic; common medium and many very fine and fine roots; many very fine and fine irregular pores; 5 percent cobbles; 20 percent gravel; neutral; clear smooth boundary.
 E/Bt—11 to 18 inches; E part (60 percent) is light brownish gray (10YR 6/2) very gravelly loam, brown (10YR 5/3) moist; B part: (40 percent) is brown (10YR 5/3) very gravelly loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; hard, friable, moderately sticky, moderately plastic; common medium and many very fine and fine roots; common very fine and fine irregular pores; 10 percent cobbles; 25 percent gravel; neutral; clear smooth boundary.
 Bt1—18 to 29 inches; light yellowish brown (10YR 6/4) very gravelly clay loam, dark brown (10YR 4/3) moist; moderate coarse subangular blocky structure; hard, friable, moderately sticky, moderately plastic; many very fine and fine and common medium and coarse roots; common very fine and fine irregular pores; few faint clay films on faces of peds; 15 percent cobbles; 35 percent gravel; neutral; clear smooth boundary.
 Bt2—29 to 60 inches; brown (10YR 5/3) very cobbly clay loam, dark brown (10YR 4/3) moist; massive; slightly hard, friable, slightly sticky, slightly plastic; few medium and coarse and common very fine and fine roots; common very fine irregular pores; few faint clay films on faces of peds; 20 percent cobbles; 35 percent gravel; neutral.

Range in Characteristics

Soil temperature: 39 to 45 degrees F
Moisture control section: Between 4 and 12 inches

E horizon

Hue: 10YR or 7.5YR
 Value: 5 to 7 dry; 4 or 5 moist
 Chroma: 2 or 3

Clay content: 7 to 20 percent
 Content of rock fragments: 15 to 35 percent—0 to 10 percent stones and cobbles; 15 to 25 percent gravel
 Reaction: pH 5.6 to 7.3

E/Bt horizon

Hue: 10YR or 7.5YR
 Value: E part: 6 or 7 dry; 5 or 6 moist; B part: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Loam or sandy loam
 Clay content: 7 to 25 percent, mixed
 Content of rock fragments: 15 to 35 percent—0 to 10 percent cobbles; 15 to 25 percent gravel
 Reaction: pH 5.6 to 7.3

Bt horizons

Hue: 2.5Y, 10YR, or 7.5YR
 Value: 5 or 6 dry; 4 or 5 moist
 Chroma: 2 to 4
 Texture: Clay loam or sandy clay loam
 Clay content: 20 to 35 percent
 Content of rock fragments: 35 to 60 percent—10 to 20 percent cobbles; 25 to 40 percent gravel
 Reaction: pH 5.6 to 7.3

Zelda Series

Depth class: Very deep (greater than 60 inches)
Drainage class: Poorly drained
Permeability: Moderately slow (0.2 to 0.6 inch/hour)
Landform: Flood plains
Parent material: Alluvium
Slope range: 0 to 2 percent
Elevation range: 5,800 to 6,100 feet
Annual precipitation: 15 to 19 inches
Annual air temperature: 36 to 37 degrees F
Frost-free period: 30 to 70 days

Taxonomic Class: Fine-loamy, mixed, superactive Typic Cryaqualfs

Typical Pedon

Zelda loam, in an area of Zelda-Nana-Foolhen complex, 0 to 2 percent slopes, in an area of rangeland, 350 feet east and 500 feet north of the southwest corner of sec. 33, T. 1 N., R. 14 W.

- A—0 to 4 inches; dark gray (10YR 4/1) loam, grayish brown (10YR 5/2) dry; moderate thick platy structure parting to moderate medium granular; slightly hard, friable, slightly sticky, slightly plastic; common medium and many fine roots; many very fine tubular pores; very strongly alkaline; clear smooth boundary.
- E—4 to 9 inches; grayish brown (10YR 5/2) loamy fine sand, light brownish gray (10YR 6/2) dry; weak medium subangular blocky structure; slightly hard, friable, slightly sticky, slightly plastic; few medium and common fine roots; common fine and many very fine tubular pores; violently effervescent; very strongly alkaline; abrupt smooth boundary.

- Btn1—9 to 14 inches; very dark grayish brown (10YR 3/2) sandy clay loam, grayish brown (10YR 5/2) dry; strong medium columnar structure; hard, firm, moderately sticky, moderately plastic; few medium and common very fine roots; common very fine tubular pores; many distinct clay films on faces of peds; common grayish brown (10YR 5/2) and light gray (10YR 7/2) moist tongues of albic materials on upper vertical faces of peds; very strongly alkaline; clear smooth boundary.
- Btn2—14 to 21 inches; dark grayish brown (10YR 4/2) cobbly sandy clay loam, grayish brown (10YR 5/2) dry; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky, moderately plastic; common very fine and fine roots; common very fine tubular pores; common distinct clay films on faces of peds; 15 percent cobbles; 10 percent gravel; very strongly alkaline; clear smooth boundary.
- Cn1—21 to 34 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, grayish brown (10YR 5/2) dry; massive; slightly hard, firm, slightly sticky, slightly plastic; common very fine and fine roots; common fine and medium tubular pores; 5 percent cobbles; 10 percent gravel; very strongly alkaline; gradual smooth boundary.
- Cn2—34 to 44 inches; brown (10YR 5/3) sandy loam, pale brown (10YR 6/3) dry; massive; slightly hard, firm, slightly sticky, slightly plastic; few very fine roots; few very fine tubular pores; slightly effervescent; very strongly alkaline; gradual smooth boundary.
- 2Cn3—44 to 60 inches; brown (10YR 5/3) very cobbly loamy sand, pale brown (10YR 6/3) dry; single grain; loose, nonsticky, nonplastic; 20 percent cobbles; 30 percent gravel; very strongly alkaline.

Range in Characteristics

Soil temperature: 38 to 39 degrees F

Moisture control section: Between 4 and 12 inches

Depth to the seasonal high water table: 12 to 24 inches

Depth to the 2C horizon: 40 to 60 inches

A horizon

Value: 5 to 7 dry; 4 to 6 moist

Chroma: 1 or 2

Clay content: 18 to 27 percent

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 30 to 40

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 8.5 to 9.6

E horizon

Value: 6 to 8 dry; 5 or 6 moist

Chroma: 1 or 2

Texture: Loamy fine sand or silt loam

Clay content: 10 to 18 percent

Electrical conductivity: 0 to 2 mmhos/cm

Sodium adsorption ratio: 30 to 40

Calcium carbonate equivalent: 0 to 5 percent

Reaction: pH 9.1 to 9.6

Btn1 horizon

Hue: 10YR or 2.5Y

Value: 5 to 7 dry; 3 to 6 moist

Chroma: 1 or 2

Texture: Sandy clay loam or clay loam

Clay content: 27 to 35 percent
Content of rock fragments: 0 to 5 percent gravel
Calcium carbonate equivalent: 0 to 10 percent
Electrical conductivity: 1 to 3 mmhos/cm
Sodium adsorption ratio: 13 to 30
Reaction: pH 9.1 to 9.6

Btn2 horizon

Hue: 10YR or 2.5Y
Value: 5 to 7 dry; 3 to 6 moist
Chroma: 1 to 3
Texture: Sandy clay loam or clay loam
Clay content: 27 to 35 percent
Content of rock fragments: 0 to 25 percent—0 to 15 percent cobbles; 0 to 10 percent gravel
Calcium carbonate equivalent: 0 to 10 percent
Electrical conductivity: 1 to 3 mmhos/cm
Sodium adsorption ratio: 13 to 30
Reaction: pH 9.1 to 9.6

Cn1 and Cn2 horizons

Hue: 10YR or 2.5Y
Value: 5 to 7 dry; 4 or 5 moist
Chroma: 1 to 3
Texture: Sandy loam, very fine sandy loam, or sandy clay loam
Clay content: 15 to 25 percent
Content of rock fragments: 0 to 15 percent—0 to 5 percent cobbles; 0 to 10 percent gravel
Calcium carbonate equivalent: 0 to 10 percent
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 13 to 30
Reaction: pH 9.1 to 9.6

2Cn3 horizon

Hue: 10YR or 2.5Y
Value: 5 to 7 dry; 4 or 5 moist
Texture: Loamy sand, sand, or loamy coarse sand
Clay content: 0 to 10 percent
Content of rock fragments: 40 to 60 percent—0 to 5 percent stones; 15 to 20 percent cobbles; 25 to 35 percent gravel
Calcium carbonate equivalent: 0 to 5 percent
Electrical conductivity: 0 to 2 mmhos/cm
Sodium adsorption ratio: 4 to 13
Reaction: pH 9.1 to 9.6

Detailed Soil Map Units

The map units delineated on the detailed soil maps in this survey represent the soils or miscellaneous areas in the survey area. The map unit descriptions in this section, along with the maps, can be used to determine the suitability and potential of a unit for specific uses. They also can be used to plan the management needed for those uses.

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

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

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

An identifying symbol precedes the map unit name in the map unit descriptions. Each description includes general facts about the unit.

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

Soils of one series can differ in texture of the surface layer, slope, stoniness, salinity, degree of erosion, and other characteristics that affect their use. On the basis of such differences, a soil series is divided into *soil phases*. Most of the areas shown on the detailed soil maps are phases of soil series. The name of a soil phase

commonly indicates a feature that affects use or management. For example, Foolhen loam, 0 to 4 percent slopes, is a phase of the Foolhen series.

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

This survey includes *complexes*. They consist of two or more soils or miscellaneous areas in such an intricate pattern or in such small areas that they cannot be shown separately on the maps. The pattern and proportion of the soils or miscellaneous areas are somewhat similar in all areas. Varney-Con loams, 0 to 4 percent slopes, is an example.

This soil includes *associations*. They are made up of two or more geographically associated soils or miscellaneous areas that are shown as one unit on the maps. Because of present or anticipated uses of the map units in the survey area, it was not considered practical or necessary to map the soils or miscellaneous areas separately. The pattern and relative proportion of the soils or miscellaneous areas are somewhat similar. Karloff-Coslaw-Illiano association, 8 to 35 percent slopes, moderately impacted, is an example.

This survey includes *miscellaneous areas*. They have little or no soil material and support little or no vegetation. Rock outcrop is an example.

The "Acreage and Proportionate Extent of the Soils" table gives the acreage and proportionate extent of each map unit. Other tables (see "Summary of Tables") give properties of the soils and the limitations, capabilities, and potentials for many uses. Many of the terms used in describing the soils or miscellaneous areas are defined in the "Glossary."

2A—Dougcliff mucky peat, 0 to 2 percent slopes

Map Unit Setting

Elevation: 4,900 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Component Description

Dougcliff and similar soils

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 4,900 to 5,800 feet

Effective annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Surface layer texture: Mucky peat

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Organic, unspecified

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Ponding duration: Very long

Available water capacity: Mainly 20.7 inches

Additional Components

Bushong and similar soils: 10 percent

Water: 5 percent

3B—Foolhen loam, 0 to 4 percent slopes**Map Unit Setting**

Elevation: 5,700 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description**Foolhen and similar soils**

Composition: 85 percent

Geomorphic description: Stream terrace

Slope: 0 to 4 percent

Elevation: 5,700 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Mucky peat

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Fine-loamy alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Ponding duration: Brief

Available water capacity: Mainly 7.1 inches

Additional Components

Mooseflat and similar soils: 6 percent

Finn and similar soils: 5 percent

Dunkleber and similar soils: 4 percent

3C—Foolhen loam, 4 to 8 percent slopes**Map Unit Setting**

Elevation: 5,700 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description**Foolhen and similar soils**

Composition: 85 percent

Geomorphic description: Stream terrace

Slope: 4 to 8 percent

Elevation: 5,700 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Mucky peat

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Fine-loamy alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Ponding duration: Brief

Available water capacity: Mainly 7.1 inches

Additional Components

Mooseflat and similar soils: 6 percent

Dunkleber and similar soils: 5 percent

Finn and similar soils: 4 percent

6B—Elliston loam, 0 to 2 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Elliston and similar soils

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 3,800 to 5,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Fine-loamy alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Present

Available water capacity: Mainly 8.5 inches

Additional Components

Blossberg and similar soils: 5 percent

Kleinschmidt and similar soils: 4 percent

Carten and similar soils: 3 percent

Elliston, greater slope and similar soils: 3 percent

8B—Danielvil loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,020 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 30 to 70 days

Component Description

Danielvil and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent
Elevation: 5,800 to 6,020 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Coarse-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.0 inches

Additional Components

Maurice and similar soils: 10 percent
 Adel and similar soils: 5 percent

15A—Dunkleber mucky peat, 0 to 2 percent slopes

Map Unit Setting

Elevation: 6,300 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Dunkleber and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 6,300 to 6,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Organic, unspecified
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Ponding duration: Long
Available water capacity: Mainly 13.6 inches

Additional Components

Foolhen and similar soils: 8 percent
 Mooseflat and similar soils: 7 percent

16B—Maciver loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 6,350 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Maciver and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Interfluvium on hill
- Side slope on hill
- Mountainflank on mountain

Slope: 2 to 4 percent

Elevation: 6,350 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly colluvium or gravelly slope alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 13.5 inches

Additional Components

Levengood and similar soils: 5 percent

Libeg and similar soils: 5 percent

Tibson and similar soils: 5 percent

20A—Dougcliff mucky peat, 0 to 2 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,900 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Component Description

Dougcliff and similar soils

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 4,900 to 5,800 feet

Effective annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Surface layer texture: Mucky peat

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Organic, unspecified

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Ponding duration: Very long

Available water capacity: Mainly 20.7 inches

Additional Components

Bushong and similar soils: 10 percent
Water: 5 percent

20B—Eyerbow gravelly loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,300 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Eyerbow and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 15.7 inches

Additional Components

Bridger and similar soils: 15 percent

20C—Eyerbow gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,100 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Eyerbow and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 5,800 to 6,100 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.3 inches

Additional Components

Bridger and similar soils: 15 percent

21C—Maurice loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Maurice and similar soils

Composition: 85 percent
Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 2 to 8 percent
Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Additional Components

Libeg and similar soils: 10 percent
 Redchief and similar soils: 5 percent

21D—Maurice cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Maurice and similar soils

Composition: 85 percent
Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Libeg and similar soils: 10 percent
 Redchief and similar soils: 5 percent

21E—Maurice cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,960 to 8,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Maurice and similar soils

Composition: 85 percent
Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,960 to 8,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Libeg and similar soils: 10 percent
 Redchief and similar soils: 5 percent

22E—Lolon gravelly loam, 4 to 25 percent slopes, bouldery

Map Unit Setting

Elevation: 6,100 to 6,300 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Lolon and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Moraine

Slope: 4 to 25 percent

Elevation: 6,100 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Rock fragments on the soil surface: 0.01 to 0.10 percent boulders

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.0 inches

Additional Components

Adel and similar soils: 5 percent

Finn and similar soils: 5 percent

Water: 5 percent

24B—Con loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,000 to 5,000 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.1 inches

Additional Components

Con, very gravelly and similar soils: 10 percent

Saypo and similar soils: 5 percent

24C—Con loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 4,000 to 5,000 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.2 inches

Additional Components

Con, very gravelly and similar soils: 10 percent

Saypo and similar soils: 5 percent

24D—Con loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,700 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 4,700 to 5,700 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.8 inches

Additional Components

Anaconda and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

Varney and similar soils: 5 percent

25B—Staad silty clay loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Staad and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Drainageway

Slope: 0 to 4 percent

Elevation: 5,600 to 6,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Silty clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 10.6 inches

Additional Components

Martinsdale and similar soils: 5 percent

Perma and similar soils: 5 percent

Quigley and similar soils: 5 percent

25D—Staad silty clay loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Staad and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Drainageway

Slope: 8 to 15 percent
Elevation: 4,700 to 5,800 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Silty clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 10.6 inches

Additional Components

Martinsdale and similar soils: 5 percent
 Perma and similar soils: 5 percent
 Quigley and similar soils: 5 percent

26C—Bearmouth gravelly loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,700 to 6,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Bearmouth and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 2 to 4 percent
Elevation: 5,700 to 6,200 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Available water capacity: Mainly 2.9 inches

Additional Components

Mooseflat and similar soils: 10 percent
 Foolhen and similar soils: 5 percent

30C—Quigg loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,250 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 8 percent

Elevation: 5,900 to 6,250 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Additional Components

Mollet and similar soils: 10 percent

Redchief and similar soils: 5 percent

30D—Quigg loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,250 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,900 to 6,250 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Additional Components

Mollet and similar soils: 10 percent

Redchief and similar soils: 5 percent

30E—Quigg loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,250 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,900 to 6,250 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Additional Components

Mollet and similar soils: 10 percent

Redchief and similar soils: 5 percent

31B—Varney clay loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,700 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,700 to 5,200 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

Additional Components

Anaconda and similar soils: 5 percent
 Con and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

31C—Varney clay loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,000 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.8 inches

Additional Components

Beaverell and similar soils: 5 percent
 Beaverell, cobbly and similar soils: 5 percent
 Varney, cobbly and similar soils: 5 percent

31D—Varney clay loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,700 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

Additional Components

Anaconda and similar soils: 5 percent
 Con and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

32E—Sula-Shook complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,500 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Sula and similar soils

Composition: 45 percent
Geomorphic description:

- Alluvial fan
- Mountainflank on mountain
- Mountainbase on mountain
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,800 to 6,500 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Coarse-loamy colluvium derived from granite or coarse-loamy residuum weathered from granite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

Shook and similar soils

Composition: 40 percent
Geomorphic description: Mountainbase on mountain
Slope: 15 to 35 percent
Elevation: 5,800 to 6,500 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 30 to 40 inches

Drainage class: Well drained

Parent material: Coarse-loamy colluvium derived from granite or coarse-loamy residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.5 inches

Additional Components

Rock outcrop: 10 percent

Libeg and similar soils: 5 percent

32F—Sula-Shook complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Sula and similar soils

Composition: 45 percent

Geomorphic description:

- Alluvial fan
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,800 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Coarse-loamy colluvium derived from granite or coarse-loamy residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

Shook and similar soils

Composition: 40 percent

Geomorphic description: Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,800 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 30 to 40 inches

Drainage class: Well drained

Parent material: Coarse-loamy colluvium derived from granite or coarse-loamy residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 3.5 inches

Additional Components

Rock outcrop: 10 percent

Libeg and similar soils: 5 percent

34B—Cetrack loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,800 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Cetrack and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Outwash plain
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,800 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium over sandy and gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.8 inches

Additional Components

Gregson and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

Varney and similar soils: 5 percent

35B—Anaconda sandy loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,700 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent
 Gregson and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

35C—Anaconda sandy loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,700 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent
 Gregson and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

35D—Anaconda sandy loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 4,700 to 5,200 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent

Gregson and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

36B—Varney-Con loams, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 60 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,000 to 5,000 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 7.0 inches

Con and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,000 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Varney, clay loam and similar soils: 10 percent
 Beaverell and similar soils: 5 percent

36C—Varney-Con loams, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 65 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,700 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.6 inches

Con and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,700 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Sixbeacon and similar soils: 4 percent
 Anaconda and similar soils: 3 percent
 Varney, clay loam and similar soils: 3 percent

36D—Varney-Con loams, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,500 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 60 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,000 to 5,500 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.0 inches

Con and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,000 to 5,500 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Varney, clay loam and similar soils: 10 percent
 Con, cobbly and similar soils: 5 percent

36E—Varney-Con loams, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,700 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 65 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 4,700 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.6 inches

Con and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 4,700 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Sixbeacon and similar soils: 4 percent
 Anaconda and similar soils: 3 percent
 Varney, clay loam and similar soils: 3 percent

36F—Varney-Con loams, 35 to 60 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 60 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent
Elevation: 4,700 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Flooding: None
Available water capacity: Mainly 7.6 inches

Con and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent
Elevation: 4,700 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Anaconda and similar soils: 5 percent
 Cetrack and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

37C—Adel loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,100 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Adel and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Drainageway

Slope: 2 to 8 percent
Elevation: 5,800 to 6,100 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Mixed alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.5 inches

Additional Components

Monad and similar soils: 10 percent
 Libeg and similar soils: 5 percent

39E—Winspect gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,500 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Winspect and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 15 to 35 percent
Elevation: 5,400 to 6,500 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium derived from limestone
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.3 inches

Additional Components

Rock outcrop: 5 percent

Shawmut and similar soils: 5 percent

Winspect, cobbly and similar soils: 5 percent

41C—Perma gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,300 to 6,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent

Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 4 to 8 percent

Elevation: 5,300 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Additional Components

Braziel and similar soils: 5 percent

Shawmut and similar soils: 5 percent

Winspect and similar soils: 5 percent

41D—Perma gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,300 to 6,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent

Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 8 to 15 percent*Elevation:* 5,300 to 6,600 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Gravelly loam*Depth to restrictive feature:* None noted*Drainage class:* Somewhat excessively drained*Parent material:* Gravelly alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.4 inches**Additional Components**

Braziel and similar soils: 5 percent

Shawmut and similar soils: 5 percent

Winspect and similar soils: 5 percent

41F—Perma gravelly loam, 35 to 60 percent slopes**Map Unit Setting***Elevation:* 3,800 to 5,000 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Component Description****Perma and similar soils***Composition:* 85 percent*Geomorphic description:* Alluvial fan*Slope:* 35 to 60 percent*Elevation:* 3,800 to 5,000 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Gravelly loam*Depth to restrictive feature:* None noted*Drainage class:* Somewhat excessively drained*Parent material:* Alluvium and/or colluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.4 inches**Additional Components**

Rock outcrop: 10 percent

Whitlash and similar soils: 5 percent

45B—Redchief cobbly loam, 2 to 4 percent slopes**Map Unit Setting**

Elevation: 5,900 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description**Redchief and similar soils**

Composition: 85 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 2 to 4 percent

Elevation: 5,900 to 7,000 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

Additional Components

Libeg and similar soils: 5 percent

Mollet and similar soils: 5 percent

Rock outcrop: 5 percent

45C—Redchief cobbly loam, 4 to 8 percent slopes**Map Unit Setting**

Elevation: 5,900 to 7,000 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description**Redchief and similar soils**

Composition: 85 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 4 to 8 percent

Elevation: 5,900 to 7,000 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Libeg and similar soils: 5 percent
 Mollet and similar soils: 5 percent
 Rock outcrop: 5 percent

45D—Redchief cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,900 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 85 percent
Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 8 to 15 percent
Elevation: 5,900 to 7,000 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Libeg and similar soils: 5 percent
 Mollet and similar soils: 5 percent
 Rock outcrop: 5 percent

45E—Redchief cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,900 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 85 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 15 to 35 percent*Elevation:* 5,900 to 7,000 feet*Effective annual precipitation:* 15 to 22 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Gravelly clayey colluvium derived from igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.5 inches**Additional Components**

Libeg and similar soils: 5 percent

Mollet and similar soils: 5 percent

Rock outcrop: 5 percent

45F—Redchief cobbly loam, 35 to 60 percent slopes**Map Unit Setting***Elevation:* 5,900 to 7,000 feet*Mean annual precipitation:* 15 to 22 inches*Frost-free period:* 30 to 70 days**Component Description****Redchief and similar soils***Composition:* 85 percent*Geomorphic description:*

- Footslope on hill
- Backslope on hill

Slope: 35 to 60 percent*Elevation:* 5,900 to 7,000 feet*Effective annual precipitation:* 15 to 22 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Gravelly clayey colluvium derived from igneous rocks*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.5 inches**Additional Components**

Libeg and similar soils: 5 percent

Mollet and similar soils: 5 percent

Rock outcrop: 5 percent

46B—Roy gravelly loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,180 to 6,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 2 to 4 percent

Elevation: 5,180 to 6,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Danvers and similar soils: 8 percent

Shawmut and similar soils: 7 percent

46C—Roy gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,180 to 6,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 4 to 8 percent

Elevation: 5,180 to 6,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Danvers and similar soils: 8 percent

Shawmut and similar soils: 7 percent

46D—Roy gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,180 to 6,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,180 to 6,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Danvers and similar soils: 8 percent

Shawmut and similar soils: 7 percent

46E—Roy gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,180 to 6,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,180 to 6,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Danvers and similar soils: 8 percent

Shawmut and similar soils: 7 percent

46F—Roy gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,180 to 6,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,180 to 6,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Danvers and similar soils: 8 percent
Shawmut and similar soils: 7 percent

47C—Bridger cobbly loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Bridger and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 8 percent
Elevation: 5,900 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Additional Components

Donald and similar soils: 5 percent
Eyerbow and similar soils: 5 percent
Redchief and similar soils: 5 percent

47D—Bridger cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Bridger and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 5,900 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Additional Components

Donald and similar soils: 5 percent
 Eyebow and similar soils: 5 percent
 Redchief and similar soils: 5 percent

47E—Bridger cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Bridger and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,900 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Additional Components

Donald and similar soils: 5 percent
 Eyebow and similar soils: 5 percent
 Redchief and similar soils: 5 percent

48C—Mollet loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Mollet and similar soils

Composition: 85 percent

Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 2 to 8 percent

Elevation: 6,000 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Redchief and similar soils: 10 percent

Libeg and similar soils: 5 percent

48D—Mollet loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,600 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Mollet and similar soils

Composition: 85 percent

Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 8 to 15 percent

Elevation: 6,000 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Redchief and similar soils: 10 percent

Libeg and similar soils: 5 percent

48E—Mollet loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Mollet and similar soils

Composition: 85 percent
Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 15 to 35 percent
Elevation: 6,000 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.0 inches

Additional Components

Redchief and similar soils: 10 percent
 Libeg and similar soils: 5 percent

49B—Danvers clay loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent
Elevation: 5,600 to 6,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Additional Components

Martinsdale and similar soils: 8 percent

Roy and similar soils: 7 percent

49E—Danvers clay loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,600 to 6,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Additional Components

Martinsdale and similar soils: 8 percent

Roy and similar soils: 7 percent

50C—Monad loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Monad and similar soils

Composition: 85 percent

Geomorphic description: Stream terrace

Slope: 2 to 8 percent

Elevation: 5,900 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.1 inches

Additional Components

Adel and similar soils: 5 percent
 Libeg and similar soils: 5 percent
 Mollet and similar soils: 5 percent

50D—Monad loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Monad and similar soils

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 8 to 15 percent
Elevation: 5,900 to 6,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.1 inches

Additional Components

Adel and similar soils: 5 percent
 Libeg and similar soils: 5 percent
 Mollet and similar soils: 5 percent

51B—Shawmut gravelly loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent

Elevation: 5,200 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Quigley and similar soils: 5 percent

51C—Shawmut gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 5,200 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent

Quigley and similar soils: 5 percent

Shawmut, cobbly and similar soils: 5 percent

51D—Shawmut gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent
 Quigley and similar soils: 5 percent

51E—Shawmut gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Quigley and similar soils: 5 percent

51F—Shawmut gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,200 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Quigley and similar soils: 5 percent

52B—Martinsdale loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

Additional Components

Danvers and similar soils: 5 percent
 Quigley and similar soils: 5 percent
 Shawmut and similar soils: 5 percent

52C—Martinsdale loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

Additional Components

Danvers and similar soils: 5 percent
 Quigley and similar soils: 5 percent
 Shawmut and similar soils: 5 percent

52D—Martinsdale loam, 8 to 15 percent slopes**Map Unit Setting**

Elevation: 4,400 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description**Martinsdale and similar soils**

Composition: 85 percent

Geomorphic description: Alluvial fan

Slope: 8 to 15 percent

Elevation: 4,400 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.2 inches

Additional Components

Martinsdale, greater slope and similar soils: 5 percent

Martinsdale, cobbly and similar soils: 5 percent

Shawmut and similar soils: 5 percent

52E—Martinsdale loam, 15 to 35 percent slopes**Map Unit Setting**

Elevation: 5,200 to 6,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description**Martinsdale and similar soils**

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,200 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.2 inches

Additional Components

Danvers and similar soils: 5 percent
 Quigley and similar soils: 5 percent
 Shawmut and similar soils: 5 percent

54B—Libeg gravelly loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 2 to 4 percent

Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent
 Finn and similar soils: 5 percent
 Mollet and similar soils: 5 percent

54C—Libeg gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,400 to 7,800 feet
Mean annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 4 to 8 percent
Elevation: 5,400 to 7,800 feet
Effective annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhagen and similar soils: 5 percent
 Finn and similar soils: 5 percent
 Mollet and similar soils: 5 percent

54D—Libeg gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 8 to 15 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhagen and similar soils: 5 percent
 Mollet and similar soils: 5 percent
 Rock outcrop: 5 percent

54E—Libeg gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,400 to 7,800 feet
Mean annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,400 to 7,800 feet

Effective annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent

Mollet and similar soils: 5 percent

Rock outcrop: 5 percent

54F—Libeg gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,400 to 8,200 feet
Mean annual precipitation: 15 to 25 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent

Elevation: 5,400 to 8,200 feet

Effective annual precipitation: 15 to 25 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent
 Redchief and similar soils: 5 percent
 Rock outcrop: 5 percent

55D—Maciver gravelly loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Maciver and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Interfluvium on hill
- Side slope on hill
- Mountainflank on mountain

Slope: 8 to 15 percent

Elevation: 5,400 to 6,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly colluvium or gravelly slope alluvium
Flooding: None
Available water capacity: Mainly 13.2 inches

Additional Components

Libeg and similar soils: 8 percent
 Tibson and similar soils: 7 percent

55E—Maciver gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Maciver and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Interfluvium on hill
- Side slope on hill
- Mountainflank on mountain

Slope: 15 to 35 percent

Elevation: 5,400 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly colluvium or gravelly slope alluvium

Flooding: None

Available water capacity: Mainly 13.2 inches

Additional Components

Libeg and similar soils: 8 percent

Tibson and similar soils: 7 percent

59D—Tewfel-Hackney complex, 4 to 15 percent slopes

Map Unit Setting

Elevation: 5,500 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Tewfel and similar soils

Composition: 50 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 4 to 15 percent

Elevation: 5,500 to 6,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Clay loam

Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Shale

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Hackney and similar soils

Composition: 35 percent

Geomorphic description: Shoulder on hill

Slope: 4 to 15 percent

Elevation: 5,500 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (paralithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Shale
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Additional Components

Rock outcrop: 5 percent
 Tewfel, greater slope and similar soils: 5 percent
 Winspect and similar soils: 5 percent

59E—Tewfel-Hackney complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,500 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Tewfel and similar soils

Composition: 50 percent
Geomorphic description:

- Foothlope on hill
- Backslope on hill

Slope: 15 to 35 percent
Elevation: 5,500 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Shale
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Hackney and similar soils

Composition: 35 percent
Geomorphic description: Shoulder on hill
Slope: 15 to 35 percent
Elevation: 5,500 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (paralithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Shale
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.2 inches

Additional Components

Hackney, greater slope and similar soils: 5 percent

Rock outcrop: 5 percent

Winspect and similar soils: 5 percent

60B—Quigley loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,360 to 6,020 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Quigley and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Outwash plain
- Stream terrace

Slope: 2 to 4 percent

Elevation: 5,360 to 6,020 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.9 inches

Additional Components

Danvers and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Shawmut and similar soils: 5 percent

60C—Quigley loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Quigley and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent*Elevation:* 3,800 to 5,800 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 7.1 inches**Additional Components**

Perma and similar soils: 4 percent

Quigley, greater slope and similar soils: 4 percent

Quigley, calcareous and similar soils: 4 percent

Quigley, cobbly and similar soils: 3 percent

60D—Quigley loam, 8 to 15 percent slopes**Map Unit Setting***Elevation:* 3,800 to 5,800 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Component Description****Quigley and similar soils***Composition:* 85 percent*Geomorphic description:* Alluvial fan*Slope:* 8 to 15 percent*Elevation:* 3,800 to 5,800 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 7.1 inches**Additional Components**

Perma and similar soils: 4 percent

Quigley, greater slope and similar soils: 4 percent

Quigley, calcareous and similar soils: 4 percent

Quigley, cobbly and similar soils: 3 percent

66E—Bata gravelly ashy loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,300 to 7,400 feet

Mean annual precipitation: 25 to 40 inches

Frost-free period: 30 to 70 days

Component Description

Bata and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 15 to 35 percent

Elevation: 6,300 to 7,400 feet

Effective annual precipitation: 25 to 40 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Belt colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Evoro and similar soils: 5 percent

Holloway and similar soils: 5 percent

Worock and similar soils: 5 percent

68D—Phillcher gravelly ashy silt loam, 4 to 15 percent slopes

Map Unit Setting

Elevation: 7,000 to 8,720 feet

Mean annual precipitation: 26 to 40 inches

Frost-free period: 20 to 40 days

Component Description

Phillcher and similar soils

Composition: 85 percent

Geomorphic description: Mountaintop on mountain slope

Slope: 4 to 15 percent

Elevation: 7,000 to 8,720 feet

Effective annual precipitation: 26 to 40 inches

Frost-free period: 20 to 40 days

Surface layer texture: Gravelly ashy silt loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Sandy and silty volcanic ash over gravelly colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.6 inches

Additional Components

Rock outcrop: 10 percent

Holloway and similar soils: 5 percent

68E—Phillcher gravelly ashy silt loam, 15 to 45 percent slopes

Map Unit Setting

Elevation: 7,000 to 8,720 feet

Mean annual precipitation: 26 to 40 inches

Frost-free period: 20 to 40 days

Component Description

Phillcher and similar soils

Composition: 85 percent

Geomorphic description: Mountaintop on mountain slope

Slope: 15 to 45 percent

Elevation: 7,000 to 8,720 feet

Effective annual precipitation: 26 to 40 inches

Frost-free period: 20 to 40 days

Surface layer texture: Gravelly ashy silt loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Sandy and silty volcanic ash over gravelly colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.6 inches

Additional Components

Rock outcrop: 10 percent

Holloway and similar soils: 5 percent

75E—Hanson gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Hanson and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,800 to 7,800 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Tibson and similar soils: 6 percent

Levengood and similar soils: 5 percent

Rock outcrop: 4 percent

75F—Hanson gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Hanson and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 5,800 to 7,800 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Tibson and similar soils: 6 percent

Levengood and similar soils: 5 percent

Rock outcrop: 4 percent

76B—Tibson gravelly loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 2 to 4 percent

Elevation: 5,800 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Levengood and similar soils: 8 percent

Maciver and similar soils: 7 percent

76C—Tibson gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 4 to 8 percent

Elevation: 5,800 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Levengood and similar soils: 8 percent

Maciver and similar soils: 7 percent

76D—Tibson gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 8 to 15 percent

Elevation: 5,800 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Levengood and similar soils: 8 percent

Maciver and similar soils: 7 percent

76E—Tibson gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 15 to 35 percent

Elevation: 5,800 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Levengood and similar soils: 8 percent
 Maciver and similar soils: 7 percent

76F—Tibson gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent
Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Levengood and similar soils: 8 percent
 Maciver and similar soils: 7 percent

78D—Rumsey gravelly ashy silt loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 6,400 to 6,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Rumsey and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainbase on mountain
- Mountainflank on mountain

Slope: 8 to 15 percent*Elevation:* 6,400 to 6,600 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Gravelly ashy silt loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Sandy and silty volcanic ash over gravelly colluvium derived from limestone, unspecified*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.3 inches**Additional Components**

Bata and similar soils: 5 percent

Elve and similar soils: 5 percent

Evaro and similar soils: 5 percent

78E—Rumsey gravelly ashy silt loam, 15 to 35 percent slopes**Map Unit Setting***Elevation:* 6,400 to 6,600 feet*Mean annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days**Component Description****Rumsey and similar soils***Composition:* 85 percent*Geomorphic description:*

- Mountainbase on mountain
- Mountainflank on mountain

Slope: 15 to 35 percent*Elevation:* 6,400 to 6,600 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Gravelly ashy silt loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Sandy and silty volcanic ash over gravelly colluvium derived from limestone, unspecified*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 5.3 inches**Additional Components**

Bata and similar soils: 5 percent

Elve and similar soils: 5 percent

Evaro and similar soils: 5 percent

81E—Holloway gravelly ashy silt loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Holloway and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy silt loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.5 inches

Additional Components

Evano and similar soils: 8 percent
 Rumsey and similar soils: 7 percent

81F—Holloway gravelly ashy silt loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Holloway and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy silt loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.5 inches

Additional Components

Evandro and similar soils: 8 percent
Rumsey and similar soils: 7 percent

82D—Elve gravelly loam, 4 to 15 percent slopes

Map Unit Setting

Elevation: 5,600 to 8,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 4 to 15 percent
Elevation: 5,600 to 8,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Evandro and similar soils: 5 percent
Rock outcrop: 5 percent
Worock and similar soils: 5 percent

82E—Elve gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 8,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,600 to 8,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Evapo and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

82F—Elve gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,600 to 8,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,600 to 8,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Evapo and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

82G—Elve gravelly loam, 60 to 80 percent slopes

Map Unit Setting

Elevation: 5,800 to 8,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 60 to 80 percent
Elevation: 5,800 to 8,000 feet
Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Evoro and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

84C—Helmville cobbly loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 6,500 to 6,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Helmville and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 2 to 8 percent
Elevation: 6,500 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Relyea and similar soils: 5 percent
 Rock outcrop: 5 percent
 Whitore and similar soils: 5 percent

84D—Helmville cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Helmville and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 8 to 15 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Additional Components

Relyea and similar soils: 5 percent

Rock outcrop: 5 percent

Whitore and similar soils: 5 percent

84E—Helmville cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Helmville and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,800 to 7,500 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Additional Components

Relyea and similar soils: 5 percent

Rock outcrop: 5 percent

Whitore and similar soils: 5 percent

84F—Helmville cobbly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Helmville and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Relyea and similar soils: 5 percent
 Rock outcrop: 5 percent
 Whitore and similar soils: 5 percent

85D—Loberg gravelly loam, 4 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Loberg and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 4 to 15 percent
Elevation: 5,800 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.7 inches

Additional Components

Danaher and similar soils: 6 percent

Worock and similar soils: 5 percent

Foolhen and similar soils: 4 percent

85E—Loberg gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Loberg and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 15 to 35 percent

Elevation: 5,800 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.7 inches

Additional Components

Danaher and similar soils: 5 percent

Worock and similar soils: 4 percent

Foolhen and similar soils: 3 percent

Rock outcrop: 3 percent

85F—Loberg gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Loberg and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 35 to 60 percent
Elevation: 5,800 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Danaher and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

86D—Winkler gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Winkler and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 5,400 to 6,200 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

Additional Components

Rock outcrop: 8 percent
 Bignell and similar soils: 7 percent

86E—Winkler gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Winkler and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,400 to 6,200 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

Additional Components

Rock outcrop: 8 percent
 Bignell and similar soils: 7 percent

86F—Winkler gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Winkler and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,400 to 6,200 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

Additional Components

Yreka and similar soils: 10 percent
 Rock outcrop: 5 percent

87D—Danaher loam, 4 to 15 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Danaher and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 4 to 15 percent
Elevation: 6,000 to 6,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey alluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 8.6 inches

Additional Components

Foolhen and similar soils: 5 percent
 Loberg and similar soils: 5 percent
 Worock and similar soils: 5 percent

87E—Danaher loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Danaher and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,000 to 6,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey alluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 8.6 inches

Additional Components

Foolhen and similar soils: 5 percent
 Loberg and similar soils: 5 percent
 Worock and similar soils: 5 percent

88F—Whitecow gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,200 to 7,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Whitecow and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,200 to 7,200 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Trapps and similar soils: 8 percent
 Rock outcrop: 7 percent

91D—Mohaggin stony ashy very fine sandy loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 7,800 to 9,000 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 7,800 to 9,000 feet
Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy very fine sandy loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Additional Components

Mohaggin, greater slope and similar soils: 5 percent
 Rubble land: 5 percent
 Comad and similar soils: 3 percent
 Mooseflat and similar soils: 2 percent

91E—Mohaggin stony ashy very fine sandy loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 7,800 to 9,000 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 7,800 to 9,000 feet
Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Additional Components

Mohaggin, greater slope and similar soils: 5 percent
 Rubble land: 5 percent
 Comad and similar soils: 3 percent
 Mooseflat and similar soils: 2 percent

91F—Mohaggin stony ashy very fine sandy loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 7,600 to 9,000 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 7,600 to 9,000 feet

Effective annual precipitation: 22 to 40 inches

Frost-free period: 30 to 70 days

Surface layer texture: Stony ashy very fine sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Volcanic ash over colluvium derived from granite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.9 inches

Additional Components

Mohaggin, bouldery and similar soils: 5 percent

Rubble land: 5 percent

Comad and similar soils: 3 percent

Mooseflat and similar soils: 2 percent

92C—Whitore gravelly loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,600 feet

Mean annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 2 to 8 percent

Elevation: 5,800 to 6,600 feet

Effective annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.8 inches

Additional Components

Helmville and similar soils: 8 percent

Rock outcrop: 7 percent

92D—Whitore gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,600 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 5,800 to 6,600 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

Additional Components

Helmville and similar soils: 8 percent
 Rock outcrop: 7 percent

92E—Whitore gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,400 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 7,400 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

Additional Components

Helmville and similar soils: 8 percent
Rock outcrop: 7 percent

92F—Whitore gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,400 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 7,400 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

Additional Components

Helmville and similar soils: 8 percent
Rock outcrop: 7 percent

95D—Yreka gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,600 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Yreka and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 5,200 to 6,600 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

Additional Components

Bignell and similar soils: 5 percent
 Winkler and similar soils: 5 percent
 Yreka, greater slope and similar soils: 5 percent

95E—Yreka gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Yreka and similar soils

Composition: 85 percent
Geomorphic description: Mountain
Slope: 15 to 35 percent
Elevation: 4,000 to 6,500 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.8 inches

Additional Components

Winkler and similar soils: 7 percent
 Rock outcrop: 5 percent
 Rubble land: 3 percent

95F—Yreka gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,600 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Yreka and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,200 to 6,600 feet
Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

Additional Components

Bignell and similar soils: 5 percent
 Winkler and similar soils: 5 percent
 Yreka, lesser slope and similar soils: 5 percent

96D—Worock gravelly loam, 4 to 15 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,100 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 4 to 15 percent
Elevation: 6,300 to 8,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Elve and similar soils: 5 percent
 Loberg and similar soils: 4 percent
 Danaher and similar soils: 3 percent
 Evaro and similar soils: 3 percent

96E—Worock gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 8,100 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,600 to 8,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Elve and similar soils: 5 percent
 Loberg and similar soils: 4 percent
 Danaher and similar soils: 3 percent
 Evaro and similar soils: 3 percent

96F—Worock gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,600 to 8,100 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,600 to 8,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Elve and similar soils: 5 percent
 Evaro and similar soils: 4 percent
 Danaher and similar soils: 3 percent
 Loberg and similar soils: 3 percent

97C—Evaro gravelly ashy loam, 4 to 8 percent slopes**Map Unit Setting**

Elevation: 6,000 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description**Evaro and similar soils**

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 4 to 8 percent

Elevation: 6,000 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Sandy and silty volcanic ash over gravelly colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.2 inches

Additional Components

Elve and similar soils: 5 percent

Holloway and similar soils: 5 percent

Worock and similar soils: 5 percent

97D—Evaro gravelly ashy loam, 8 to 15 percent slopes**Map Unit Setting**

Elevation: 6,400 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description**Evaro and similar soils**

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 8 to 15 percent

Elevation: 6,400 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Sandy and silty volcanic ash over gravelly colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.2 inches

Additional Components

Elve and similar soils: 5 percent
 Holloway and similar soils: 5 percent
 Worock and similar soils: 5 percent

97E—Evaro gravelly ashy loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,400 to 8,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,400 to 8,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Holloway and similar soils: 4 percent
 Rock outcrop: 4 percent
 Worock and similar soils: 4 percent
 Elve and similar soils: 3 percent

97F—Evaro gravelly ashy loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,650 to 8,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,650 to 8,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Rock outcrop: 5 percent
 Elve and similar soils: 3 percent
 Holloway and similar soils: 3 percent
 Worock and similar soils: 3 percent
 Rubble land: 1 percent

98F—Trapps gravelly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Trapps and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 35 to 60 percent
Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium or gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.0 inches

Additional Components

Rock outcrop: 5 percent
 Silverchief and similar soils: 5 percent
 Whitecow and similar soils: 5 percent

99E—Bignell gravelly clay loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,560 to 6,000 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Bignell and similar soils

Composition: 85 percent

Geomorphic description:

- Moraine
- Mountain slope

Slope: 15 to 35 percent

Elevation: 5,560 to 6,000 feet

Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Colluvium and/or till

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Rock outcrop: 5 percent

Yreka, greater slope and similar soils: 5 percent

Yreka and similar soils: 5 percent

100—Rubble land-Rock outcrop complex

Component Description

Rubble land

Composition: 65 percent

Definition: Rubble land consists of areas of boulders, stones, and cobbles.

Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Rock outcrop

Composition: 35 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

102—Pits, gravel

Component Description

Pits, gravel

Composition: 100 percent

Definition: This component consists of open excavations from which soil and commonly underlying material have been removed, exposing either rock or other material.

103—Dumps, mine

Component Description

Dumps, mine

Composition: 100 percent

Definition: Dumps, mine consist of areas of waste rock from mines, quarries, and smelters.

104A—Fluvaquentic Endoaquolls-Slickens complex, 0 to 2 percent slopes, severely impacted

Map Unit Setting

Elevation: 4,600 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Fluvaquentic Endoaquolls and similar soils

Composition: 75 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 4,600 to 5,000 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Fine sandy loam

Depth to restrictive feature: None noted

Drainage class: Poorly drained

Parent material: Alluvium

Flooding: Occasional

Water table: Present

Available water capacity: Mainly 6.1 inches

Slickens

Composition: 10 percent

Definition: Slickens are accumulations of fine-textured material, such as that separated in placer mine and ore mill operations. Slickens from ore mills consist largely of freshly ground rock that commonly has undergone chemical treatment during the milling process.

Additional Components

Aquic Cumulic Haplustolls and similar soils: 5 percent

Mccabe and similar soils: 3 percent

Saypo and similar soils: 3 percent

Canarway and similar soils: 2 percent

Riverwash: 1 percent

Water: 1 percent

105A—Slickens-Fluvaquentic Endoaquolls complex, 0 to 2 percent slopes, severely impacted

Map Unit Setting

Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Slickens

Composition: 50 percent
Definition: Slickens are accumulations of fine-textured material, such as that separated in placer mine and ore mill operations. Slickens from ore mills consist largely of freshly ground rock that commonly has undergone chemical treatment during the milling process.

Fluvaquentic Endoaquolls and similar soils

Composition: 35 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,600 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 6.1 inches

Additional Components

Aquic Cumulic Haplustolls and similar soils: 5 percent
 McCabe and similar soils: 3 percent
 Saypo and similar soils: 3 percent
 Canarway and similar soils: 2 percent
 Riverwash: 1 percent
 Water: 1 percent

106—Slickens

Component Description

Slickens

Composition: 85 percent
Definition: Slickens are accumulations of fine-textured material, such as that separated in placer mine and ore mill operations. Slickens from ore mills consist largely of freshly ground rock that commonly has undergone chemical treatment during the milling process.

Additional Components

Dumps, mine: 15 percent

107A—Aquic Cumulic Haplustolls-Aridic Ustifluvents-Slickens complex, 0 to 2 percent slopes, severely impacted

Map Unit Setting

Elevation: 4,700 to 5,100 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Aquic Cumulic Haplustolls and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,700 to 5,100 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Mixed alluvium
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 8.5 inches

Aridic Ustifluvents and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,700 to 5,100 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Stratified loamy sand to loam
Depth to restrictive feature: None noted
Drainage class: Moderately well drained
Parent material: Mixed alluvium
Native plant cover type: Forest land
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 7.1 inches

Slickens

Composition: 20 percent
Definition: Slickens are accumulations of fine-textured material, such as that separated in placer mine and ore mill operations. Slickens from ore mills consist largely of freshly ground rock that commonly has undergone chemical treatment during the milling process.

Additional Components

Canarway and similar soils: 5 percent
 McCabe and similar soils: 5 percent
 Gregson and similar soils: 3 percent
 Riverwash: 2 percent

108A—Slickens-Aridic Ustifluvents-Aquic Cumulic Haplustolls complex, 0 to 2 percent slopes, severely impacted

Map Unit Setting

Elevation: 4,700 to 5,100 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 70 to 105 days

Component Description

Slickens

Composition: 50 percent

Definition: Slickens are accumulations of fine-textured material, such as that separated in placer mine and ore mill operations. Slickens from ore mills consist largely of freshly ground rock that commonly has undergone chemical treatment during the milling process.

Aridic Ustifluvents and similar soils

Composition: 20 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 4,700 to 5,100 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Fine sandy loam

Depth to restrictive feature: None noted

Drainage class: Moderately well drained

Parent material: Mixed alluvium

Native plant cover type: Forest land

Flooding: Occasional

Water table: Present

Available water capacity: Mainly 5.9 inches

Aquic Cumulic Haplustolls and similar soils

Composition: 20 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 4,700 to 5,100 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 70 to 105 days

Surface layer texture: Fine sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Alluvium

Flooding: Occasional

Water table: Present

Available water capacity: Mainly 9.6 inches

Additional Components

Aeric Fluvaquents and similar soils: 5 percent

Aquic Haplustolls and similar soils: 3 percent

Riverwash: 2 percent

110A—Carten-Wetsand complex, 0 to 2 percent slopes**Map Unit Setting**

Elevation: 4,200 to 6,000 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description**Carten and similar soils**

Composition: 45 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,200 to 6,000 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.4 inches

Wetsand and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,200 to 6,000 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Salt affected: Saline within 30 inches
Available water capacity: Mainly 3.8 inches

Additional Components

Water: 6 percent
 Riverwash: 5 percent
 Carten, greater slope and similar soils: 4 percent

114A—Mooseflat loam, 0 to 2 percent slopes**Map Unit Setting**

Elevation: 5,700 to 6,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Mooseflat and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,200 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Additional Components

Dunkleber and similar soils: 5 percent
 Foolhen and similar soils: 5 percent
 Mooseflat and similar soils: 5 percent

116A—Eine-Nana complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,100 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Ein and similar soils

Composition: 55 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,800 to 6,100 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Sandy and gravelly alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 3.6 inches

Nana and similar soils

Composition: 30 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,800 to 6,100 feet
Effective annual precipitation: 15 to 19 inches

Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 5.0 inches

Additional Components

Zelda and similar soils: 10 percent
 Water: 3 percent
 Riverwash: 2 percent

117A—Zelda-Nana-Foolhen complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,100 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Zelda and similar soils

Composition: 30 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,800 to 6,100 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 6.4 inches

Nana and similar soils

Composition: 30 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,800 to 6,100 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained

Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 5.0 inches

Foolhen and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,800 to 6,100 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 7.1 inches

Additional Components

Eine and similar soils: 5 percent
 Mooseflat and similar soils: 5 percent
 Water: 5 percent

120C—Eyerbow-Donald cobbly loams, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Eyerbow and similar soils

Composition: 50 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 8 percent
Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 9.3 inches

Donald and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 8 percent
Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.4 inches

Additional Components

Bridger and similar soils: 5 percent
 Quigg and similar soils: 5 percent

120D—Eyebrow-Donald cobbly loams, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Eyebrow and similar soils

Composition: 50 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 5,800 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.3 inches

Donald and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent*Elevation:* 5,800 to 6,400 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Clayey calcareous alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 8.4 inches**Additional Components**

Bridger and similar soils: 5 percent

Quigg and similar soils: 5 percent

120E—Eyebow-Donald complex, 15 to 35 percent slopes**Map Unit Setting***Elevation:* 5,800 to 6,400 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 30 to 70 days**Component Description****Eyebow and similar soils***Composition:* 50 percent*Geomorphic description:*

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent*Elevation:* 5,800 to 6,400 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Gravelly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Clayey calcareous alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 9.3 inches**Donald and similar soils***Composition:* 40 percent*Geomorphic description:*

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent*Elevation:* 5,800 to 6,400 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 30 to 70 days

Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.4 inches

Additional Components

Bridger and similar soils: 5 percent
 Quigg and similar soils: 5 percent

121B—Maurice-Danielvil complex, 2 to 4 percent slopes

Map Unit Setting

Elevation: 5,700 to 7,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Maurice and similar soils

Composition: 55 percent
Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 2 to 4 percent
Elevation: 5,700 to 7,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Danielvil and similar soils

Composition: 30 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent
Elevation: 5,800 to 6,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Coarse-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.0 inches

Additional Components

Adel and similar soils: 5 percent
 Foolhen and similar soils: 5 percent
 Monad and similar soils: 5 percent

127D—Julius clay loam, 8 to 15 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,300 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Julius and similar soils

Composition: 90 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 5,300 to 6,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Arlen and similar soils: 5 percent
 Julius, greater slope and similar soils: 5 percent

129C—Wimper-Winspect complex, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,440 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Wimper and similar soils

Composition: 50 percent
Geomorphic description:

- Mountainbase on mountain
- Mountainflank on mountain

Slope: 4 to 8 percent
Elevation: 5,440 to 6,600 feet
Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium or gravelly colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.7 inches

Winspect and similar soils

Composition: 35 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 4 to 8 percent
Elevation: 5,440 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium derived from limestone
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 6.3 inches

Additional Components

Staad and similar soils: 5 percent
 Wimper, greater slope and similar soils: 5 percent
 Winspect, greater slope and similar soils: 5 percent

129E—Wimper-Winspect complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,440 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Wimper and similar soils

Composition: 50 percent
Geomorphic description:

- Mountainbase on mountain
- Mountainflank on mountain

Slope: 15 to 35 percent
Elevation: 5,440 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Calcareous gravelly alluvium or gravelly colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.7 inches

Winspect and similar soils

Composition: 35 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 15 to 35 percent

Elevation: 5,440 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Colluvium derived from limestone

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 6.3 inches

Additional Components

Perma and similar soils: 8 percent

Rock outcrop: 7 percent

131C—Varney cobbly clay loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 4,700 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.3 inches

Additional Components

Con and similar soils: 8 percent

Sixbeacon and similar soils: 7 percent

131D—Varney cobbly clay loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 4,700 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.3 inches

Additional Components

Con and similar soils: 8 percent

Sixbeacon and similar soils: 7 percent

131E—Varney cobbly clay loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 4,700 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.3 inches

Additional Components

Anaconda and similar soils: 8 percent
Sixbeacon and similar soils: 7 percent

131F—Varney cobbly clay loam, 35 to 50 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 50 percent
Elevation: 4,700 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Additional Components

Anaconda and similar soils: 8 percent
Sixbeacon and similar soils: 7 percent

132B—Beaverell cobbly loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,700 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Additional Components

Con and similar soils: 10 percent
 Gregson and similar soils: 5 percent

132C—Beaverell cobbly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,700 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Additional Components

Con and similar soils: 10 percent
 Gregson and similar soils: 5 percent

134C—Cetrack loam, 4 to 8 percent slopes, severely impacted

Map Unit Setting

Elevation: 4,900 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Cetrack and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Outwash plain
- Stream terrace

Slope: 4 to 8 percent*Elevation:* 4,900 to 5,600 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days*Surface layer texture:* Loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Fine-loamy alluvium over sandy and gravelly alluvium*Flooding:* None*Available water capacity:* Mainly 5.8 inches**Additional Components**

Beaverell and similar soils: 5 percent

Reclaimed Areas and similar soils: 5 percent

Severely Disturbed Areas and similar soils: 5 percent

136E—Varney-Con complex, 15 to 35 percent slopes**Map Unit Setting***Elevation:* 4,700 to 5,400 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days**Component Description****Varney and similar soils***Composition:* 65 percent*Geomorphic description:*

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent*Elevation:* 4,700 to 5,400 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Fine-loamy calcareous alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 7.3 inches**Con and similar soils***Composition:* 25 percent*Geomorphic description:*

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent*Elevation:* 4,700 to 5,400 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days

Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Sixbeacon and similar soils: 10 percent

136F—Varney-Con complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 60 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 50 percent
Elevation: 4,700 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Con and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent
Elevation: 4,700 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Aridic Ustorthents, fine and similar soils: 8 percent

Sixbeacon and similar soils: 7 percent

137B—Sixbeacon cobbly loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,800 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,700 to 5,800 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.3 inches

Additional Components

Con and similar soils: 10 percent

Anaconda and similar soils: 5 percent

137C—Sixbeacon cobbly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 3,800 to 5,200 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Sixbeacon, gravelly and similar soils: 8 percent
 Cetrack and similar soils: 7 percent

137D—Sixbeacon cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description: Alluvial fan
Slope: 8 to 15 percent
Elevation: 3,800 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Sixbeacon, gravelly and similar soils: 8 percent
 Cetrack and similar soils: 7 percent

145C—Redchief-Mollet complex, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 50 percent

Geomorphic description:

- Foothlope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 4 to 8 percent

Elevation: 5,800 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Mollet and similar soils

Composition: 35 percent

Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 4 to 8 percent

Elevation: 5,800 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Libeg and similar soils: 8 percent

Maciver and similar soils: 7 percent

145D—Redchief-Mollet complex, 8 to 15 percent slopes**Map Unit Setting**

Elevation: 5,600 to 6,700 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description**Redchief and similar soils**

Composition: 50 percent

Geomorphic description:

- Foothlope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 8 to 15 percent

Elevation: 5,600 to 6,700 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Mollet and similar soils

Composition: 35 percent

Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 8 to 15 percent

Elevation: 5,600 to 6,700 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Libeg and similar soils: 8 percent

Maciver and similar soils: 7 percent

145E—Redchief-Mollet complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,700 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 50 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 15 to 35 percent

Elevation: 5,600 to 6,700 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

Mollet and similar soils

Composition: 35 percent
Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 15 to 35 percent
Elevation: 5,600 to 6,700 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.0 inches

Additional Components

Libeg and similar soils: 8 percent
 Maciver and similar soils: 7 percent

148C—Mollet cobbly loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 6,200 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Mollet and similar soils

Composition: 85 percent
Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 2 to 8 percent
Elevation: 6,200 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey alluvium
Flooding: None
Available water capacity: Mainly 7.7 inches

Additional Components

Monad and similar soils: 8 percent

Adel and similar soils: 7 percent

148D—Mollet cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 6,200 to 6,600 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Mollet and similar soils

Composition: 85 percent

Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 8 to 15 percent

Elevation: 6,200 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Flooding: None

Available water capacity: Mainly 7.7 inches

Additional Components

Monad and similar soils: 8 percent

Adel and similar soils: 7 percent

151D—Shawmut cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,100 to 6,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent
 Roy and similar soils: 5 percent

151E—Shawmut cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,100 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,100 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent
 Roy and similar soils: 5 percent

151F—Shawmut cobbly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,100 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.5 inches

Additional Components

Danvers and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Roy and similar soils: 5 percent

152C—Clasoil sandy loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 3,500 to 5,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 3,500 to 5,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium and/or colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.2 inches

Additional Components

Crackerville and similar soils: 8 percent

Clasoil, greater slope and similar soils: 7 percent

152D—Clasoil sandy loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.2 inches

Additional Components

Crackerville and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Rock outcrop: 5 percent

154E—Libeg cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,750 to 7,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,750 to 7,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent
 Finn and similar soils: 5 percent
 Rock outcrop: 5 percent

154F—Libeg cobbly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,750 to 7,400 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent
Elevation: 5,750 to 7,400 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent
 Finn and similar soils: 5 percent
 Rock outcrop: 5 percent

176D—Tibson-Levengood gravelly loams, 8 to 15 percent slopes

Map Unit Setting

Elevation: 6,000 to 7,200 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 55 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 8 to 15 percent

Elevation: 6,000 to 7,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Levengood and similar soils

Composition: 30 percent

Geomorphic description: Mountainflank on mountain

Slope: 8 to 15 percent

Elevation: 6,000 to 7,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.8 inches

Additional Components

Libeg and similar soils: 5 percent

Maciver and similar soils: 5 percent

Rock outcrop: 5 percent

176F—Tibson-Levengood gravelly loams, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,000 to 7,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 55 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 6,000 to 7,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Levengood and similar soils

Composition: 30 percent

Geomorphic description: Mountainflank on mountain

Slope: 35 to 60 percent

Elevation: 6,000 to 7,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.8 inches

Additional Components

Libeg and similar soils: 5 percent

Maciver and similar soils: 5 percent

Rock outcrop: 5 percent

179E—Ambrant-Rochester complex, 15 to 35 percent slopes**Map Unit Setting**

Elevation: 5,000 to 6,800 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Component Description**Ambrant and similar soils**

Composition: 50 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,000 to 6,800 feet

Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days
Surface layer texture: Stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Granitics
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.6 inches

Rochester and similar soils

Composition: 35 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,000 to 6,800 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Granitics
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.4 inches

Additional Components

Bignell and similar soils: 8 percent
 Rock outcrop: 7 percent

179F—Ambrant-Rochester complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,000 to 6,800 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Ambrant and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,000 to 6,800 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Granitics
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.6 inches

Rochester and similar soils

Composition: 35 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,000 to 6,800 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Granitics
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.4 inches

Additional Components

Bignell and similar soils: 8 percent
 Rock outcrop: 7 percent

182F—Elve very cobbly loam, 35 to 60 percent slopes**Map Unit Setting**

Elevation: 5,800 to 6,700 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description**Elve and similar soils**

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 6,700 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.0 inches

Additional Components

Libeg and similar soils: 8 percent
 Rock outcrop: 7 percent

185E—Relyea-Helmville complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,700 to 6,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Relyea and similar soils

Composition: 55 percent

Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 15 to 35 percent

Elevation: 5,700 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Colluvium derived from limestone and/or colluvium derived from argillite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.5 inches

Helmville and similar soils

Composition: 30 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,700 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Danaher and similar soils: 5 percent

Rock outcrop: 5 percent

Worock and similar soils: 5 percent

192E—Whitore gravelly clay loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,200 to 7,200 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,200 to 7,200 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Rock outcrop: 8 percent
 Helmville and similar soils: 7 percent

195E—Yreka gravelly loam, cool, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,000 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Yreka and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,400 to 6,000 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

Additional Components

Bignell and similar soils: 5 percent
 Silverchief and similar soils: 5 percent
 Winkler and similar soils: 5 percent

198E—Trapps-Yreka stony loams, 8 to 25 percent slopes

Map Unit Setting

Elevation: 4,000 to 6,500 feet
Mean annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days

Component Description

Trapps and similar soils

Composition: 45 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 4,000 to 6,500 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Till
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.4 inches

Yreka and similar soils

Composition: 40 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 4,000 to 6,500 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Till
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.8 inches

Additional Components

Bignell and similar soils: 4 percent
 Trapps, bouldery and similar soils: 4 percent
 Whitecow and similar soils: 4 percent
 Trapps, greater slope and similar soils: 3 percent

214A—Foolhen-Mooseflat-Water complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,740 to 7,000 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Mooseflat and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,740 to 7,000 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Foolhen and similar soils

Composition: 35 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,740 to 7,000 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 7.1 inches

Water

Composition: 25 percent
Definition: Water includes streams, lakes, and ponds. These areas are covered with water in most years, at least during the period that is warm enough for plants to grow. Many areas are covered throughout the year.

Additional Components

Dunkleber and similar soils: 8 percent
 Finn and similar soils: 7 percent

227E—Julius-Tolbert complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Julius and similar soils

Composition: 65 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 5,800 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly clay loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 5.2 inches

Tolbert and similar soils

Composition: 20 percent
Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 15 to 35 percent
Elevation: 5,200 to 5,800 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very channery loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 1.2 inches

Additional Components

Danvers and similar soils: 10 percent
 Wilspring and similar soils: 3 percent
 Rock outcrop: 2 percent

230E—Quigg-Libeg complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,940 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 45 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,940 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,940 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Additional Components

Copenhaver and similar soils: 10 percent

Mollet and similar soils: 5 percent

232B—Beaverell cobbly loam, 1 to 4 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 90 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 1 to 4 percent
Elevation: 5,200 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Flooding: None
Available water capacity: Mainly 3.1 inches

Additional Components

Sixbeacon and similar soils: 6 percent
 Cetrack and similar soils: 4 percent

232E—Beaverell cobbly loam, 15 to 35 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 90 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Extremely cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium

Flooding: None

Available water capacity: Mainly 2.5 inches

Additional Components

Sixbeacon and similar soils: 10 percent

235B—Anaconda sandy loam, 0 to 4 percent slopes, severely impacted

Map Unit Setting

Elevation: 4,700 to 5,500 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,700 to 5,500 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous alluvium

Flooding: None

Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent

Gregson and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

236B—Varney sandy clay loam, 2 to 4 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent

Elevation: 4,000 to 5,200 feet

Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Additional Components

Anaconda and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney, greater slope and similar soils: 4 percent
 Cetrack and similar soils: 3 percent

236C—Varney sandy clay loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,000 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.3 inches

Additional Components

Con and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney, greater slope and similar soils: 4 percent
 Cetrack and similar soils: 3 percent

236D—Varney sandy clay loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,600 to 5,600 feet
Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 4,600 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Sandy clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Flooding: None

Available water capacity: Mainly 7.5 inches

Additional Components

Anaconda and similar soils: 4 percent

Sixbeacon and similar soils: 4 percent

Varney, greater slope and similar soils: 4 percent

Cetrack and similar soils: 3 percent

236E—Varney sandy clay loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 4,600 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 4,600 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Sandy clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Flooding: None

Available water capacity: Mainly 7.5 inches

Additional Components

Anaconda and similar soils: 4 percent

Con and similar soils: 4 percent

Sixbeacon and similar soils: 4 percent

Cetrack and similar soils: 3 percent

237B—Sixbeacon gravelly loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,800 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,700 to 5,800 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 5 percent

Con and similar soils: 5 percent

Varney and similar soils: 5 percent

237C—Sixbeacon gravelly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,800 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 4,700 to 5,800 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 5 percent
 Con and similar soils: 5 percent
 Varney and similar soils: 5 percent

237D—Sixbeacon gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,800 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,700 to 5,800 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 5 percent
 Con and similar soils: 5 percent
 Sixbeacon, cobbly and similar soils: 5 percent

242D—Braziel gravelly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Braziel and similar soils

Composition: 85 percent
Geomorphic description: Backslope on hill
Slope: 8 to 15 percent
Elevation: 5,600 to 6,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanics
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Perma and similar soils: 5 percent
 Shawmut and similar soils: 5 percent
 Staad and similar soils: 5 percent

242E—Braziel gravelly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Braziel and similar soils

Composition: 85 percent
Geomorphic description: Backslope on hill
Slope: 15 to 35 percent
Elevation: 5,600 to 6,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanics
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Perma and similar soils: 5 percent
 Shawmut and similar soils: 5 percent
 Staad and similar soils: 5 percent

245D—Redchief-Mollet bouldery loams, 4 to 15 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 50 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 4 to 15 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Bouldery loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.0 inches

Mollet and similar soils

Composition: 35 percent

Geomorphic description:

- Fan
- Mountainbase on mountain
- Terrace

Slope: 4 to 15 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Bouldery loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.7 inches

Additional Components

Libeg and similar soils: 8 percent

Lolon and similar soils: 7 percent

246D—Roy gravelly loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 90 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainflank on mountain
- Mountainbase on mountain
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,200 to 5,900 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 4.6 inches

Additional Components

Caramon and similar soils: 5 percent

Julius and similar soils: 5 percent

246E—Roy gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,200 to 5,900 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 4.6 inches

Additional Components

Caramon and similar soils: 8 percent

Roy, greater slope and similar soils: 5 percent

Julius and similar soils: 2 percent

251D—Shawmut stony loam, 0 to 15 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description: Alluvial fan

Slope: 0 to 15 percent

Elevation: 3,800 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.0 inches

Additional Components

Roy and similar soils: 8 percent

Winspect and similar soils: 7 percent

251E—Shawmut stony loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,300 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent*Elevation:* 5,300 to 6,200 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Stony loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Calcareous gravelly alluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.6 inches**Additional Components**

Roy and similar soils: 8 percent

Winspect and similar soils: 7 percent

254E—Libeg stony loam, 15 to 35 percent slopes**Map Unit Setting***Elevation:* 6,000 to 6,800 feet*Mean annual precipitation:* 18 to 23 inches*Frost-free period:* 30 to 70 days**Component Description****Libeg and similar soils***Composition:* 85 percent*Geomorphic description:*

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent*Elevation:* 6,000 to 6,800 feet*Effective annual precipitation:* 18 to 23 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Stony loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Gravelly loamy colluvium*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 4.4 inches**Additional Components**

Rock outcrop: 10 percent

Tolbert and similar soils: 5 percent

254F—Libeg stony loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,800 feet
Mean annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent

Elevation: 6,000 to 6,800 feet

Effective annual precipitation: 18 to 23 inches

Frost-free period: 30 to 70 days

Surface layer texture: Stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.4 inches

Additional Components

Rock outcrop: 10 percent

Tolbert and similar soils: 5 percent

275F—Hanson stony loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,000 to 7,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 30 to 70 days

Component Description

Hanson and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 6,000 to 7,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 30 to 70 days

Surface layer texture: Stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.8 inches

Additional Components

Tibson and similar soils: 8 percent

Rock outcrop: 7 percent

276D—Tibson stony loam, 2 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,600 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 2 to 15 percent

Elevation: 5,800 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Libeg and similar soils: 10 percent

Maurice and similar soils: 5 percent

280E—Comad-Elkner-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,800 to 8,400 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 40 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,800 to 8,400 feet

Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Extremely bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.3 inches

Elkner and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,800 to 8,400 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Coarse-loamy colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.6 inches

Rock outcrop

Composition: 25 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 10 percent

280F—Comad-Elkner-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,800 to 8,400 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 40 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,800 to 8,400 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Extremely bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite

Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.3 inches

Elkner and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,800 to 8,400 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Coarse-loamy colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.6 inches

Rock outcrop

Composition: 25 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 10 percent

**282D—Elve gravelly loam, 8 to 15 percent slopes,
 moderately impacted**

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 5,800 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Elve, greater slope and similar soils: 5 percent
 Libeg and similar soils: 5 percent
 Karloff and similar soils: 3 percent
 Adel and similar soils: 2 percent

282E—Elve gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Elve, greater slope and similar soils: 5 percent
 Libeg and similar soils: 5 percent
 Karloff and similar soils: 3 percent
 Adel and similar soils: 2 percent

282F—Elve gravelly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Elve, lesser slope and similar soils: 5 percent
 Libeg and similar soils: 5 percent
 Karloff and similar soils: 3 percent
 Rock outcrop: 2 percent

282G—Elve gravelly loam, 60 to 85 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 60 to 85 percent
Elevation: 5,800 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Elve, lesser slope and similar soils: 5 percent
 Libeg and similar soils: 5 percent
 Karloff and similar soils: 3 percent
 Rock outcrop: 2 percent

296E—Worock-Elve-Whitore stony loams, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,000 to 7,500 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 35 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 5,600 to 7,500 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Elve and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 5,000 to 7,500 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 2.3 inches

Whitore and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 5,200 to 7,200 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Evano and similar soils: 5 percent
 Loberg and similar soils: 5 percent
 Rock outcrop: 5 percent

300B—Arents, 1 to 4 percent slopes

Map Unit Setting

Elevation: 5,080 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Arents and similar soils

Composition: 90 percent
Geomorphic description: None assigned
Slope: 1 to 4 percent
Elevation: 5,080 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Sixbeacon and similar soils: 6 percent
 Beaverell and similar soils: 2 percent
 Cetrack and similar soils: 2 percent

300F—Arents, 30 to 45 percent slopes

Map Unit Setting

Elevation: 5,080 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Arents and similar soils

Composition: 90 percent
Geomorphic description: None assigned
Slope: 30 to 45 percent
Elevation: 5,080 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Beaverell and similar soils: 6 percent
 Sixbeacon and similar soils: 2 percent
 Slickens: 2 percent

314A—Kilgore-Foolhen-Mooseflat complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,700 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Kilgore and similar soils

Composition: 35 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 4.5 inches

Foolhen and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 7.1 inches

Mooseflat and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,600 feet

Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Additional Components

Dunkleber and similar soils: 8 percent
 Water: 7 percent

332B—Beaverell loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 3,600 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 3.0 inches

Additional Components

Carten and similar soils: 7 percent
 Beaverell, cobbly and similar soils: 4 percent
 Beaverell, greater slope and similar soils: 4 percent

335B—Tetonview-Blossberg-Poronto complex, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

Elevation: 4,700 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Tetonview and similar soils

Composition: 35 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 4,700 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 8.9 inches

Blossberg and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 4,700 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.2 inches

Poronto and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 4,700 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland

Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.3 inches

Additional Components

Gregson and similar soils: 5 percent
 Mannixlee and similar soils: 5 percent
 Turrah and similar soils: 5 percent

336B—Varney-Anaconda loams, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,000 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 110 days

Component Description

Varney and similar soils

Composition: 60 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,000 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Flooding: None
Salt affected: Saline within 30 inches
Available water capacity: Mainly 7.6 inches

Anaconda and similar soils

Composition: 30 percent
Geomorphic description: None assigned
Slope: 0 to 4 percent
Elevation: 4,000 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 95 to 110 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Salt affected: Saline within 30 inches
Available water capacity: Mainly 7.4 inches

Additional Components

Varney, cobbly and similar soils: 10 percent

337B—Sixbeacon fine sandy loam, 1 to 4 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,000 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 1 to 4 percent
Elevation: 5,000 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Cetrack and similar soils: 8 percent
 Beaverell and similar soils: 5 percent
 Slickens: 2 percent

337C—Sixbeacon fine sandy loam, 4 to 8 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,000 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 5,000 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Cetrack and similar soils: 8 percent
 Beaverell and similar soils: 5 percent
 Slickens: 2 percent

338C—Perma cobbly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,100 to 5,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent
Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 4 to 8 percent
Elevation: 5,100 to 5,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Anaconda and similar soils: 5 percent
 Wimper and similar soils: 5 percent
 Beaverell and similar soils: 3 percent
 Stad and similar soils: 2 percent

339E—Winspect cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,000 to 5,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Winspect and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 15 to 35 percent

Elevation: 5,000 to 5,200 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Colluvium derived from limestone*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.3 inches**Additional Components**

Rock outcrop: 7 percent

Windham and similar soils: 5 percent

Wimper and similar soils: 3 percent

339F—Winspect cobbly loam, 35 to 60 percent slopes**Map Unit Setting***Elevation:* 5,000 to 5,200 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Component Description****Winspect and similar soils***Composition:* 85 percent*Geomorphic description:*

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,000 to 5,200 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Colluvium derived from limestone*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 6.3 inches**Additional Components**

Rock outcrop: 7 percent

Windham and similar soils: 5 percent

Wimper and similar soils: 3 percent

345F—Redchief-Tibson complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,500 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 50 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,800 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Tibson and similar soils

Composition: 35 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,800 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Libeg and similar soils: 5 percent

Mollet and similar soils: 5 percent

Monad and similar soils: 5 percent

351E—Roy-Shawmut-Danvers complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 35 percent
Geomorphic description: Alluvial fan
Slope: 15 to 35 percent
Elevation: 3,800 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Shawmut and similar soils

Composition: 25 percent
Geomorphic description: Alluvial fan
Slope: 15 to 35 percent
Elevation: 3,800 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Danvers and similar soils

Composition: 25 percent
Geomorphic description: Alluvial fan
Slope: 15 to 35 percent
Elevation: 3,800 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

Additional Components

Roy, greater slope and similar soils: 5 percent
 Roy, extremely cobbly and similar soils: 5 percent
 Shawmut, calcareous and similar soils: 5 percent

351F—Roy-Shawmut-Danvers complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 35 percent
Geomorphic description: Alluvial fan
Slope: 35 to 60 percent
Elevation: 3,800 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.8 inches

Shawmut and similar soils

Composition: 25 percent
Geomorphic description: Alluvial fan
Slope: 35 to 60 percent
Elevation: 3,800 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.3 inches

Danvers and similar soils

Composition: 25 percent
Geomorphic description: Alluvial fan
Slope: 35 to 60 percent
Elevation: 3,800 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly clay loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 9.2 inches

Additional Components

Roy, extremely cobbly and similar soils: 5 percent
 Roy, greater slope and similar soils: 5 percent
 Shawmut, calcareous and similar soils: 5 percent

352C—Martinsdale cobbly loam, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,200 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 5,200 to 5,800 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.9 inches

Additional Components

Danvers and similar soils: 5 percent
 Roy and similar soils: 5 percent
 Shawmut and similar soils: 3 percent
 Winspect and similar soils: 2 percent

352D—Martinsdale cobbly loam, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,200 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,200 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.9 inches

Additional Components

Danvers and similar soils: 5 percent

Roy and similar soils: 5 percent

Shawmut and similar soils: 3 percent

Winspect and similar soils: 2 percent

352E—Martinsdale cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,200 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,200 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.9 inches

Additional Components

Danvers and similar soils: 4 percent

Roy and similar soils: 4 percent

Shawmut and similar soils: 4 percent

Winspect and similar soils: 3 percent

352F—Martinsdale cobbly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,200 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,200 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.9 inches

Additional Components

Danvers and similar soils: 4 percent

Roy and similar soils: 4 percent

Shawmut and similar soils: 4 percent

Winspect and similar soils: 3 percent

354D—Libeg-Redchief complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,400 feet

Mean annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 60 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 8 to 15 percent

Elevation: 5,800 to 7,400 feet

Effective annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.4 inches

Redchief and similar soils

Composition: 25 percent
Geomorphic description:

- Backslope on hill
- Footslope on hill
- Mountainbase on mountain

Slope: 8 to 15 percent
Elevation: 5,800 to 7,400 feet
Effective annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Adel and similar soils: 5 percent
 Mollet and similar soils: 5 percent
 Monad and similar soils: 5 percent

354E—Libeg-Redchief complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,400 feet
Mean annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 60 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent
Elevation: 5,800 to 7,400 feet
Effective annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.4 inches

Redchief and similar soils

Composition: 25 percent
Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 15 to 35 percent
Elevation: 5,800 to 7,400 feet
Effective annual precipitation: 15 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Adel and similar soils: 5 percent
 Mollet and similar soils: 5 percent
 Monad and similar soils: 5 percent

376E—Tibson very stony loam, 8 to 25 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,300 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 8 to 25 percent
Elevation: 5,800 to 6,300 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.0 inches

Additional Components

Levengood and similar soils: 5 percent

Libeg and similar soils: 5 percent

Maciver and similar soils: 5 percent

379E—Ambrant-Rochester-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,400 to 7,400 feet

Mean annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Component Description

Ambrant and similar soils

Composition: 40 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,400 to 7,400 feet

Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Surface layer texture: Bouldery coarse sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Granitics

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.6 inches

Rochester and similar soils

Composition: 30 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,400 to 7,400 feet

Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very bouldery coarse sandy loam

Depth to restrictive feature: None noted

Drainage class: Excessively drained

Parent material: Granitics

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.4 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Bignell and similar soils: 10 percent

379F—Ambrant-Rochester-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,400 to 7,400 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Ambrant and similar soils

Composition: 40 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,400 to 7,400 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Bouldery coarse sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Granitics
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.6 inches

Rochester and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,400 to 7,400 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very bouldery coarse sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Granitics
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.4 inches

Rock outcrop

Composition: 20 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Bignell and similar soils: 10 percent

387E—Danaher-Loberg complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,990 to 6,700 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Danaher and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,990 to 6,700 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey alluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 8.6 inches

Loberg and similar soils

Composition: 35 percent
Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 15 to 35 percent
Elevation: 5,990 to 6,700 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Relyea and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

391F—Mohaggin bouldery ashy very fine sandy loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,100 to 7,400 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,100 to 7,400 feet

Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Additional Components

Worock and similar soils: 10 percent
 Mooseflat and similar soils: 3 percent
 Rubble land: 2 percent

392E—Whitore cobbly loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,200 to 7,800 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,200 to 7,800 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Helmville and similar soils: 8 percent
 Rock outcrop: 7 percent

392F—Whitore cobbly loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,200 to 7,800 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 6,200 to 7,800 feet

Effective annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.5 inches

Additional Components

Helmville and similar soils: 8 percent

Rock outcrop: 7 percent

400D—Aridic Ustorthents, clayey substratum, 4 to 15 percent slopes

Map Unit Setting

Elevation: 5,160 to 5,280 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Aridic Ustorthents and similar soils

Composition: 90 percent

Geomorphic description: None assigned

Slope: 4 to 15 percent

Elevation: 5,160 to 5,280 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Coarse sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Roy and similar soils: 4 percent

Beaverell and similar soils: 3 percent

Slag and similar soils: 3 percent

414A—Kilgore-Mooseflat-Water complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 4,740 to 8,800 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Kilgore and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,740 to 8,800 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 4.5 inches

Mooseflat and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,740 to 8,800 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Water

Composition: 10 percent
Definition: Water includes streams, lakes, and ponds. These areas are covered with water in most years, at least during the period that is warm enough for plants to grow. Many areas are covered throughout the year.

Additional Components

Dunkleber and similar soils: 5 percent
 Foolhen and similar soils: 5 percent

430C—Quigg-Mollet complex, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 45 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 8 percent

Elevation: 5,800 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Mollet and similar soils

Composition: 40 percent

Geomorphic description:

- Fan
- Terrace

Slope: 2 to 8 percent

Elevation: 5,800 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Adel and similar soils: 5 percent

Monad and similar soils: 5 percent

Redchief and similar soils: 5 percent

430D—Quigg-Mollet complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 45 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,800 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Mollet and similar soils

Composition: 40 percent

Geomorphic description:

- Fan
- Terrace

Slope: 8 to 15 percent

Elevation: 5,800 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Adel and similar soils: 5 percent

Monad and similar soils: 5 percent

Redchief and similar soils: 5 percent

430E—Quigg-Mollet complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Quigg and similar soils

Composition: 45 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,800 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 8.6 inches

Mollet and similar soils

Composition: 40 percent

Geomorphic description:

- Fan
- Terrace

Slope: 15 to 35 percent

Elevation: 5,800 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 9.0 inches

Additional Components

Adel and similar soils: 5 percent

Monad and similar soils: 5 percent

Redchief and similar soils: 5 percent

432B—Beaverell cobbly loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,960 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,960 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Flooding: None
Available water capacity: Mainly 2.9 inches

Additional Components

Cetrack and similar soils: 5 percent
 Con and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

432C—Beaverell cobbly loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,960 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,960 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Alluvium

Flooding: None

Available water capacity: Mainly 2.9 inches

Additional Components

Cetrack and similar soils: 5 percent

Con and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

437E—Adel-Mooseflat complex, 8 to 35 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,200 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Adel and similar soils

Composition: 70 percent

Geomorphic description:

- Alluvial fan
- Drainageway

Slope: 15 to 35 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Mixed alluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 9.3 inches

Mooseflat and similar soils

Composition: 20 percent

Geomorphic description: Mountainbase on mountain

Slope: 8 to 15 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Alluvium

Flooding: None

Water table: Present

Available water capacity: Mainly 4.8 inches

Additional Components

Mooseflat, lesser slope and similar soils: 10 percent

438B—Perma cobbly loam, 2 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,820 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent
Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 2 to 4 percent
Elevation: 4,820 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly alluvium
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Gregson and similar soils: 5 percent
 Perma, greater slope and similar soils: 5 percent
 Shawmut and similar soils: 5 percent

442E—Braziel-Tolbert complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Braziel and similar soils

Composition: 60 percent
Geomorphic description: Mountain
Slope: 15 to 35 percent
Elevation: 3,800 to 5,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium
Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 5.2 inches

Tolbert and similar soils

Composition: 25 percent
Geomorphic description: Mountain
Slope: 15 to 35 percent
Elevation: 3,800 to 5,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very stony loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

Additional Components

Braziel, greater slope and similar soils: 3 percent
 Crackerville and similar soils: 3 percent
 Perma and similar soils: 3 percent
 Rock outcrop: 3 percent
 Roy and similar soils: 3 percent

442F—Braziel-Tolbert complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Braziel and similar soils

Composition: 60 percent
Geomorphic description: Mountain
Slope: 35 to 60 percent
Elevation: 3,800 to 5,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Tolbert and similar soils

Composition: 25 percent
Geomorphic description: Mountain
Slope: 35 to 60 percent
Elevation: 3,800 to 5,000 feet

Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very stony loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

Additional Components

Crackerville and similar soils: 3 percent
 Perma and similar soils: 3 percent
 Rock outcrop: 3 percent
 Roy and similar soils: 3 percent
 Tolbert, greater slope and similar soils: 3 percent

451E—Shawmut very bouldery loam, 8 to 25 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 3,800 to 5,800 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very bouldery loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.7 inches

Additional Components

Poronto and similar soils: 4 percent
 Rochester and similar soils: 4 percent
 Shawmut, greater slope and similar soils: 4 percent
 Winspect and similar soils: 3 percent

454D—Libeg-Macabre-Redchief complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,600 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 90 days

Component Description

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 8 to 15 percent

Elevation: 5,600 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Macabre and similar soils

Composition: 25 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 8 to 15 percent

Elevation: 5,600 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 70 to 90 days

Surface layer texture: Ashy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.9 inches

Redchief and similar soils

Composition: 20 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 8 to 15 percent

Elevation: 5,600 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Adel and similar soils: 4 percent

Monad and similar soils: 4 percent

Rock outcrop: 4 percent

Mollet and similar soils: 3 percent

454E—Libeg-Macabre-Redchief complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,600 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 90 days

Component Description

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,600 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Macabre and similar soils

Composition: 25 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 35 percent

Elevation: 5,600 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 70 to 90 days

Surface layer texture: Ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Redchief and similar soils

Composition: 20 percent
Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 15 to 35 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Adel and similar soils: 4 percent
 Monad and similar soils: 4 percent
 Rock outcrop: 4 percent
 Mollet and similar soils: 3 percent

454F—Libeg-Macabre-Redchief complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 90 days

Component Description

Libeg and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Macabre and similar soils

Composition: 25 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 35 to 60 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 70 to 90 days
Surface layer texture: Ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.9 inches

Redchief and similar soils

Composition: 20 percent
Geomorphic description:

- Footslope on hill
- Backslope on hill

Slope: 35 to 60 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Adel and similar soils: 4 percent
 Monad and similar soils: 4 percent
 Rock outcrop: 4 percent
 Mollet and similar soils: 3 percent

482E—Elve gravelly loam, dry, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,000 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,000 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Loberg and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

482F—Elve gravelly loam, dry, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,000 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,000 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Loberg and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

492E—Whitore, dry-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 65 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.5 inches

Rock outcrop

Composition: 20 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Helmville and similar soils: 5 percent
 Loberg and similar soils: 5 percent
 Relyea and similar soils: 5 percent

492F—Whitore, dry-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 65 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.5 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Helmville and similar soils: 5 percent

Loberg and similar soils: 5 percent

Relyea and similar soils: 5 percent

492G—Whitore, dry-Rock outcrop complex, 60 to 80 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 65 percent

Geomorphic description: Mountain slope

Slope: 60 to 80 percent

Elevation: 5,800 to 7,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Flooding: None

Available water capacity: Mainly 4.5 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Helmville and similar soils: 5 percent

Loberg and similar soils: 5 percent

Relyea and similar soils: 5 percent

497C—Waldbillig gravelly ashy loam, 2 to 8 percent slopes

Map Unit Setting

Elevation: 5,900 to 7,800 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Waldbillig and similar soils

Composition: 85 percent
Geomorphic description: Moraine
Slope: 2 to 8 percent
Elevation: 5,900 to 7,800 feet
Effective annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Sandy and silty volcanic ash over gravelly till, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Worock and similar soils: 7 percent
 Evaro and similar soils: 4 percent
 Helmville and similar soils: 4 percent

497E—Waldbillig gravelly ashy loam, 8 to 25 percent slopes

Map Unit Setting

Elevation: 5,900 to 7,800 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Waldbillig and similar soils

Composition: 85 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 5,900 to 7,800 feet
Effective annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Sandy and silty volcanic ash over gravelly till, unspecified
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Additional Components

Worock and similar soils: 7 percent

Evaro and similar soils: 4 percent

Helmville and similar soils: 4 percent

509B—Gregson fine sandy loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,800 to 5,100 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Gregson and similar soils

Composition: 85 percent

Geomorphic description: Stream terrace

Slope: 0 to 4 percent

Elevation: 4,800 to 5,100 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Fine sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Alluvium

Flooding: None

Water table: Present

Available water capacity: Mainly 5.9 inches

Additional Components

Blossberg and similar soils: 5 percent

Carten and similar soils: 5 percent

Cetrack and similar soils: 5 percent

514A—Mooseflat-Foolhen complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,700 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Mooseflat and similar soils

Composition: 45 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 5,700 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Foolhen and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,500 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Fine-loamy alluvium
Flooding: None
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 7.1 inches

Additional Components

Dunkleber and similar soils: 5 percent
 Finn and similar soils: 5 percent
 Kilgore and similar soils: 5 percent

533B—Pozega silty clay loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Pozega and similar soils

Composition: 85 percent
Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,600 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Silty clay loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Coarse-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None

Water table: Present

Salt affected: Saline within 30 inches

Sodium affected: Sodic within 30 inches

Available water capacity: Mainly 8.4 inches

Additional Components

Saypo and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

Tetonview and similar soils: 5 percent

535B—Saypo loam, cool, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,600 to 5,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Saypo and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,600 to 5,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Available water capacity: Mainly 8.1 inches

Additional Components

Mcmanus and similar soils: 5 percent

Quigley and similar soils: 5 percent

Tetonview and similar soils: 5 percent

537B—Truchot gravelly loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,800 to 4,900 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Truchot and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent*Elevation:* 4,800 to 4,900 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days*Surface layer texture:* Gravelly loam*Depth to restrictive feature:* None noted*Drainage class:* Somewhat poorly drained*Parent material:* Calcareous alluvium*Native plant cover type:* Rangeland*Flooding:* None*Water table:* Present*Available water capacity:* Mainly 5.2 inches**Additional Components**

Kleinschmidt and similar soils: 5 percent

Poronto and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

544B—Gregson loam, 0 to 4 percent slopes**Map Unit Setting***Elevation:* 4,600 to 5,520 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days**Component Description****Gregson and similar soils***Composition:* 85 percent*Geomorphic description:* Stream terrace*Slope:* 0 to 4 percent*Elevation:* 4,600 to 5,520 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days*Surface layer texture:* Loam*Depth to restrictive feature:* None noted*Drainage class:* Somewhat poorly drained*Parent material:* Alluvium*Native plant cover type:* Rangeland*Flooding:* None*Water table:* Present*Available water capacity:* Mainly 5.9 inches**Additional Components**

Carten and similar soils: 5 percent

Saypo and similar soils: 5 percent

Wetsand and similar soils: 5 percent

545B—Saypo loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,520 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Saypo and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,700 to 5,520 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Available water capacity: Mainly 8.1 inches

Additional Components

Blossberg and similar soils: 5 percent

Con and similar soils: 5 percent

Tetonview and similar soils: 5 percent

547B—Kleinschmidt gravelly loam, cool, 0 to 4 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Kleinschmidt and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 3,800 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 5.4 inches

Additional Components

Poronto and similar soils: 5 percent
 Quigley, calcareous and similar soils: 5 percent
 Saypo, saline and similar soils: 5 percent

549B—Marcott silty clay loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,060 to 5,200 feet
Mean annual precipitation: 12 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Marcott and similar soils

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 0 to 4 percent
Elevation: 5,060 to 5,200 feet
Effective annual precipitation: 12 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Silty clay loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Clayey calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 9.0 inches

Additional Components

Gregson and similar soils: 5 percent
 Saypo and similar soils: 5 percent
 Turrah and similar soils: 5 percent

551F—Shawmut extremely bouldery loam, 8 to 50 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent
Geomorphic description: Moraine
Slope: 8 to 50 percent
Elevation: 3,800 to 5,800 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Extremely bouldery loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Till
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Quigley and similar soils: 5 percent
 Staad and similar soils: 5 percent
 Poronto and similar soils: 3 percent
 Water: 2 percent

552C—Clasoil-Crackerville complex, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,000 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent
Geomorphic description: Mountainside
Slope: 4 to 8 percent
Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium
 derived from granite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.2 inches

Crackerville and similar soils

Composition: 35 percent
Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 4 to 8 percent

Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Colluvium derived from granite over residuum weathered from granite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Additional Components

Crackerville, stony and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent
 Rock outcrop: 5 percent

552D—Clasoil-Crackerville complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 3,500 to 5,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent
Geomorphic description: Mountain
Slope: 8 to 15 percent
Elevation: 3,500 to 5,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.5 inches

Crackerville and similar soils

Composition: 35 percent
Geomorphic description: Mountain
Slope: 8 to 15 percent
Elevation: 3,500 to 5,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained

Parent material: Colluvium derived from granite and/or residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Additional Components

Perma, stony and similar soils: 5 percent

Rock outcrop: 5 percent

Tolbert and similar soils: 5 percent

552E—Clasoil-Crackerville complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 3,500 to 5,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent

Geomorphic description: Mountain

Slope: 15 to 35 percent

Elevation: 3,500 to 5,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Crackerville and similar soils

Composition: 35 percent

Geomorphic description: Mountain

Slope: 15 to 35 percent

Elevation: 3,500 to 5,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from granite and/or residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Additional Components

Perma, stony and similar soils: 5 percent
 Rock outcrop: 5 percent
 Tolbert and similar soils: 5 percent

552F—Clasoil-Crackerville complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,000 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent
Geomorphic description: Mountainside
Slope: 35 to 60 percent
Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.2 inches

Crackerville and similar soils

Composition: 30 percent
Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 35 to 60 percent
Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Colluvium derived from granite over residuum weathered from granite
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.2 inches

Additional Components

Rock outcrop and similar soils: 10 percent
 Crackerville, stony and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent

554E—Redchief-Macabre-Libeg complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,300 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 90 days

Component Description

Redchief and similar soils

Composition: 30 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 15 to 35 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.6 inches

Macabre and similar soils

Composition: 30 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 35 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Libeg and similar soils

Composition: 25 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Mollet and similar soils: 8 percent

Monad and similar soils: 7 percent

554F—Redchief-Macabre-Libeg complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,300 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 90 days

Component Description

Redchief and similar soils

Composition: 30 percent

Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.6 inches

Macabre and similar soils

Composition: 30 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 35 to 60 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.7 inches

Libeg and similar soils

Composition: 25 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent

Elevation: 5,900 to 6,300 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Mollet and similar soils: 8 percent

Monad and similar soils: 7 percent

557B—Kleinschmidt gravelly loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,800 to 5,520 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Kleinschmidt and similar soils

Composition: 85 percent

Geomorphic description:

- Stream terrace
- Terrace

Slope: 0 to 4 percent

Elevation: 4,800 to 5,520 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Calcareous alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Available water capacity: Mainly 5.4 inches

Additional Components

Gregson and similar soils: 10 percent

Mannixlee and similar soils: 5 percent

562B—Carten loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 4,700 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Carten and similar soils

Composition: 85 percent

Geomorphic description: Outwash plain

Slope: 0 to 4 percent

Elevation: 4,700 to 5,000 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Fine-loamy alluvium over sandy and gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Available water capacity: Mainly 4.4 inches

Additional Components

Gregson and similar soils: 5 percent

Truchot and similar soils: 5 percent

Wetsand and similar soils: 5 percent

576B—Finn gravelly loam, dry, 0 to 4 percent slopes

Map Unit Setting

Elevation: 6,300 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Finn and similar soils

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 6,300 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 5.9 inches

Additional Components

Adel and similar soils: 5 percent
 Monad and similar soils: 5 percent
 Mooseflat and similar soils: 5 percent

580D—Comad-Elkner complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 70 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.4 inches

Elkner and similar soils

Composition: 20 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Coarse-loamy colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Rock outcrop: 5 percent
Sandy clay loam subsoils and similar soils: 5 percent

580E—Comad-Elkner complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 70 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.4 inches

Elkner and similar soils

Composition: 20 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Coarse-loamy colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Rock outcrop: 5 percent
Rubble land: 5 percent

580F—Comad-Elkner complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 70 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.4 inches

Elkner and similar soils

Composition: 20 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Coarse-loamy colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Comad, greater slope and similar soils: 5 percent
 Rock outcrop: 5 percent

582D—Elve-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,600 to 8,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent

Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 5,600 to 8,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Dunkleber and similar soils: 5 percent
 Mohaggin and similar soils: 5 percent
 Phillcher and similar soils: 5 percent

592E—Whitore gravelly loam, cold, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,400 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description**Whitore and similar soils**

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,300 to 8,400 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Rock outcrop: 10 percent
Helmville and similar soils: 5 percent

592F—Whitore gravelly loam, cold, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,400 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,300 to 8,400 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Rock outcrop: 10 percent
Helmville and similar soils: 5 percent

592G—Whitore gravelly loam, cold, 60 to 80 percent slopes

Map Unit Setting

Elevation: 6,300 to 8,400 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 60 to 80 percent
Elevation: 6,300 to 8,400 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified

Flooding: None

Available water capacity: Mainly 4.4 inches

Additional Components

Rock outcrop: 10 percent

Helmville and similar soils: 5 percent

596E—Worock-Loberg complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 50 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 5,600 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Loberg and similar soils

Composition: 35 percent

Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 15 to 35 percent

Elevation: 5,600 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.0 inches

Additional Components

Danaher and similar soils: 6 percent
 Elve and similar soils: 3 percent
 Foolhen and similar soils: 3 percent
 Rock outcrop: 3 percent

597D—Evaro gravelly ashy loam, cold, 8 to 15 percent slopes

Map Unit Setting

Elevation: 7,700 to 8,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 7,700 to 8,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Elve and similar soils: 5 percent
 Phillcher and similar soils: 5 percent
 Rock outcrop: 5 percent

597E—Evaro gravelly ashy loam, cold, 15 to 35 percent slopes

Map Unit Setting

Elevation: 7,700 to 8,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 7,700 to 8,500 feet
Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Elve and similar soils: 5 percent
 Phillcher and similar soils: 5 percent
 Rock outcrop: 5 percent

597F—Evaro gravelly ashy loam, cold, 35 to 60 percent slopes

Map Unit Setting

Elevation: 7,700 to 8,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 7,700 to 8,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Elve and similar soils: 5 percent
 Phillcher and similar soils: 5 percent
 Rock outcrop: 5 percent

599D—Silverchief-Trapps complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,000 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Silverchief and similar soils

Composition: 45 percent

Geomorphic description:

- Mountainbase on mountain
- Mountainflank on mountain

Slope: 8 to 15 percent

Elevation: 5,600 to 6,000 feet

Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey calcareous slope alluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 7.4 inches

Trapps and similar soils

Composition: 40 percent

Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 8 to 15 percent

Elevation: 5,600 to 6,000 feet

Effective annual precipitation: 18 to 25 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly alluvium or gravelly colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.0 inches

Additional Components

Rock outcrop: 5 percent

Whitecow and similar soils: 5 percent

Yreka and similar soils: 5 percent

600A—Aeric Fluvaquents, 0 to 2 percent slopes

Map Unit Setting

Elevation: 4,780 to 4,900 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Aeric Fluvaquents and similar soils

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent

Elevation: 4,780 to 4,900 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Very cobbly clay loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Mixed alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 3.4 inches

Additional Components

Water: 10 percent
 Riverwash: 5 percent

632B—Bushong loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 3,600 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Bushong and similar soils

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 0 to 4 percent
Elevation: 3,600 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Canarway and similar soils: 8 percent
 Blossberg and similar soils: 7 percent

634B—Blossberg loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Blossberg and similar soils

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 0 to 4 percent
Elevation: 3,800 to 5,200 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Bushong and similar soils: 5 percent
 Flintcreek and similar soils: 5 percent
 Tetonview and similar soils: 5 percent

635B—Tetonview loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 3,800 to 5,800 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description

Tetonview and similar soils

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 0 to 4 percent
Elevation: 3,800 to 5,800 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 9.1 inches

Additional Components

Blossberg and similar soils: 3 percent
 Nythar and similar soils: 3 percent
 Poronto and similar soils: 3 percent
 Saypo and similar soils: 3 percent
 Saypo, saline and similar soils: 3 percent

637B—Poronto loam, 0 to 4 percent slopes**Map Unit Setting**

Elevation: 4,700 to 5,600 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description**Poronto and similar soils**

Composition: 85 percent
Geomorphic description: Terrace
Slope: 0 to 4 percent
Elevation: 4,700 to 5,600 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 5.5 inches

Additional Components

Blossberg and similar soils: 4 percent
 Bushong and similar soils: 4 percent
 Kleinschmidt and similar soils: 4 percent
 Mannixlee and similar soils: 3 percent

645A—Mannixlee clay loam, 0 to 2 percent slopes, moderately impacted**Map Unit Setting**

Elevation: 4,900 to 5,040 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description**Mannixlee and similar soils**

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 0 to 2 percent
Elevation: 4,900 to 5,040 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland

Flooding: None
Water table: Present
Available water capacity: Mainly 8.8 inches

Additional Components

Bushong and similar soils: 5 percent
 Poronto and similar soils: 5 percent
 Tetonview and similar soils: 5 percent

646B—Danvers-Roy complex, 2 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,180 to 5,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 50 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent
Elevation: 5,180 to 5,700 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 8.6 inches

Roy and similar soils

Composition: 35 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 2 to 4 percent
Elevation: 5,180 to 5,700 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Work and similar soils: 8 percent
 Braziel and similar soils: 5 percent
 Julius and similar soils: 2 percent

649B—Turrah silty clay loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 5,400 to 5,480 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Turrah and similar soils

Composition: 85 percent
Geomorphic description: Stream terrace
Slope: 0 to 4 percent
Elevation: 5,400 to 5,480 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Silty clay loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Clayey alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 7.7 inches

Additional Components

Mannixlee and similar soils: 5 percent
 Poronto and similar soils: 5 percent
 Tetonview and similar soils: 5 percent

676B—Finn loam, 0 to 4 percent slopes

Map Unit Setting

Elevation: 5,790 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Finn and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 5,790 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted

Drainage class: Very poorly drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 5.9 inches

Additional Components

Dunkleber and similar soils: 4 percent
 Foolhen and similar soils: 4 percent
 Mooseflat and similar soils: 4 percent
 Kilgore and similar soils: 3 percent

680E—Comad-Rubble land complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,400 to 9,200 feet
Mean annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 65 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,400 to 9,200 feet
Effective annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days
Surface layer texture: Extremely bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Flooding: None
Available water capacity: Mainly 1.3 inches

Rubble land

Composition: 20 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles. Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Rock outcrop: 10 percent
 Comad, greater slope and similar soils: 5 percent

680F—Comad-Rubble land complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,400 to 9,200 feet
Mean annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 65 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 9,200 feet
Effective annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days
Surface layer texture: Extremely bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Flooding: None
Available water capacity: Mainly 1.3 inches

Rubble land

Composition: 20 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles. Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Rock outcrop: 10 percent
 Comad, greater slope and similar soils: 5 percent

680G—Rock outcrop-Comad complex, 45 to 80 percent slopes

Map Unit Setting

Elevation: 8,400 to 9,200 feet
Mean annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days

Component Description

Rock outcrop

Composition: 60 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Comad and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 45 to 80 percent

Elevation: 8,400 to 9,200 feet
Effective annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.4 inches

Additional Components

Comad, lesser slope and similar soils: 10 percent
 Evaro and similar soils: 5 percent

682E—Elve bouldery sandy loam, 4 to 25 percent slopes

Map Unit Setting

Elevation: 6,000 to 7,400 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 4 to 25 percent
Elevation: 6,000 to 7,400 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Evaro and similar soils: 4 percent
 Loberg and similar soils: 4 percent
 Rubble land: 4 percent
 Elve, greater slope and similar soils: 3 percent

682F—Elve bouldery sandy loam, 25 to 50 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,400 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 25 to 50 percent
Elevation: 6,400 to 7,400 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.2 inches

Additional Components

Elve, greater slope and similar soils: 5 percent
 Evaro and similar soils: 5 percent
 Rubble land: 5 percent

686A—Dougcliff mucky peat, loamy substratum, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,350 to 5,450 feet
Mean annual precipitation: 10 to 15 inches
Frost-free period: 90 to 105 days

Component Description

Dougcliff and similar soils

Composition: 90 percent
Geomorphic description:

- Depression
- Flood plain
- Outwash plain
- Stream terrace

Slope: 0 to 2 percent
Elevation: 5,350 to 5,450 feet
Effective annual precipitation: 10 to 15 inches
Frost-free period: 90 to 105 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Organic, unspecified over loamy alluvium
Flooding: Rare
Water table: Present
Ponding duration: Long
Available water capacity: Mainly 9.2 inches

Additional Components

Kleinschmidt and similar soils: 5 percent
 Carten and similar soils: 3 percent
 Wetsand and similar soils: 2 percent

696E—Worock gravelly loam, dry, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,900 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Evaro and similar soils: 4 percent
 Loberg and similar soils: 4 percent
 Rock outcrop: 4 percent
 Danaher and similar soils: 3 percent

696F—Worock gravelly loam, dry, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,740 to 6,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,740 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Evano and similar soils: 4 percent
 Loberg and similar soils: 4 percent
 Rock outcrop: 4 percent
 Danaher and similar soils: 3 percent

697E—Waldbillig-Mooseflat complex, 4 to 25 percent slopes

Map Unit Setting

Elevation: 6,400 to 8,440 feet
Mean annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Waldbillig and similar soils

Composition: 60 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 6,400 to 8,440 feet
Effective annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Sandy and silty volcanic ash over gravelly till, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.7 inches

Mooseflat, stony and similar soils

Composition: 25 percent
Geomorphic description: Drainageway
Slope: 4 to 8 percent
Elevation: 6,400 to 8,440 feet
Effective annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Rock fragments on the soil surface: 0.01 to 0.10 percent stones, 27 to 67 feet apart
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Additional Components

Waldbillig, greater slope and similar soils: 10 percent
 Rubble land: 3 percent
 Comad and similar soils: 2 percent

714E—Mooseflat-Mohaggin complex, 4 to 25 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mooseflat and similar soils

Composition: 55 percent
Geomorphic description:

- Drainageway
- Mountainbase on mountain

Slope: 4 to 25 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Mohaggin and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Additional Components

Mohaggin, greater slope and similar soils: 10 percent
 Rubble land: 3 percent
 Worock and similar soils: 2 percent

714F—Mooseflat-Mohaggin complex, 25 to 60 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mooseflat and similar soils

Composition: 55 percent
Geomorphic description: Mountainbase on mountain
Slope: 25 to 50 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 4.8 inches

Mohaggin and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 25 to 60 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 15 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Bouldery ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Additional Components

Mohaggin, lesser slope and similar soils: 5 percent
 Mooseflat, lesser slope and similar soils: 5 percent
 Rubble land: 5 percent

724B—Con loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,550 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,920 to 5,550 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Anaconda and similar soils: 4 percent
 Cetrack and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney and similar soils: 3 percent

724C—Con loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,550 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,920 to 5,550 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Fine-loamy alluvium
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Anaconda and similar soils: 4 percent
 Cetrack and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney and similar soils: 3 percent

724D—Con loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,550 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,920 to 5,550 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Flooding: None
Available water capacity: Mainly 8.8 inches

Additional Components

Anaconda and similar soils: 4 percent
 Cetrack and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney and similar soils: 3 percent

732B—Beaverell loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,550 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Beaverell and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,920 to 5,550 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Flooding: None

Available water capacity: Mainly 3.0 inches

Additional Components

Anaconda and similar soils: 5 percent

Sixbeacon and similar soils: 5 percent

Truchot and similar soils: 5 percent

735B—Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

Elevation: 4,600 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 110 days

Component Description

Tetonview and similar soils

Composition: 45 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 4,600 to 5,800 feet

Effective annual precipitation: 10 to 19 inches

Frost-free period: 70 to 110 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Poorly drained

Parent material: Fine-loamy calcareous alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Present

Available water capacity: Mainly 8.9 inches

Blossberg and similar soils

Composition: 40 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 4,600 to 5,800 feet

Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Bushong and similar soils: 4 percent
 Gregson and similar soils: 4 percent
 Mannixlee and similar soils: 4 percent
 Poronto and similar soils: 3 percent

737B—Sixbeacon gravelly loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,500 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,920 to 5,500 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 5 percent
 Con and similar soils: 5 percent
 Sixbeacon, cobbly and similar soils: 5 percent

737C—Sixbeacon gravelly loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,920 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 5 percent
 Con and similar soils: 5 percent
 Sixbeacon, cobbly and similar soils: 5 percent

737D—Sixbeacon gravelly loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,800 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,920 to 5,800 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Calcareous alluvium

Flooding: None

Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 5 percent

Con and similar soils: 5 percent

Sixbeacon, cobbly and similar soils: 5 percent

739E—Tolbert-Wilspring-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Tolbert and similar soils

Composition: 45 percent

Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 15 to 35 percent

Elevation: 4,920 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 1.2 inches

Wilspring and similar soils

Composition: 30 percent

Geomorphic description:

- Backslope on hill
- Shoulder on hill
- Mountainflank on mountain

Slope: 15 to 35 percent

Elevation: 4,920 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Channery loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Calcareous gravelly colluvium derived from shale or unspecified gravelly colluvium derived from argillaceous limestone

Flooding: None

Available water capacity: Mainly 2.6 inches

Rock outcrop*Composition:* 10 percent*Definition:* Rock outcrop consists of exposures of bare bedrock.**Additional Components**

Roy and similar soils: 5 percent

Tolbert, greater slope and similar soils: 5 percent

Work and similar soils: 5 percent

**751C—Shawmut gravelly loam, 4 to 8 percent slopes,
moderately impacted****Map Unit Setting***Elevation:* 5,200 to 6,400 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Component Description****Shawmut and similar soils***Composition:* 90 percent*Geomorphic description:* Mountain slope*Slope:* 4 to 8 percent*Elevation:* 5,200 to 6,400 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Gravelly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Calcareous gravelly alluvium*Flooding:* None*Available water capacity:* Mainly 5.0 inches**Additional Components**

Shawmut, greater slope and similar soils: 5 percent

Windham and similar soils: 5 percent

**751D—Shawmut gravelly loam, 8 to 15 percent slopes,
moderately impacted****Map Unit Setting***Elevation:* 5,200 to 6,400 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 70 to 90 days**Component Description****Shawmut and similar soils***Composition:* 90 percent*Geomorphic description:* Mountain slope*Slope:* 8 to 15 percent*Elevation:* 5,200 to 6,400 feet

Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Flooding: None
Available water capacity: Mainly 5.0 inches

Additional Components

Shawmut, greater slope and similar soils: 5 percent
 Tolbert and similar soils: 5 percent

751E—Shawmut gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Shawmut and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Flooding: None
Available water capacity: Mainly 5.0 inches

Additional Components

Wilspring and similar soils: 8 percent
 Tolbert and similar soils: 3 percent
 Braziel and similar soils: 2 percent
 Shawmut, greater slope and similar soils: 2 percent

752D—Clasoil-Crackerville-Rock outcrop complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,100 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 40 percent

Geomorphic description: Mountainside

Slope: 8 to 15 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Crackerville and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 8 to 15 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from granite over residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.2 inches

Rock outcrop

Composition: 15 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Clasoil, greater slope and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

752E—Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,100 to 6,400 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 40 percent

Geomorphic description: Mountainside

Slope: 15 to 35 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Crackerville and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 15 to 35 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from granite over residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.2 inches

Rock outcrop

Composition: 15 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Clasoil, greater slope and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

753E—Redchief-Copenhaver gravelly loams, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 6,400 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Redchief and similar soils

Composition: 50 percent

Geomorphic description:

- Foothill on hill
- Backslope on hill

Slope: 15 to 35 percent

Elevation: 5,600 to 6,400 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 5.0 inches

Copenhaver and similar soils

Composition: 35 percent

Geomorphic description: Backslope on hill

Slope: 15 to 35 percent

Elevation: 5,600 to 6,400 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from basalt, or residuum weathered from andesite

Flooding: None

Available water capacity: Mainly 1.8 inches

Additional Components

Copenhaver, extremely stony and similar soils: 8 percent

Libeg and similar soils: 5 percent

Rock outcrop: 2 percent

758F—Mishakal-Tolbert complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 5,900 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Mishakal and similar soils

Composition: 70 percent

Geomorphic description:

- Side slope on hill
- Mountainflank on mountain

Slope: 35 to 60 percent

Elevation: 5,300 to 5,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Channery loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Residuum weathered from argillite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Tolbert and similar soils

Composition: 15 percent
Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 35 to 60 percent
Elevation: 5,300 to 5,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very channery loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 1.2 inches

Additional Components

Rock outcrop: 5 percent
 Roy and similar soils: 5 percent
 Wilspring and similar soils: 5 percent

774F—Wilspring-Tolbert complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Wilspring and similar soils

Composition: 65 percent
Geomorphic description:

- Backslope on hill
- Shoulder on hill
- Mountainflank on mountain

Slope: 35 to 60 percent
Elevation: 5,400 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained

Parent material: Calcareous gravelly colluvium derived from shale or unspecified gravelly colluvium derived from argillaceous limestone

Flooding: None

Available water capacity: Mainly 2.1 inches

Tolbert and similar soils

Composition: 20 percent

Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,400 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very channery loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.2 inches

Additional Components

Mishakal and similar soils: 5 percent

Wilspring, lesser slope and similar soils: 5 percent

Rock outcrop: 3 percent

Rubble land: 2 percent

774G—Wilspring-Rubble land complex, 50 to 75 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Wilspring and similar soils

Composition: 65 percent

Geomorphic description:

- Backslope on hill
- Shoulder on hill
- Mountainflank on mountain

Slope: 50 to 75 percent

Elevation: 5,400 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very gravelly loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Calcareous gravelly colluvium derived from shale or unspecified gravelly colluvium derived from argillaceous limestone

Flooding: None

Available water capacity: Mainly 2.1 inches

Rubble land

Composition: 20 percent

Definition: Rubble land consists of areas of boulders, stones, and cobbles.

Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Tolbert and similar soils: 10 percent

Mishakal and similar soils: 5 percent

776B—Finn-Water complex, 0 to 4 percent slopes

Map Unit Setting

Elevation: 6,000 to 6,500 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Finn and similar soils

Composition: 70 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 6,000 to 6,500 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Gravelly alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Present

Ponding duration: Brief

Available water capacity: Mainly 5.9 inches

Water

Composition: 15 percent

Definition: Water includes streams, lakes, and ponds. These areas are covered with water in most years, at least during the period that is warm enough for plants to grow. Many areas are covered throughout the year.

Additional Components

Mooseflat and similar soils: 6 percent

Foolhen and similar soils: 5 percent

Dunkleber and similar soils: 4 percent

782D—Evaro stony ashy loam, 4 to 15 percent slopes

Map Unit Setting

Elevation: 7,000 to 9,000 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 4 to 15 percent
Elevation: 7,000 to 9,000 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

Additional Components

Phillcher and similar soils: 5 percent
 Rock outcrop: 5 percent
 Waldbillig and similar soils: 5 percent

782E—Evaro stony ashy loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 7,000 to 9,000 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 7,000 to 9,000 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

Additional Components

Phillcher and similar soils: 5 percent
 Rock outcrop: 5 percent
 Waldbillig and similar soils: 5 percent

782F—Evaro stony ashy loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 7,000 to 9,000 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 7,000 to 9,000 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.0 inches

Additional Components

Phillcher and similar soils: 5 percent
 Rock outcrop: 5 percent
 Waldbillig and similar soils: 5 percent

786E—Winkler gravelly loam, cool, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,700 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Winkler and similar soils

Composition: 90 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 6,700 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.0 inches

Additional Components

Rock outcrop: 5 percent
 Yreka and similar soils: 5 percent

791D—Mohaggin-Rubble land complex, 8 to 15 percent slopes

Map Unit Setting

Elevation: 7,800 to 9,200 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 60 percent
Geomorphic description: Mountain slope
Slope: 8 to 15 percent
Elevation: 7,800 to 9,200 feet
Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Rubble land

Composition: 25 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles.
 Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Cowood and similar soils: 10 percent
 Rock outcrop: 5 percent

791E—Mohaggin-Rubble land complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 7,800 to 9,200 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 60 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 7,800 to 9,200 feet
Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Rubble land

Composition: 25 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles. Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Cowood and similar soils: 10 percent
 Rock outcrop: 5 percent

791F—Mohaggin-Rubble land complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 7,800 to 9,200 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 60 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 7,800 to 9,200 feet
Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Surface layer texture: Stony ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Rubble land

Composition: 25 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles.
 Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Cowood and similar soils: 10 percent
 Rock outcrop: 5 percent

791G—Mohaggin-Rubble land complex, 60 to 80 percent slopes

Map Unit Setting

Elevation: 7,800 to 9,200 feet
Mean annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Mohaggin and similar soils

Composition: 60 percent
Geomorphic description: Mountain slope
Slope: 60 to 80 percent
Elevation: 7,800 to 9,200 feet
Effective annual precipitation: 22 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy very fine sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanic ash over colluvium derived from granite
Flooding: None
Available water capacity: Mainly 3.9 inches

Rubble land

Composition: 25 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles.
 Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Cowood and similar soils: 10 percent
 Rock outcrop: 5 percent

797E—Waldbillig-Elve complex, 8 to 25 percent slopes**Map Unit Setting**

Elevation: 5,800 to 8,000 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description**Waldbillig and similar soils**

Composition: 60 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 5,800 to 8,000 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Sandy and silty volcanic ash over gravelly till, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.7 inches

Elve and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 5,800 to 8,000 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Elve, greater slope and similar soils: 6 percent
 Evaro and similar soils: 5 percent
 Loberg and similar soils: 4 percent

797F—Waldbillig-Elve complex, 25 to 50 percent slopes**Map Unit Setting**

Elevation: 5,800 to 8,000 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Waldbillig and similar soils

Composition: 60 percent

Geomorphic description: Moraine

Slope: 25 to 50 percent

Elevation: 5,800 to 8,000 feet

Effective annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Sandy and silty volcanic ash over gravelly till, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.7 inches

Elve and similar soils

Composition: 25 percent

Geomorphic description: Mountain slope

Slope: 25 to 50 percent

Elevation: 5,800 to 8,000 feet

Effective annual precipitation: 20 to 40 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Additional Components

Elve, lesser slope and similar soils: 6 percent

Evaro and similar soils: 5 percent

Loberg and similar soils: 4 percent

800B—Aridic Ustorthents, 1 to 4 percent slopes

Map Unit Setting

Elevation: 5,080 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Aridic Ustorthents and similar soils

Composition: 85 percent

Geomorphic description: None assigned

Slope: 1 to 4 percent

Elevation: 5,080 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Very cobbly clay loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Flooding: None
Available water capacity: Mainly 7.6 inches

Additional Components

Beaverell and similar soils: 8 percent
 Aridic Ustorthents, greater slope and similar soils: 7 percent

800C—Aridic Ustorthents, 4 to 8 percent slopes

Map Unit Setting

Elevation: 5,080 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Aridic Ustorthents and similar soils

Composition: 85 percent
Geomorphic description: None assigned
Slope: 4 to 8 percent
Elevation: 5,080 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Very cobbly clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Flooding: None
Available water capacity: Mainly 7.6 inches

Additional Components

Beaverell and similar soils: 8 percent
 Aridic Ustorthents, greater slope and similar soils: 7 percent

800D—Aridic Ustorthents, 8 to 15 percent slopes

Map Unit Setting

Elevation: 5,080 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Aridic Ustorthents and similar soils

Composition: 85 percent
Geomorphic description: None assigned
Slope: 8 to 15 percent
Elevation: 5,080 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Surface layer texture: Very cobbly clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Flooding: None

Available water capacity: Mainly 7.6 inches

Additional Components

Beaverell and similar soils: 8 percent

Aridic Ustorthents, lesser slope and similar soils: 7 percent

800E—Aridic Ustorthents, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,080 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Aridic Ustorthents and similar soils

Composition: 85 percent

Geomorphic description: None assigned

Slope: 15 to 35 percent

Elevation: 5,080 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Very cobbly clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Flooding: None

Available water capacity: Mainly 7.6 inches

Additional Components

Danvers and similar soils: 8 percent

Aridic Ustorthents, lesser slope and similar soils: 7 percent

824E—Con-Sixbeacon cobbly loams, 15 to 35 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 55 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 4,000 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.4 inches

Sixbeacon and similar soils

Composition: 30 percent
Geomorphic description: Alluvial fan
Slope: 15 to 35 percent
Elevation: 4,000 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.6 inches

Additional Components

Con, calcareous and similar soils: 5 percent
 Con, greater slope and similar soils: 5 percent
 Varney and similar soils: 5 percent

824F—Con-Sixbeacon cobbly loams, 35 to 60 percent slopes

Map Unit Setting

Elevation: 4,000 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 55 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent
Elevation: 4,000 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.4 inches

Sixbeacon and similar soils

Composition: 30 percent
Geomorphic description: Alluvial fan
Slope: 35 to 60 percent
Elevation: 4,000 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.6 inches

Additional Components

Con, calcareous and similar soils: 8 percent
 Varney and similar soils: 7 percent

834B—Blossberg loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

Elevation: 4,600 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Blossberg and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 4,600 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Dougcliff and similar soils: 4 percent
 Gregson and similar soils: 4 percent
 Mannixlee and similar soils: 4 percent
 Bushong and similar soils: 3 percent

835B—Tetonview loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

Elevation: 3,800 to 5,800 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description

Tetonview and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 3,800 to 5,800 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 8.8 inches

Additional Components

Blossberg and similar soils: 3 percent
 Bushong and similar soils: 3 percent
 Dougcliff and similar soils: 3 percent
 Saypo and similar soils: 3 percent
 Turrah and similar soils: 3 percent

837B—Poronto loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

Elevation: 5,520 to 5,680 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description

Poronto and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent

Elevation: 5,520 to 5,680 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.5 inches

Additional Components

Blossberg and similar soils: 4 percent
 Dougcliff and similar soils: 4 percent
 Mannixlee and similar soils: 4 percent
 Bushong and similar soils: 3 percent

839F—Windham-Lap-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Windham and similar soils

Composition: 45 percent
Geomorphic description:

- Alluvial fan
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,600 to 6,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly alluvium derived from limestone or gravelly colluvium derived from limestone
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 4.0 inches

Lap and similar soils

Composition: 30 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain slope

Slope: 35 to 60 percent

Elevation: 5,600 to 6,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly residuum weathered from limestone, unspecified
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 2.0 inches

Rock outcrop

Composition: 10 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Wimper and similar soils: 8 percent
 Winspect and similar soils: 7 percent

840D—Arlen-Caramon-Rock outcrop complex, 8 to 15 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Arlen and similar soils

Composition: 65 percent
Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 8 to 15 percent
Elevation: 5,200 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from rhyolite or residuum weathered from tuff
Flooding: None
Available water capacity: Mainly 0.7 inches

Caramon and similar soils

Composition: 15 percent
Geomorphic description:

- Footslope on hill
- Mountain slope

Slope: 8 to 15 percent
Elevation: 5,200 to 6,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Clayey colluvium derived from rhyolite over residuum weathered from rhyolite

Flooding: None

Available water capacity: Mainly 6.5 inches

Rock outcrop (tuff)

Composition: 10 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Macabre and similar soils: 8 percent

Burrfoot and similar soils: 2 percent

840F—Arlen-Caramon-Rock outcrop complex, 15 to 60 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Arlen and similar soils

Composition: 65 percent

Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 15 to 60 percent

Elevation: 5,200 to 6,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from rhyolite or residuum weathered from tuff

Flooding: None

Available water capacity: Mainly 0.7 inches

Caramon and similar soils

Composition: 15 percent

Geomorphic description:

- Footslope on hill
- Mountain slope

Slope: 15 to 60 percent

Elevation: 5,200 to 6,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Clayey colluvium derived from rhyolite over residuum weathered from rhyolite

Flooding: None

Available water capacity: Mainly 6.5 inches

Rock outcrop (tuff)

Composition: 10 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Macabre and similar soils: 8 percent

Burrfoot and similar soils: 2 percent

846F—Roy-Tolbert complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,000 to 5,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 65 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainflank on mountain
- Mountainbase on mountain
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,000 to 5,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.9 inches

Tolbert and similar soils

Composition: 20 percent

Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,000 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

Additional Components

Rock outcrop: 5 percent
 Rubble land: 5 percent
 Shawmut and similar soils: 5 percent

854E—Libeg-Monad-Copenhaver complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.4 inches

Monad and similar soils

Composition: 25 percent
Geomorphic description: Stream terrace
Slope: 15 to 35 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted

Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.1 inches

Copenhaver and similar soils

Composition: 20 percent
Geomorphic description: Backslope on hill
Slope: 15 to 35 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

Additional Components

Libeg, greater slope and similar soils: 4 percent
 Rock outcrop: 4 percent
 Roy and similar soils: 4 percent
 Libeg, cobbly and similar soils: 3 percent

854F—Libeg-Monad-Copenhaver complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 5.4 inches

Monad and similar soils

Composition: 25 percent
Geomorphic description: Stream terrace
Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 8.1 inches

Copenhaver and similar soils

Composition: 20 percent
Geomorphic description: Backslope on hill
Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.4 inches

Additional Components

Libeg, very cobbly and similar soils: 4 percent
 Rock outcrop: 4 percent
 Roy and similar soils: 4 percent
 Libeg, greater slope and similar soils: 3 percent

855A—Mannixlee-Blossberg complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,400 to 5,540 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description

Mannixlee and similar soils

Composition: 45 percent

Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,400 to 5,540 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 8.8 inches

Blossberg and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,400 to 5,540 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Bushong and similar soils: 4 percent
 Dougcliff and similar soils: 4 percent
 Poronto and similar soils: 4 percent
 Gregson and similar soils: 3 percent

865F—Karloff gravelly ashy sandy loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 85 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent
Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Additional Components

Litag and similar soils: 8 percent
 Danvers and similar soils: 3 percent
 Nivean and similar soils: 2 percent
 Rock outcrop (tuff): 2 percent

882E—Phillcher-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 7,600 to 9,100 feet
Mean annual precipitation: 26 to 40 inches
Frost-free period: 20 to 40 days

Component Description

Phillcher and similar soils

Composition: 50 percent
Geomorphic description: Mountaintop on mountain slope
Slope: 15 to 35 percent
Elevation: 7,600 to 9,100 feet
Effective annual precipitation: 26 to 40 inches
Frost-free period: 20 to 40 days
Surface layer texture: Gravelly ashy silt loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.8 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evaro and similar soils: 10 percent
 Mohaggin and similar soils: 5 percent

882F—Phillcher-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 7,600 to 9,100 feet
Mean annual precipitation: 26 to 40 inches
Frost-free period: 20 to 40 days

Component Description

Phillcher and similar soils

Composition: 50 percent
Geomorphic description: Mountaintop on mountain slope
Slope: 35 to 60 percent
Elevation: 7,600 to 9,100 feet
Effective annual precipitation: 26 to 40 inches
Frost-free period: 20 to 40 days
Surface layer texture: Gravelly ashy silt loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.8 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evano and similar soils: 10 percent
 Mohaggin and similar soils: 5 percent

882G—Phillcher-Rock outcrop complex, 60 to 80 percent slopes

Map Unit Setting

Elevation: 7,600 to 9,100 feet
Mean annual precipitation: 26 to 40 inches
Frost-free period: 20 to 40 days

Component Description

Phillcher and similar soils

Composition: 50 percent
Geomorphic description: Mountaintop on mountain slope
Slope: 60 to 80 percent
Elevation: 7,600 to 9,100 feet
Effective annual precipitation: 26 to 40 inches
Frost-free period: 20 to 40 days
Surface layer texture: Gravelly ashy silt loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained

Parent material: Sandy and silty volcanic ash over gravelly colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.8 inches

Rock outcrop

Composition: 35 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evapo and similar soils: 10 percent

Mohaggin and similar soils: 5 percent

888E—Caramon ashy loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 6,200 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Caramon and similar soils

Composition: 85 percent

Geomorphic description:

- Footslope on hill
- Mountain slope

Slope: 15 to 35 percent

Elevation: 5,300 to 6,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Clayey colluvium derived from rhyolite over residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.6 inches

Additional Components

Burrfoot and similar soils: 6 percent

Danvers and similar soils: 5 percent

Nivean and similar soils: 2 percent

Work and similar soils: 2 percent

889E—Karloff ashy loam, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 85 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent
Elevation: 5,900 to 6,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Additional Components

Coslaw and similar soils: 10 percent
 Bendoh and similar soils: 5 percent

897E—Evaro gravelly ashy loam, moist, 8 to 25 percent slopes

Map Unit Setting

Elevation: 7,000 to 8,200 feet
Mean annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days

Component Description

Evaro and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 7,000 to 8,200 feet
Effective annual precipitation: 20 to 25 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.2 inches

Additional Components

Holloway and similar soils: 4 percent

Rock outcrop: 4 percent

Worock and similar soils: 4 percent

Elve and similar soils: 3 percent

903B—Foolhen loam, 0 to 4 percent slopes, rarely flooded

Map Unit Setting

Elevation: 5,960 to 6,800 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Foolhen and similar soils

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 5,960 to 6,800 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Mucky peat

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Fine-loamy alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Present

Ponding duration: Brief

Available water capacity: Mainly 7.1 inches

Additional Components

Dunkleber and similar soils: 4 percent

Finn and similar soils: 4 percent

Mooseflat and similar soils: 4 percent

Kilgore and similar soils: 3 percent

914A—Kilgore-Mooseflat complex, 0 to 2 percent slopes

Map Unit Setting

Elevation: 5,900 to 6,650 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Kilgore and similar soils

Composition: 45 percent

Geomorphic description: Flood plain

Slope: 0 to 2 percent
Elevation: 5,900 to 6,650 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 4.5 inches

Mooseflat and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,900 to 6,650 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Additional Components

Foolhen and similar soils: 10 percent
 Finn and similar soils: 5 percent

922E—Judco gravelly ashy sandy clay loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 6,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Judco and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Base slope on hill
- Side slope on hill
- Mountain slope

Slope: 15 to 35 percent
Elevation: 5,800 to 6,800 feet
Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy sandy clay loam
Depth to restrictive feature: Bedrock (paralithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Additional Components

Coslaw and similar soils: 5 percent
 Elve and similar soils: 5 percent
 Copenhaver and similar soils: 3 percent
 Rock outcrop: 2 percent

924E—Con-Sixbeacon cobbly loams, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Con and similar soils

Composition: 55 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 4,920 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Flooding: None
Available water capacity: Mainly 8.5 inches

Sixbeacon and similar soils

Composition: 30 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 4,920 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Calcareous alluvium

Flooding: None

Available water capacity: Mainly 4.3 inches

Additional Components

Beaverell and similar soils: 6 percent

Anaconda and similar soils: 5 percent

Varney and similar soils: 4 percent

932F—Sula-Shook-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,600 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Sula and similar soils

Composition: 30 percent

Geomorphic description:

- Alluvial fan
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,800 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Coarse-loamy colluvium derived from granite or coarse-loamy residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 5.5 inches

Shook and similar soils

Composition: 30 percent

Geomorphic description: Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,800 to 6,600 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 30 to 40 inches

Drainage class: Well drained

Parent material: Coarse-loamy colluvium derived from granite or coarse-loamy residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None
Available water capacity: Mainly 3.5 inches

Rock outcrop

Composition: 30 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Libeg and similar soils: 5 percent
 Maurice and similar soils: 5 percent

**933E—Burrfoot-Nivean complex, 15 to 35 percent slopes,
 moderately impacted**

Map Unit Setting

Elevation: 5,100 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Burrfoot and similar soils

Composition: 80 percent
Geomorphic description: Footslope on hillside
Slope: 15 to 35 percent
Elevation: 5,100 to 6,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly ashy sandy clay loam
Depth to restrictive feature: Bedrock (paralithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 3.6 inches

Nivean and similar soils

Composition: 15 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 35 percent
Elevation: 5,100 to 6,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very gravelly sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 0.9 inches

Additional Components

Danvers and similar soils: 3 percent
Rock outcrop: 2 percent

934B—Cetrack loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Cetrack and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Outwash plain
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,920 to 5,300 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium over sandy and gravelly alluvium

Flooding: None

Available water capacity: Mainly 5.8 inches

Additional Components

Con and similar soils: 5 percent
Saypo and similar soils: 5 percent
Sixbeacon and similar soils: 5 percent

935B—Anaconda sandy loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,800 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent

Elevation: 4,800 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent
 Gregson and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

935C—Anaconda sandy loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,800 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 4,800 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent
 Gregson and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

935D—Anaconda sandy loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,800 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,800 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 7.8 inches

Additional Components

Con and similar soils: 5 percent
 Gregson and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

935E—Anaconda sandy loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,800 to 5,300 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Anaconda and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 4,800 to 5,300 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 7.7 inches

Additional Components

Con and similar soils: 5 percent
 Gregson and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

937B—Sixbeacon cobbly loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,400 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,920 to 5,400 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous alluvium
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Anaconda and similar soils: 8 percent
 Con and similar soils: 7 percent

937C—Sixbeacon cobbly loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,920 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Sixbeacon and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent*Elevation:* 4,920 to 5,200 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Calcareous alluvium*Flooding:* None*Available water capacity:* Mainly 4.3 inches**Additional Components**

Anaconda and similar soils: 8 percent

Con and similar soils: 7 percent

937D—Sixbeacon cobbly loam, 8 to 15 percent slopes, moderately impacted**Map Unit Setting***Elevation:* 4,920 to 5,200 feet*Mean annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days**Component Description****Sixbeacon and similar soils***Composition:* 85 percent*Geomorphic description:*

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent*Elevation:* 4,920 to 5,200 feet*Effective annual precipitation:* 10 to 14 inches*Frost-free period:* 90 to 105 days*Surface layer texture:* Cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Calcareous alluvium*Flooding:* None*Available water capacity:* Mainly 4.3 inches**Additional Components**

Anaconda and similar soils: 8 percent

Con and similar soils: 7 percent

938D—Lap-Windham loams, 4 to 15 percent slopes, very stony, moderately impacted

Map Unit Setting

Elevation: 5,300 to 5,700 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Lap and similar soils

Composition: 65 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain slope

Slope: 4 to 15 percent
Elevation: 5,300 to 5,700 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Rock fragments on the soil surface: 0.10 to 3.00 percent stones
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly residuum weathered from limestone, unspecified
Flooding: None
Available water capacity: Mainly 1.5 inches

Windham and similar soils

Composition: 20 percent
Geomorphic description:

- Alluvial fan
- Mountainflank on mountain
- Stream terrace

Slope: 8 to 15 percent
Elevation: 5,300 to 5,700 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Rock fragments on the soil surface: 0.10 to 3.00 percent stones
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly alluvium derived from limestone or gravelly colluvium derived from limestone
Flooding: None
Available water capacity: Mainly 4.8 inches

Additional Components

Roy and similar soils: 8 percent
 Shawmut and similar soils: 4 percent
 Rock outcrop: 3 percent

939F—Windham-Lap-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 5,900 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Windham and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Mountainflank on mountain
- Stream terrace

Slope: 15 to 45 percent

Elevation: 5,400 to 5,900 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly alluvium derived from limestone or gravelly colluvium derived from limestone

Flooding: None

Available water capacity: Mainly 4.0 inches

Lap and similar soils

Composition: 35 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain slope

Slope: 15 to 25 percent

Elevation: 5,400 to 5,900 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very channery loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly residuum weathered from limestone, unspecified

Flooding: None

Available water capacity: Mainly 1.2 inches

Rock outcrop

Composition: 15 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Work and similar soils: 10 percent

944F—Work-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Work and similar soils

Composition: 50 percent
Geomorphic description: Backslope on hill
Slope: 35 to 60 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very channery clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous slope alluvium
Flooding: None
Available water capacity: Mainly 9.0 inches

Tolbert and similar soils

Composition: 20 percent
Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 35 to 60 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Extremely channery clay loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 1.2 inches

Rock outcrop

Composition: 15 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Caramon and similar soils: 8 percent
 Beaverell and similar soils: 5 percent
 Danvers and similar soils: 2 percent

945B—Saypo loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,900 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Saypo and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,900 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Fine-loamy calcareous alluvium
Flooding: None
Water table: Present
Available water capacity: Mainly 8.1 inches

Additional Components

Con and similar soils: 8 percent
 Beaverell and similar soils: 7 percent

946E—Roy-Tolbert-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 55 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Surface layer texture: Gravelly clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks
Flooding: None
Available water capacity: Mainly 4.5 inches

Tolbert and similar soils

Composition: 20 percent
Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 15 to 35 percent
Elevation: 5,200 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Extremely channery loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 1.2 inches

Rock outcrop

Composition: 10 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Roy, greater slope and similar soils: 10 percent
 Mishakal and similar soils: 3 percent
 Rubble land: 2 percent

946F—Roy-Tolbert-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 50 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent
Elevation: 5,200 to 6,000 feet
Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 4.5 inches

Tolbert and similar soils

Composition: 25 percent

Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,200 to 6,000 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Extremely channery loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 1.2 inches

Rock outcrop

Composition: 10 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Roy, lesser slope and similar soils: 8 percent

Mishakal and similar soils: 5 percent

Danvers and similar soils: 2 percent

951F—Roy-Shawmut-Danvers complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,000 to 6,000 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 35 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,000 to 6,000 feet

Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks
Flooding: None
Available water capacity: Mainly 4.8 inches

Shawmut and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent
Elevation: 5,000 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly alluvium
Flooding: None
Available water capacity: Mainly 5.3 inches

Danvers and similar soils

Composition: 25 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent
Elevation: 5,000 to 6,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 8.4 inches

Additional Components

Braziel and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent
 Staad and similar soils: 5 percent

954E—Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 18 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.7 inches

Copenhaver and similar soils

Composition: 25 percent

Geomorphic description: Backslope on hill

Slope: 15 to 35 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.3 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Adel and similar soils: 4 percent

Mollet and similar soils: 4 percent

Monad and similar soils: 4 percent

Redchief and similar soils: 3 percent

954F—Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 4.7 inches

Copenhaver and similar soils

Composition: 25 percent

Geomorphic description: Backslope on hill

Slope: 35 to 60 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 1.3 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Adel and similar soils: 4 percent

Mollet and similar soils: 4 percent

Monad and similar soils: 4 percent

Redchief and similar soils: 3 percent

958F—Mishakal loam, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,200 to 6,000 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 70 to 90 days

Component Description

Mishakal and similar soils

Composition: 85 percent

Geomorphic description:

- Side slope on hill
- Mountainflank on mountain

Slope: 35 to 60 percent

Elevation: 5,200 to 6,000 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Residuum weathered from argillite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.2 inches

Additional Components

Tolbert and similar soils: 6 percent

Wilspring and similar soils: 5 percent

Danvers and similar soils: 3 percent

Rock outcrop: 1 percent

966D—Macabre-Arlen complex, 8 to 15 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 6,000 feet

Mean annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Component Description

Macabre and similar soils

Composition: 60 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 8 to 15 percent

Elevation: 5,200 to 6,000 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly ashy sandy clay loam

Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Flooding: None

Available water capacity: Mainly 3.3 inches

Arlen and similar soils

Composition: 25 percent

Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 8 to 15 percent*Elevation:* 5,200 to 6,000 feet*Effective annual precipitation:* 18 to 24 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Very gravelly ashy sandy loam*Depth to restrictive feature:* Bedrock (lithic): 10 to 20 inches*Drainage class:* Well drained*Parent material:* Residuum weathered from tuff or residuum weathered from rhyolite*Flooding:* None*Available water capacity:* Mainly 0.7 inches**Additional Components**

Julius and similar soils: 10 percent

Rock outcrop: 3 percent

Macabre, greater slope and similar soils: 2 percent

**966E—Macabre-Arlen complex, 15 to 35 percent slopes,
severely impacted****Map Unit Setting***Elevation:* 5,200 to 6,000 feet*Mean annual precipitation:* 18 to 24 inches*Frost-free period:* 70 to 90 days**Component Description****Macabre and similar soils***Composition:* 60 percent*Geomorphic description:*

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 35 percent*Elevation:* 5,200 to 6,000 feet*Effective annual precipitation:* 18 to 24 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Gravelly ashy sandy clay loam*Depth to restrictive feature:* Bedrock (lithic): 20 to 60 inches*Drainage class:* Well drained*Parent material:* Rhyolite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 3.3 inches**Arlen and similar soils***Composition:* 25 percent

Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 15 to 35 percent*Elevation:* 5,200 to 6,000 feet*Effective annual precipitation:* 18 to 24 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Very gravelly ashy sandy loam*Depth to restrictive feature:* Bedrock (lithic): 10 to 20 inches*Drainage class:* Well drained*Parent material:* Residuum weathered from tuff or residuum weathered from rhyolite*Flooding:* None*Available water capacity:* Mainly 0.7 inches**Additional Components**

Caramon and similar soils: 10 percent

Rock outcrop: 5 percent

975F—Hanson-Rock outcrop complex, 35 to 60 percent slopes**Map Unit Setting***Elevation:* 5,700 to 6,800 feet*Mean annual precipitation:* 15 to 19 inches*Frost-free period:* 30 to 70 days**Component Description****Hanson and similar soils***Composition:* 50 percent*Geomorphic description:* Mountain slope*Slope:* 35 to 60 percent*Elevation:* 5,700 to 6,800 feet*Effective annual precipitation:* 15 to 19 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Gravelly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Very calcareous gravelly colluvium derived from limestone, unspecified*Native plant cover type:* Rangeland*Flooding:* None*Available water capacity:* Mainly 5.1 inches**Rock outcrop***Composition:* 40 percent*Definition:* Rock outcrop consists of exposures of bare bedrock.**Additional Components**

Tibson and similar soils: 10 percent

977E—Work-Julius-Arlen complex, 15 to 35 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 15 to 24 inches
Frost-free period: 70 to 90 days

Component Description

Work and similar soils

Composition: 45 percent
Geomorphic description: Backslope on hill
Slope: 15 to 35 percent
Elevation: 5,200 to 6,200 feet
Effective annual precipitation: 15 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous slope alluvium
Flooding: None
Available water capacity: Mainly 9.2 inches

Julius and similar soils

Composition: 30 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 6,200 feet
Effective annual precipitation: 15 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very gravelly clay loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 4.8 inches

Arlen and similar soils

Composition: 15 percent
Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 15 to 35 percent
Elevation: 5,200 to 6,200 feet
Effective annual precipitation: 15 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from tuff or residuum weathered from rhyolite

Flooding: None

Available water capacity: Mainly 0.7 inches

Additional Components

Caramon and similar soils: 8 percent

Rock outcrop: 2 percent

977F—Work-Julius-Arlen complex, 35 to 60 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,200 to 6,200 feet

Mean annual precipitation: 15 to 24 inches

Frost-free period: 70 to 90 days

Component Description

Work and similar soils

Composition: 45 percent

Geomorphic description: Backslope on hill

Slope: 35 to 60 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey calcareous slope alluvium

Flooding: None

Available water capacity: Mainly 9.2 inches

Julius and similar soils

Composition: 30 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 60 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very gravelly clay loam

Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Clayey calcareous alluvium

Flooding: None

Available water capacity: Mainly 4.8 inches

Arlen and similar soils

Composition: 15 percent

Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 35 to 60 percent
Elevation: 5,200 to 6,200 feet
Effective annual precipitation: 15 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from rhyolite or residuum weathered from tuff
Flooding: None
Available water capacity: Mainly 0.7 inches

Additional Components

Caramon and similar soils: 7 percent
 Rock outcrop: 3 percent

982E—Elve-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evaro and similar soils: 8 percent
 Worock and similar soils: 7 percent

982F—Elve-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evoro and similar soils: 8 percent
 Worock and similar soils: 7 percent

982G—Elve-Rock outcrop complex, 60 to 80 percent slopes

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 60 to 80 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evoro and similar soils: 8 percent
 Worock and similar soils: 7 percent

988F—Whitecow-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,600 to 6,200 feet
Mean annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days

Component Description

Whitecow and similar soils

Composition: 55 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,600 to 6,200 feet
Effective annual precipitation: 18 to 25 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 30 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 6 percent
 Yreka and similar soils: 5 percent
 Windham and similar soils: 4 percent

992E—Whitore-Rock outcrop complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,800 to 8,600 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 45 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 8,600 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

Rock outcrop

Composition: 40 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Helmville and similar soils: 4 percent
 Whitecow, moderately deep and similar soils: 4 percent
 Whitecow and similar soils: 4 percent
 Elve and similar soils: 3 percent

992F—Whitore-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 8,600 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 45 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 8,600 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.8 inches

Rock outcrop

Composition: 40 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Helmville and similar soils: 4 percent
 Whitecow, moderately deep and similar soils: 4 percent
 Whitecow and similar soils: 4 percent
 Elve and similar soils: 3 percent

992G—Whitore-Rock outcrop complex, 60 to 80 percent slopes**Map Unit Setting**

Elevation: 5,800 to 8,600 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description**Whitore and similar soils**

Composition: 45 percent
Geomorphic description: Mountain slope
Slope: 60 to 80 percent
Elevation: 5,800 to 8,600 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Flooding: None
Available water capacity: Mainly 4.8 inches

Rock outcrop

Composition: 40 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Elve and similar soils: 4 percent
 Helmville and similar soils: 4 percent
 Worock and similar soils: 4 percent
 Rubble land: 3 percent

996F—Worock-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Elve and similar soils: 4 percent
 Evaro and similar soils: 4 percent
 Loberg and similar soils: 4 percent
 Rubble land: 3 percent

997E—Waldbillig stony ashy very fine sandy loam, 8 to 25 percent slopes

Map Unit Setting

Elevation: 7,600 to 8,600 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Waldbillig and similar soils

Composition: 85 percent
Geomorphic description: Moraine
Slope: 8 to 25 percent
Elevation: 7,600 to 8,600 feet
Effective annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony ashy very fine sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Sandy and silty volcanic ash over gravelly till, unspecified

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Additional Components

Waldbillig, gravelly and similar soils: 10 percent

Mooseflat and similar soils: 3 percent

Rubble land: 2 percent

1021D—Maurice cobbly loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Maurice and similar soils

Composition: 85 percent

Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,800 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly alluvium

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Libeg and similar soils: 10 percent

Redchief and similar soils: 5 percent

1025D—Staad silty clay loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,700 to 5,800 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Staad and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Drainageway

Slope: 8 to 15 percent

Elevation: 4,700 to 5,800 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Silty clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Flooding: None

Available water capacity: Mainly 10.6 inches

Additional Components

Martinsdale and similar soils: 5 percent

Perma and similar soils: 5 percent

Quigley and similar soils: 5 percent

1025F—Copenhaver, stony-Libeg, very stony-Rock outcrop complex, 15 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 7,200 to 7,800 feet

Mean annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Component Description

Copenhaver and similar soils

Composition: 40 percent

Geomorphic description: Backslope on hill

Slope: 15 to 45 percent

Elevation: 7,200 to 7,800 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly loam

Rock fragments on the soil surface: 0.01 to 0.10 percent stones

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt

Flooding: None

Available water capacity: Mainly 1.2 inches

Libeg and similar soils

Composition: 35 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 25 to 60 percent

Elevation: 7,200 to 7,800 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very gravelly loam

Rock fragments on the soil surface: 0.10 to 3.00 percent stones

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 4.7 inches

Rock outcrop

Composition: 10 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 10 percent

Redfern and similar soils: 3 percent

Illiano and similar soils: 2 percent

1039D—Winspect gravelly loam, 8 to 15 percent slopes, moderately impacted**Map Unit Setting**

Elevation: 5,400 to 6,500 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description**Winspect and similar soils**

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 8 to 15 percent

Elevation: 5,400 to 6,500 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Colluvium derived from limestone

Flooding: None

Available water capacity: Mainly 6.3 inches

Additional Components

Rock outcrop: 5 percent
 Shawmut and similar soils: 5 percent
 Wimper and similar soils: 5 percent

1039E—Winspect gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,500 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Winspect and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 15 to 35 percent
Elevation: 5,400 to 6,500 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium derived from limestone
Flooding: None
Available water capacity: Mainly 6.3 inches

Additional Components

Rock outcrop: 5 percent
 Shawmut and similar soils: 5 percent
 Winspect, cobbly and similar soils: 5 percent

1039F—Winspect gravelly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,500 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Winspect and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,400 to 6,500 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium derived from limestone
Flooding: None
Available water capacity: Mainly 6.3 inches

Additional Components

Rock outcrop: 5 percent
 Shawmut and similar soils: 5 percent
 Wimper and similar soils: 5 percent

1041E—Perma gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent
Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 15 to 35 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly alluvium
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Braziel and similar soils: 5 percent
 Shawmut and similar soils: 5 percent
 Winspect and similar soils: 5 percent

1041F—Perma gravelly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent
Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly alluvium
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Braziel and similar soils: 5 percent
 Shawmut and similar soils: 5 percent
 Winspect and similar soils: 5 percent

1046C—Roy gravelly loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,180 to 6,800 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Roy and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 4 to 8 percent
Elevation: 5,180 to 6,800 feet
Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Danvers and similar soils: 8 percent
 Shawmut and similar soils: 7 percent

1052B—Martinsdale loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 5,200 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Flooding: None
Available water capacity: Mainly 9.2 inches

Additional Components

Danvers and similar soils: 5 percent
 Quigley and similar soils: 5 percent
 Shawmut and similar soils: 5 percent

1052C—Martinsdale loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Martinsdale and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 5,200 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Flooding: None

Available water capacity: Mainly 9.2 inches

Additional Components

Danvers and similar soils: 5 percent

Quigley and similar soils: 5 percent

Shawmut and similar soils: 5 percent

1054C—Libeg gravelly loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 7,800 feet

Mean annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 4 to 8 percent

Elevation: 5,400 to 7,800 feet

Effective annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent

Finn and similar soils: 5 percent

Mollet and similar soils: 5 percent

1054D—Libeg gravelly loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,800 feet

Mean annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 8 to 15 percent

Elevation: 5,800 to 7,800 feet

Effective annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent

Mollet and similar soils: 5 percent

Rock outcrop: 5 percent

1054E—Libeg gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 7,800 feet

Mean annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,400 to 7,800 feet

Effective annual precipitation: 15 to 23 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent
 Mollet and similar soils: 5 percent
 Rock outcrop: 5 percent

1054F—Libeg gravelly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 8,200 feet
Mean annual precipitation: 15 to 25 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent

Elevation: 5,400 to 8,200 feet

Effective annual precipitation: 15 to 25 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 5.4 inches

Additional Components

Copenhaver and similar soils: 5 percent
 Redchief and similar soils: 5 percent
 Rock outcrop: 5 percent

1060E—Quigley loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,360 to 6,020 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Quigley and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Outwash plain
- Stream terrace

Slope: 15 to 35 percent

Elevation: 5,360 to 6,020 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy calcareous alluvium

Flooding: None

Available water capacity: Mainly 6.9 inches

Additional Components

Danvers and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

Shawmut and similar soils: 5 percent

1076F—Tibson gravelly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 6,400 feet

Mean annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent

Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,800 to 6,400 feet

Effective annual precipitation: 15 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Levengood and similar soils: 8 percent

Maciver and similar soils: 7 percent

1081F—Holloway gravelly ashy silt loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Holloway and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 30 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy silt loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Sandy and silty volcanic ash over gravelly colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.5 inches

Additional Components

Evano and similar soils: 8 percent
 Rumsey and similar soils: 7 percent

1084F—Helmville cobbly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,400 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Helmville and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Additional Components

Relyea and similar soils: 5 percent

Rock outcrop: 5 percent

Whitore and similar soils: 5 percent

1096D—Worock gravelly loam, 4 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,300 to 8,100 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 4 to 15 percent

Elevation: 6,300 to 8,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Additional Components

Elve and similar soils: 5 percent

Loberg and similar soils: 4 percent

Danaher and similar soils: 3 percent

Evare and similar soils: 3 percent

1096E—Worock gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 8,100 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent
Elevation: 5,600 to 8,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Elve and similar soils: 5 percent
 Loberg and similar soils: 4 percent
 Danaher and similar soils: 3 percent
 Evaro and similar soils: 3 percent

1096F—Worock gravelly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 8,100 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,600 to 8,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Elve and similar soils: 5 percent
 Evaro and similar soils: 4 percent
 Danaher and similar soils: 3 percent
 Loberg and similar soils: 3 percent

1110A—Carten-Wetsand complex, 0 to 2 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,200 to 6,000 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description

Carten and similar soils

Composition: 45 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,200 to 6,000 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.4 inches

Wetsand and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 4,200 to 6,000 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Salt affected: Saline within 30 inches
Available water capacity: Mainly 3.8 inches

Additional Components

Water: 6 percent
 Riverwash: 5 percent
 Carten, greater slope and similar soils: 4 percent

1141F—Perma gravelly loam, 35 to 60 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent
Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly alluvium
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Braziel and similar soils: 8 percent
 Shawmut and similar soils: 7 percent

1152C—Clasoil sandy loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 3,500 to 5,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent
Elevation: 3,500 to 5,200 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Alluvium and/or colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 7.2 inches

Additional Components

Crackerville and similar soils: 8 percent
 Clasoil, greater slope and similar soils: 7 percent

1152D—Clasoil sandy loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 6,200 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,200 to 6,200 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium
 derived from granite

Flooding: None

Available water capacity: Mainly 7.2 inches

Additional Components

Crackerville and similar soils: 5 percent
 Martinsdale and similar soils: 5 percent
 Rock outcrop: 5 percent

1236B—Varney sandy clay loam, 2 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,000 to 5,200 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 2 to 4 percent

Elevation: 4,000 to 5,200 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Sandy clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.3 inches

Additional Components

Anaconda and similar soils: 4 percent

Sixbeacon and similar soils: 4 percent

Varney, greater slope and similar soils: 4 percent

Cetrack and similar soils: 3 percent

1236C—Varney sandy clay loam, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,000 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 4,000 to 5,200 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Sandy clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.3 inches

Additional Components

Con and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney, greater slope and similar soils: 4 percent
 Cetrack and similar soils: 3 percent

1236D—Varney sandy clay loam, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,600 to 5,600 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Varney and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent
Elevation: 4,600 to 5,600 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Sandy clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy calcareous alluvium
Flooding: None
Available water capacity: Mainly 7.5 inches

Additional Components

Anaconda and similar soils: 4 percent
 Sixbeacon and similar soils: 4 percent
 Varney, greater slope and similar soils: 4 percent
 Cetrack and similar soils: 3 percent

1242E—Braziel gravelly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 6,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Braziel and similar soils

Composition: 85 percent
Geomorphic description: Backslope on hill
Slope: 15 to 35 percent

Elevation: 5,600 to 6,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Volcanics
Flooding: None
Available water capacity: Mainly 5.2 inches

Additional Components

Perma and similar soils: 5 percent
 Shawmut and similar soils: 5 percent
 Staad and similar soils: 5 percent

1276D—Tibson stony loam, 2 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Tibson and similar soils

Composition: 85 percent
Geomorphic description:

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 2 to 15 percent
Elevation: 5,800 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified
Flooding: None
Available water capacity: Mainly 5.1 inches

Additional Components

Libeg and similar soils: 10 percent
 Maurice and similar soils: 5 percent

1314A—Kilgore-Foolhen-Mooseflat complex, 0 to 2 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,700 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Kilgore and similar soils

Composition: 35 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Occasional
Water table: Present
Available water capacity: Mainly 4.5 inches

Foolhen and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Mucky peat
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Fine-loamy alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 7.1 inches

Mooseflat and similar soils

Composition: 25 percent
Geomorphic description: Flood plain
Slope: 0 to 2 percent
Elevation: 5,700 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Alluvium

Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 4.8 inches

Additional Components

Dunkleber and similar soils: 8 percent
 Water: 7 percent

1338F—Perma cobbly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,100 to 5,900 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Perma and similar soils

Composition: 85 percent
Geomorphic description:

- Moraine
- Mountainbase on mountain
- Outwash plain

Slope: 35 to 60 percent
Elevation: 5,100 to 5,900 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly alluvium
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Dominic and similar soils: 8 percent
 Wimper and similar soils: 7 percent

1392E—Whitore cobbly loam, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,200 to 7,800 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,200 to 7,800 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Helmville and similar soils: 8 percent
 Rock outcrop: 7 percent

1392F—Whitore cobbly loam, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,200 to 7,800 feet
Mean annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days

Component Description

Whitore and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,200 to 7,800 feet
Effective annual precipitation: 20 to 40 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Very calcareous gravelly colluvium derived from limestone, unspecified
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.5 inches

Additional Components

Helmville and similar soils: 8 percent
 Rock outcrop: 7 percent

1442E—Braziel-Tolbert complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 3,800 to 5,000 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Braziel and similar soils

Composition: 60 percent
Geomorphic description: Mountain
Slope: 15 to 35 percent
Elevation: 3,800 to 5,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Stony loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Colluvium
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 5.2 inches

Tolbert and similar soils

Composition: 25 percent
Geomorphic description: Mountain
Slope: 15 to 35 percent
Elevation: 3,800 to 5,000 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very stony loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum
Native plant cover type: Rangeland
Flooding: None
Available water capacity: Mainly 1.7 inches

Additional Components

Braziel, greater slope and similar soils: 3 percent
 Crackerville and similar soils: 3 percent
 Perma and similar soils: 3 percent
 Rock outcrop: 3 percent
 Roy and similar soils: 3 percent

1446C—Danvers-Roy complex, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 50 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 4 to 8 percent

Elevation: 5,200 to 5,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey calcareous alluvium

Flooding: None

Available water capacity: Mainly 8.6 inches

Roy and similar soils

Composition: 35 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 4 to 8 percent

Elevation: 5,200 to 5,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Braziel and similar soils: 6 percent

Shawmut and similar soils: 6 percent

Winspect and similar soils: 3 percent

1446D—Danvers-Roy complex, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 50 percent

Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,200 to 5,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Clay loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey calcareous alluvium

Flooding: None

Available water capacity: Mainly 8.6 inches

Roy and similar soils

Composition: 35 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainflank on mountain
- Mountainbase on mountain
- Stream terrace

Slope: 8 to 15 percent

Elevation: 5,200 to 5,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 4.9 inches

Additional Components

Martinsdale and similar soils: 5 percent

Winspect and similar soils: 5 percent

Braziel and similar soils: 3 percent

Shawmut and similar soils: 2 percent

1446E—Danvers-Roy complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 50 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 8.6 inches

Roy and similar soils

Composition: 35 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainflank on mountain
- Mountainbase on mountain
- Stream terrace

Slope: 15 to 35 percent
Elevation: 5,200 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Martinsdale and similar soils: 5 percent
 Winspect and similar soils: 5 percent
 Braziel and similar soils: 3 percent
 Shawmut and similar soils: 2 percent

1446F—Danvers-Roy complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,200 to 5,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Danvers and similar soils

Composition: 50 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 35 to 45 percent
Elevation: 5,200 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Clayey calcareous alluvium
Flooding: None
Available water capacity: Mainly 8.6 inches

Roy and similar soils

Composition: 35 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain
- Mountainflank on mountain
- Stream terrace

Slope: 35 to 60 percent
Elevation: 5,200 to 5,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Calcareous gravelly clayey colluvium derived from igneous rocks
Flooding: None
Available water capacity: Mainly 4.9 inches

Additional Components

Martinsdale and similar soils: 5 percent
 Winspect and similar soils: 5 percent
 Braziel and similar soils: 3 percent
 Shawmut and similar soils: 2 percent

1454E—Libeg-Macabre-Redchief complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 6,600 feet
Mean annual precipitation: 15 to 22 inches
Frost-free period: 30 to 90 days

Component Description

Libeg and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 5.4 inches

Macabre and similar soils

Composition: 25 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 35 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 70 to 90 days
Surface layer texture: Ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 2.9 inches

Redchief and similar soils

Composition: 20 percent
Geomorphic description:

- Footslope on hill
- Backslope on hill
- Mountainbase on mountain

Slope: 15 to 35 percent
Elevation: 5,600 to 6,600 feet
Effective annual precipitation: 15 to 22 inches
Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Flooding: None

Available water capacity: Mainly 5.1 inches

Additional Components

Adel and similar soils: 4 percent

Monad and similar soils: 4 percent

Rock outcrop: 4 percent

Mollet and similar soils: 3 percent

1482E—Elve gravelly loam, dry, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,000 to 7,200 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,000 to 7,200 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.6 inches

Additional Components

Loberg and similar soils: 5 percent

Rock outcrop: 5 percent

Worock and similar soils: 5 percent

1482F—Elve gravelly loam, dry, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,000 to 7,200 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 85 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,000 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Additional Components

Loberg and similar soils: 5 percent
 Rock outcrop: 5 percent
 Worock and similar soils: 5 percent

1533B—Pozega silty clay loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,600 to 5,000 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Pozega and similar soils

Composition: 85 percent
Geomorphic description:

- Outwash plain
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,600 to 5,000 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Silty clay loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Coarse-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Salt affected: Saline within 30 inches
Sodium affected: Sodic within 30 inches
Available water capacity: Mainly 8.4 inches

Additional Components

Saypo and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent
 Tetonview and similar soils: 5 percent

1537B—Truchot gravelly loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,800 to 4,900 feet
Mean annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days

Component Description

Truchot and similar soils

Composition: 85 percent
Geomorphic description:

- Alluvial fan
- Stream terrace

Slope: 0 to 4 percent
Elevation: 4,800 to 4,900 feet
Effective annual precipitation: 10 to 14 inches
Frost-free period: 90 to 105 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat poorly drained
Parent material: Calcareous alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Kleinschmidt and similar soils: 5 percent
 Poronto and similar soils: 5 percent
 Sixbeacon and similar soils: 5 percent

1552C—Clasoil-Crackerville complex, 4 to 8 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,000 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent
Geomorphic description: Mountainside
Slope: 4 to 8 percent

Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite
Flooding: None
Available water capacity: Mainly 7.2 inches

Crackerville and similar soils

Composition: 35 percent
Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 4 to 8 percent
Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Colluvium derived from granite over residuum weathered from granite
Flooding: None
Available water capacity: Mainly 2.2 inches

Additional Components

Martinsdale and similar soils: 8 percent
 Rock outcrop: 7 percent

1552D—Clasoil-Crackerville complex, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,000 to 6,600 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent
Geomorphic description: Mountainside
Slope: 8 to 15 percent
Elevation: 5,000 to 6,600 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained

Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite

Flooding: None

Available water capacity: Mainly 7.2 inches

Crackerville and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 8 to 15 percent

Elevation: 5,000 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from granite over residuum weathered from granite

Flooding: None

Available water capacity: Mainly 2.2 inches

Additional Components

Martinsdale and similar soils: 8 percent

Rock outcrop: 7 percent

1552E—Clasoil-Crackerville complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,000 to 6,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 50 percent

Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 15 to 35 percent

Elevation: 5,000 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite

Flooding: None

Available water capacity: Mainly 7.2 inches

Crackerville and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 15 to 35 percent

Elevation: 5,000 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from granite over residuum weathered from granite

Flooding: None

Available water capacity: Mainly 2.2 inches

Additional Components

Martinsdale and similar soils: 8 percent

Rock outcrop: 7 percent

1562B—Carten loam, 0 to 4 percent slopes, moderately impacted**Map Unit Setting**

Elevation: 4,700 to 5,000 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description**Carten and similar soils**

Composition: 85 percent

Geomorphic description: Outwash plain

Slope: 0 to 4 percent

Elevation: 4,700 to 5,000 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Fine-loamy alluvium over sandy and gravelly alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Available water capacity: Mainly 4.4 inches

Additional Components

Gregson and similar soils: 5 percent

Truchot and similar soils: 5 percent

Wetsand and similar soils: 5 percent

1580E—Comad-Elkner complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,300 to 8,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 70 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Flooding: None
Available water capacity: Mainly 1.4 inches

Elkner and similar soils

Composition: 20 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,300 to 8,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Stony sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Coarse-loamy colluvium derived from granite
Flooding: None
Available water capacity: Mainly 4.3 inches

Additional Components

Rock outcrop: 5 percent
 Sandy clay loam subsoils and similar soils: 5 percent

1580F—Comad-Elkner complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,300 to 8,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 70 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 6,300 to 8,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very stony sandy loam

Depth to restrictive feature: None noted

Drainage class: Excessively drained

Parent material: Sandy and gravelly colluvium derived from granite

Flooding: None

Available water capacity: Mainly 1.4 inches

Elkner and similar soils

Composition: 20 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 6,300 to 8,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Stony sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Coarse-loamy colluvium derived from granite

Flooding: None

Available water capacity: Mainly 4.3 inches

Additional Components

Comad, greater slope and similar soils: 5 percent

Rock outcrop: 5 percent

1582D—Elve-Rock outcrop complex, 8 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 8,200 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent

Geomorphic description: Mountain slope

Slope: 8 to 15 percent

Elevation: 5,600 to 8,200 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Dunkleber and similar soils: 5 percent
 Mohaggin and similar soils: 5 percent
 Phillcher and similar soils: 5 percent

**1596E—Worock-Loberg complex, 15 to 35 percent slopes,
 moderately impacted**

Map Unit Setting

Elevation: 5,600 to 6,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,600 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Loberg and similar soils

Composition: 35 percent
Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 15 to 35 percent
Elevation: 5,600 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly clayey colluvium derived from igneous rocks
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.7 inches

Additional Components

Danaher and similar soils: 6 percent

Elve and similar soils: 3 percent

Foolhen and similar soils: 3 percent

Rock outcrop: 3 percent

1634B—Blossberg loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 3,800 to 5,200 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description

Blossberg and similar soils

Composition: 85 percent

Geomorphic description: Stream terrace

Slope: 0 to 4 percent

Elevation: 3,800 to 5,200 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Poorly drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: None

Water table: Present

Available water capacity: Mainly 5.2 inches

Additional Components

Bushong and similar soils: 5 percent

Flintcreek and similar soils: 5 percent

Tetonview and similar soils: 5 percent

1635B—Tetonview loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Component Description

Tetonview and similar soils

Composition: 85 percent

Geomorphic description: Stream terrace
Slope: 0 to 4 percent
Elevation: 3,800 to 5,800 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 9.1 inches

Additional Components

Blossberg and similar soils: 3 percent
 Nythar and similar soils: 3 percent
 Poronto and similar soils: 3 percent
 Saypo and similar soils: 3 percent
 Saypo, saline and similar soils: 3 percent

1637B—Poronto loam, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 4,700 to 5,600 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days

Component Description

Poronto and similar soils

Composition: 85 percent
Geomorphic description: Terrace
Slope: 0 to 4 percent
Elevation: 4,700 to 5,600 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Gravelly alluvium
Native plant cover type: Rangeland
Flooding: None
Water table: Present
Available water capacity: Mainly 5.5 inches

Additional Components

Blossberg and similar soils: 4 percent
 Bushong and similar soils: 4 percent
 Kleinschmidt and similar soils: 4 percent
 Mannixlee and similar soils: 3 percent

1680F—Comad-Rubble land complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,400 to 9,200 feet
Mean annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days

Component Description

Comad and similar soils

Composition: 65 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 9,200 feet
Effective annual precipitation: 20 to 35 inches
Frost-free period: 30 to 70 days
Surface layer texture: Extremely bouldery sandy loam
Depth to restrictive feature: None noted
Drainage class: Excessively drained
Parent material: Sandy and gravelly colluvium derived from granite
Flooding: None
Available water capacity: Mainly 1.3 inches

Rubble land

Composition: 20 percent
Definition: Rubble land consists of areas of boulders, stones, and cobbles. Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Rock outcrop: 10 percent
 Comad, greater slope and similar soils: 5 percent

1735B—Tetonview-Blossberg loams, 0 to 4 percent slopes, rarely flooded, moderately impacted

Map Unit Setting

Elevation: 4,600 to 5,800 feet
Mean annual precipitation: 10 to 19 inches
Frost-free period: 70 to 110 days

Component Description

Tetonview and similar soils

Composition: 45 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 4,600 to 5,800 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 110 days
Surface layer texture: Loam

Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Fine-loamy calcareous alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 8.9 inches

Blossberg and similar soils

Composition: 40 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 4,600 to 5,800 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 5.2 inches

Additional Components

Bushong and similar soils: 4 percent
 Gregson and similar soils: 4 percent
 Mannixlee and similar soils: 4 percent
 Poronto and similar soils: 3 percent

1752E—Clasoil-Crackerville-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,100 to 6,400 feet
Mean annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days

Component Description

Clasoil and similar soils

Composition: 40 percent
Geomorphic description: Mountainside
Slope: 15 to 35 percent
Elevation: 5,100 to 6,400 feet
Effective annual precipitation: 15 to 19 inches
Frost-free period: 70 to 90 days
Surface layer texture: Sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium derived from granite or fine-loamy colluvium derived from granite
Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 7.5 inches

Crackerville and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Backslope on mountain

Slope: 15 to 35 percent

Elevation: 5,100 to 6,400 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from granite over residuum weathered from granite

Native plant cover type: Rangeland

Flooding: None

Available water capacity: Mainly 2.2 inches

Rock outcrop

Composition: 15 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Clasoil, greater slope and similar soils: 5 percent

Martinsdale and similar soils: 5 percent

1774F—Wilspring-Tolbert complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Wilspring and similar soils

Composition: 65 percent

Geomorphic description:

- Backslope on hill
- Shoulder on hill
- Mountainflank on mountain

Slope: 35 to 60 percent

Elevation: 5,400 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Calcareous gravelly colluvium derived from shale or unspecified gravelly colluvium derived from argillaceous limestone

Flooding: None

Available water capacity: Mainly 2.1 inches

Tolbert and similar soils

Composition: 20 percent

Geomorphic description:

- Mountaintop on mountain
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,400 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very channery loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 1.2 inches

Additional Components

Mishakal and similar soils: 5 percent

Wilspring, lesser slope and similar soils: 5 percent

Rock outcrop: 3 percent

Rubble land: 2 percent

1774G—Wilspring-Rubble land complex, 50 to 75 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,600 feet

Mean annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Component Description

Wilspring and similar soils

Composition: 65 percent

Geomorphic description:

- Backslope on hill
- Shoulder on hill
- Mountainflank on mountain

Slope: 50 to 75 percent

Elevation: 5,400 to 6,600 feet

Effective annual precipitation: 15 to 19 inches

Frost-free period: 70 to 90 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Calcareous gravelly colluvium derived from shale or unspecified gravelly colluvium derived from argillaceous limestone

Flooding: None

Available water capacity: Mainly 2.1 inches

Rubble land

Composition: 20 percent

Definition: Rubble land consists of areas of boulders, stones, and cobbles.

Commonly, rubble land is at the base of mountains, hills, and escarpments but some areas are deposits of boulders, stones, and cobbles left on mountain slopes by glaciation.

Additional Components

Tolbert and similar soils: 10 percent

Mishakal and similar soils: 5 percent

1834B—Blossberg loam, 0 to 4 percent slopes, rarely flooded, moderately impacted**Map Unit Setting**

Elevation: 4,600 to 5,600 feet

Mean annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Component Description**Blossberg and similar soils**

Composition: 85 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 4,600 to 5,600 feet

Effective annual precipitation: 10 to 14 inches

Frost-free period: 90 to 105 days

Surface layer texture: Loam

Depth to restrictive feature: None noted

Drainage class: Poorly drained

Parent material: Alluvium

Native plant cover type: Rangeland

Flooding: Rare

Water table: Present

Available water capacity: Mainly 5.2 inches

Additional Components

Dougcliff and similar soils: 4 percent

Gregson and similar soils: 4 percent

Mannixlee and similar soils: 4 percent

Bushong and similar soils: 3 percent

1835B—Tetonview loam, 0 to 4 percent slopes, rarely flooded, moderately impacted**Map Unit Setting**

Elevation: 3,800 to 5,800 feet

Mean annual precipitation: 10 to 19 inches

Frost-free period: 70 to 105 days

Component Description

Tetonview and similar soils

Composition: 85 percent
Geomorphic description: Flood plain
Slope: 0 to 4 percent
Elevation: 3,800 to 5,800 feet
Effective annual precipitation: 10 to 19 inches
Frost-free period: 70 to 105 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Poorly drained
Parent material: Alluvium
Native plant cover type: Rangeland
Flooding: Rare
Water table: Present
Available water capacity: Mainly 8.8 inches

Additional Components

Blossberg and similar soils: 3 percent
 Bushong and similar soils: 3 percent
 Dougcliff and similar soils: 3 percent
 Saypo and similar soils: 3 percent
 Turrah and similar soils: 3 percent

1854E—Libeg-Monad-Copenhaver complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 5.4 inches

Monad and similar soils

Composition: 25 percent

Geomorphic description: Stream terrace
Slope: 15 to 35 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Flooding: None
Available water capacity: Mainly 8.1 inches

Copenhaver and similar soils

Composition: 20 percent
Geomorphic description: Backslope on hill
Slope: 15 to 35 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from quartzite, residuum weathered from basalt, or residuum weathered from andesite
Flooding: None
Available water capacity: Mainly 1.4 inches

Additional Components

Libeg, greater slope and similar soils: 4 percent
 Rock outcrop: 4 percent
 Roy and similar soils: 4 percent
 Libeg, cobbly and similar soils: 3 percent

1854F—Libeg-Monad-Copenhaver complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 6,600 feet
Mean annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 5.4 inches

Monad and similar soils

Composition: 25 percent
Geomorphic description: Stream terrace
Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Fine-loamy alluvium
Flooding: None
Available water capacity: Mainly 8.1 inches

Copenhaver and similar soils

Composition: 20 percent
Geomorphic description: Backslope on hill
Slope: 35 to 60 percent
Elevation: 5,300 to 6,600 feet
Effective annual precipitation: 18 to 23 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt
Flooding: None
Available water capacity: Mainly 1.4 inches

Additional Components

Libeg, very cobbly and similar soils: 4 percent
 Rock outcrop: 4 percent
 Roy and similar soils: 4 percent
 Libeg, greater slope and similar soils: 3 percent

1954E—Libeg-Copenhaver-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 18 to 22 inches
Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 4.7 inches

Copenhaver and similar soils

Composition: 25 percent

Geomorphic description: Backslope on hill

Slope: 15 to 35 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from basalt, or residuum weathered from andesite

Flooding: None

Available water capacity: Mainly 1.3 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Adel and similar soils: 4 percent

Mollet and similar soils: 4 percent

Monad and similar soils: 4 percent

Redchief and similar soils: 3 percent

1954F—Libeg-Copenhaver-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,200 feet

Mean annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Component Description

Libeg and similar soils

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 4.7 inches

Copenhaver and similar soils

Composition: 25 percent

Geomorphic description: Backslope on hill

Slope: 35 to 60 percent

Elevation: 5,800 to 7,200 feet

Effective annual precipitation: 18 to 22 inches

Frost-free period: 30 to 70 days

Surface layer texture: Extremely stony loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt

Flooding: None

Available water capacity: Mainly 1.3 inches

Rock outcrop

Composition: 20 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Adel and similar soils: 4 percent

Mollet and similar soils: 4 percent

Monad and similar soils: 4 percent

Redchief and similar soils: 3 percent

1982E—Elve-Rock outcrop complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evuro and similar soils: 8 percent
 Worock and similar soils: 7 percent

1982F—Elve-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,800 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.6 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Evapo and similar soils: 8 percent
 Worock and similar soils: 7 percent

1996F—Worock-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Elve and similar soils: 4 percent
 Evapo and similar soils: 4 percent
 Loberg and similar soils: 4 percent
 Rubble land: 3 percent

1996G—Worock-Rock outcrop complex, 60 to 80 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,400 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 50 percent
Geomorphic description: Mountain slope

Slope: 60 to 80 percent
Elevation: 6,400 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Rock outcrop

Composition: 35 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Elve and similar soils: 4 percent
 Evaro and similar soils: 4 percent
 Rubble land: 4 percent
 Loberg and similar soils: 3 percent

5001E—Bendoh-Karloff-Eremis complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,600 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days

Component Description

Bendoh and similar soils

Composition: 40 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,600 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Karloff and similar soils

Composition: 25 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent

Elevation: 6,600 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Eremis and similar soils

Composition: 25 percent
Geomorphic description:

- Footslope on hill
- Mountain slope

Slope: 15 to 35 percent
Elevation: 6,600 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very cobbly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Additional Components

Illiano and similar soils: 5 percent
 Rock outcrop: 3 percent
 Judco and similar soils: 2 percent

5002F—Coslaw-Rock outcrop association, 15 to 60 percent slopes, severely impacted

Map Unit Setting

Elevation: 5,600 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days

Component Description

Coslaw and similar soils

Composition: 45 percent
Geomorphic description:

- Summit on hill
- Mountain

Slope: 15 to 60 percent
Elevation: 5,600 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from rhyolite over residuum weathered from rhyolite

Flooding: None

Available water capacity: Mainly 1.5 inches

Rock outcrop (tuff)

Composition: 30 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Bendoh and similar soils: 8 percent

Illiano and similar soils: 7 percent

Eremis and similar soils: 5 percent

Karloff and similar soils: 5 percent

5003D—Daras-Bendoh-Karloff complex, 4 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,300 to 6,900 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Component Description

Daras and similar soils

Composition: 45 percent

Geomorphic description:

- Hillside
- Mountain slope

Slope: 4 to 15 percent

Elevation: 6,300 to 6,900 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Gravelly ashy sandy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.7 inches

Bendoh and similar soils

Composition: 25 percent

Geomorphic description: Mountain slope

Slope: 4 to 15 percent

Elevation: 6,300 to 6,900 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.5 inches

Karloff and similar soils

Composition: 20 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 4 to 15 percent

Elevation: 6,300 to 6,900 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Additional Components

Eremis and similar soils: 5 percent

Illiano and similar soils: 3 percent

Coslaw and similar soils: 2 percent

5005C—Liart-Mooseflat-Tibkey complex, 0 to 4 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,300 to 6,800 feet

Mean annual precipitation: 15 to 24 inches

Frost-free period: 30 to 70 days

Component Description

Liart and similar soils

Composition: 40 percent

Geomorphic description:

- Base slope on flood plain
- Mountainbase on mountain

Slope: 0 to 4 percent

Elevation: 6,300 to 6,800 feet

Effective annual precipitation: 15 to 24 inches

Frost-free period: 30 to 70 days

Surface layer texture: Mucky silt loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Fine-loamy alluvium

Flooding: Occasional

Water table: Present

Available water capacity: Mainly 10.0 inches

Mooseflat and similar soils

Composition: 35 percent

Geomorphic description: Flood plain

Slope: 0 to 4 percent

Elevation: 6,300 to 6,800 feet

Effective annual precipitation: 15 to 24 inches

Frost-free period: 30 to 70 days

Surface layer texture: Mucky loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Alluvium

Flooding: Occasional

Water table: Present

Available water capacity: Mainly 5.4 inches

Tibkey and similar soils

Composition: 20 percent

Geomorphic description: Drainageway

Slope: 1 to 4 percent

Elevation: 6,300 to 6,800 feet

Effective annual precipitation: 15 to 24 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Depth to restrictive feature: None noted

Drainage class: Somewhat poorly drained

Parent material: Gravelly alluvium

Flooding: Rare

Water table: Present

Available water capacity: Mainly 6.3 inches

Additional Components

Bendoh and similar soils: 5 percent

5006D—Bendoh-Eremis-Karloff complex, 2 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,200 to 6,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Component Description

Bendoh and similar soils

Composition: 50 percent

Geomorphic description: Mountain slope

Slope: 2 to 15 percent

Elevation: 6,200 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.7 inches

Eremis and similar soils

Composition: 20 percent
Geomorphic description:

- Footslope on hill
- Mountain slope

Slope: 2 to 15 percent
Elevation: 6,200 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Karloff and similar soils

Composition: 15 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 4 to 15 percent
Elevation: 6,200 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Additional Components

Vitroff and similar soils: 6 percent
 Coslaw and similar soils: 5 percent
 Figaro and similar soils: 4 percent

5007E—Karloff-Figaro-Bendoh complex, 8 to 25 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,400 to 6,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Component Description

Karloff and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 25 percent

Elevation: 6,400 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.2 inches

Figaro and similar soils

Composition: 30 percent

Geomorphic description:

- Alluvial fan
- Footslope on hill
- Mountain slope

Slope: 8 to 25 percent

Elevation: 6,400 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Cobbly ashy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Clayey alluvium or clayey slope alluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 8.1 inches

Bendoh and similar soils

Composition: 25 percent

Geomorphic description: Mountain slope

Slope: 8 to 25 percent

Elevation: 6,400 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.5 inches

Additional Components

Eremis and similar soils: 4 percent

Coslaw and similar soils: 3 percent

Vitroff and similar soils: 2 percent

Liart and similar soils: 1 percent

5008D—Elve-Bendoh-Mooseflat complex, 4 to 25 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,100 to 7,000 feet

Mean annual precipitation: 15 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 40 percent

Geomorphic description: Mountain slope

Slope: 8 to 25 percent

Elevation: 6,100 to 7,000 feet

Effective annual precipitation: 15 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.5 inches

Mooseflat and similar soils

Composition: 25 percent

Geomorphic description: Drainageway

Slope: 4 to 15 percent

Elevation: 6,100 to 7,000 feet

Effective annual precipitation: 15 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Mucky silt loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Alluvium

Flooding: Rare

Water table: Present

Available water capacity: Mainly 5.4 inches

Bendoh and similar soils*Composition:* 25 percent*Geomorphic description:* Mountain slope*Slope:* 8 to 25 percent*Elevation:* 6,100 to 7,000 feet*Effective annual precipitation:* 15 to 30 inches*Frost-free period:* 30 to 60 days*Surface layer texture:* Cobbly ashy loam*Depth to restrictive feature:* Bedrock (lithic): 40 to 60 inches*Drainage class:* Well drained*Parent material:* Rhyolite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 6.7 inches**Additional Components**

Eremis and similar soils: 4 percent

Coslaw and similar soils: 3 percent

Liart and similar soils: 3 percent

5008E—Elve-Bendoh-Mooseflat complex, 8 to 35 percent slopes, moderately impacted**Map Unit Setting***Elevation:* 6,100 to 7,200 feet*Mean annual precipitation:* 15 to 30 inches*Frost-free period:* 30 to 70 days**Component Description****Elve and similar soils***Composition:* 40 percent*Geomorphic description:* Mountain slope*Slope:* 15 to 35 percent*Elevation:* 6,100 to 7,200 feet*Effective annual precipitation:* 15 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Very cobbly sandy loam*Depth to restrictive feature:* None noted*Drainage class:* Somewhat excessively drained*Parent material:* Gravelly loamy colluvium*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 4.5 inches**Bendoh and similar soils***Composition:* 35 percent*Geomorphic description:* Mountain slope*Slope:* 15 to 35 percent*Elevation:* 6,100 to 7,200 feet*Effective annual precipitation:* 15 to 30 inches*Frost-free period:* 30 to 60 days*Surface layer texture:* Cobbly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.7 inches

Mooseflat and similar soils

Composition: 15 percent

Geomorphic description: Drainageway

Slope: 8 to 25 percent

Elevation: 6,100 to 7,200 feet

Effective annual precipitation: 15 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Mucky silt loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Alluvium

Flooding: Rare

Water table: Present

Available water capacity: Mainly 5.4 inches

Additional Components

Coslaw and similar soils: 5 percent

Eremis and similar soils: 3 percent

Liart and similar soils: 2 percent

5009E—Vitroff-Elve-Karloff complex, 8 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,600 to 6,800 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Vitroff and similar soils

Composition: 35 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,600 to 6,800 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 50 to 70 days

Surface layer texture: Very cobbly ashy loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.2 inches

Elve and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 8 to 35 percent
Elevation: 6,600 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.5 inches

Karloff and similar soils

Composition: 25 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 8 to 35 percent
Elevation: 6,600 to 6,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Additional Components

Coslaw and similar soils: 4 percent
 Eremis and similar soils: 3 percent
 Mooseflat and similar soils: 2 percent
 Illiano and similar soils: 1 percent

5010E—Karloff-Bendoh-Eremis complex, 8 to 35 percent slopes, moderately impacted**Map Unit Setting**

Elevation: 6,480 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days

Component Description**Karloff and similar soils**

Composition: 35 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 8 to 35 percent
Elevation: 6,480 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Bendoh and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 8 to 35 percent
Elevation: 6,480 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.7 inches

Eremis and similar soils

Composition: 20 percent
Geomorphic description:

- Foothlope on hill
- Mountain slope

Slope: 8 to 15 percent
Elevation: 6,480 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Additional Components

Coslaw and similar soils: 6 percent
 Vitroff and similar soils: 5 percent
 Illiano and similar soils: 4 percent
 Elve and similar soils: 3 percent
 Rock outcrop: 2 percent

5011E—Karloff-Illiano-Rock outcrop complex, 8 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,000 to 7,500 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days

Component Description

Karloff and similar soils

Composition: 45 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 8 to 35 percent
Elevation: 6,000 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very cobbly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Illiano and similar soils

Composition: 25 percent
Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 15 to 35 percent
Elevation: 6,000 to 7,500 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very flaggy ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 0.7 inches

Rock outcrop, welded tuff

Composition: 15 percent
Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Bendoh and similar soils: 6 percent
 Worock and similar soils: 4 percent

Finn and similar soils: 3 percent

Elve and similar soils: 2 percent

5011F—Karloff-Illiano-Rock outcrop complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,000 to 7,100 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Component Description

Karloff and similar soils

Composition: 40 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent

Elevation: 6,000 to 7,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Illiano and similar soils

Composition: 25 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 35 to 60 percent

Elevation: 6,000 to 7,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very flaggy ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 0.7 inches

Rock outcrop, welded tuff

Composition: 15 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Bendoh and similar soils: 6 percent
 Loberg and similar soils: 5 percent
 Worock and similar soils: 4 percent
 Finn and similar soils: 3 percent
 Rubble land: 2 percent

5012E—Worock-Finn-Cujob complex, 1 to 25 percent slopes, moderately impacted

Map Unit Setting

Elevation: 6,600 to 7,600 feet
Mean annual precipitation: 15 to 30 inches
Frost-free period: 30 to 60 days

Component Description

Worock and similar soils

Composition: 40 percent
Geomorphic description: Mountain slope
Slope: 8 to 25 percent
Elevation: 6,600 to 7,600 feet
Effective annual precipitation: 15 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very cobbly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.1 inches

Finn and similar soils

Composition: 25 percent
Geomorphic description: Drainageway
Slope: 1 to 8 percent
Elevation: 6,600 to 7,600 feet
Effective annual precipitation: 15 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Cobbly loam
Depth to restrictive feature: None noted
Drainage class: Very poorly drained
Parent material: Gravelly alluvium
Flooding: None
Water table: Present
Ponding duration: Brief
Available water capacity: Mainly 5.7 inches

Cujob and similar soils

Composition: 20 percent

Geomorphic description:

- Depression
- Mountain slope
- Slump

Slope: 1 to 4 percent*Elevation:* 6,600 to 7,600 feet*Effective annual precipitation:* 15 to 30 inches*Frost-free period:* 30 to 60 days*Surface layer texture:* Mucky silt loam*Depth to restrictive feature:* None noted*Drainage class:* Very poorly drained*Parent material:* Alluvium*Flooding:* None*Water table:* Present*Ponding duration:* Long*Available water capacity:* Mainly 6.1 inches**Additional Components**

Coslaw and similar soils: 5 percent

Elve and similar soils: 5 percent

Mooseflat and similar soils: 5 percent

5013F—Tibson very cobbly loam, 35 to 60 percent slopes**Map Unit Setting***Elevation:* 7,400 to 8,000 feet*Mean annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days**Component Description****Tibson and similar soils***Composition:* 90 percent*Geomorphic description:*

- Mountainflank on mountain
- Mountainbase on mountain

Slope: 35 to 60 percent*Elevation:* 7,400 to 8,000 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Very cobbly loam*Depth to restrictive feature:* None noted*Drainage class:* Well drained*Parent material:* Gravelly slope alluvium over gravelly colluvium derived from limestone, unspecified*Flooding:* None*Available water capacity:* Mainly 5.0 inches**Additional Components**

Worock and similar soils: 4 percent

Elve and similar soils: 3 percent

Karloff and similar soils: 3 percent

5014E—Loberg-Finn complex, 8 to 25 percent slopes

Map Unit Setting

Elevation: 7,000 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Loberg and similar soils

Composition: 60 percent

Geomorphic description:

- Mountainbase on mountain slope
- Mountainflank on mountain slope

Slope: 8 to 25 percent

Elevation: 7,000 to 7,500 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly clayey colluvium derived from igneous rocks

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.3 inches

Finn and similar soils

Composition: 30 percent

Geomorphic description: Drainageway

Slope: 8 to 25 percent

Elevation: 7,000 to 7,500 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Very poorly drained

Parent material: Gravelly alluvium

Flooding: None

Water table: Present

Ponding duration: Brief

Available water capacity: Mainly 5.7 inches

Additional Components

Worock and similar soils: 4 percent

Elve and similar soils: 3 percent

Vitroff and similar soils: 3 percent

5016F—Illiano-Bendoh-Rock outcrop association, 35 to 70 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,700 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days

Component Description

Illiano and similar soils

Composition: 45 percent
Geomorphic description:

- Nose slope summit on hill
- Head slope summit on hill
- Mountaintop on mountain

Slope: 35 to 70 percent
Elevation: 5,700 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very flaggy ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 0.7 inches

Bendoh and similar soils

Composition: 20 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,700 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Rock outcrop, welded tuff

Composition: 10 percent
Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Rubble land, welded tuff: 10 percent
 Karloff and similar soils: 6 percent
 Eremis and similar soils: 4 percent

Coslaw and similar soils: 3 percent

Worock and similar soils: 2 percent

5017E—Karloff-Coslaw-Illiano association, 8 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,500 to 7,500 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 40 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 8 to 35 percent

Elevation: 5,500 to 7,500 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Coslaw and similar soils

Composition: 25 percent

Geomorphic description:

- Summit on hill
- Mountain

Slope: 15 to 35 percent

Elevation: 5,500 to 7,500 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from rhyolite over residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Illiano and similar soils

Composition: 20 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 15 to 35 percent*Elevation:* 5,500 to 7,500 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Very flaggy ashy sandy loam*Depth to restrictive feature:* Bedrock (lithic): 10 to 20 inches*Drainage class:* Well drained*Parent material:* Gravelly residuum weathered from tuff or unspecified gravelly residuum weathered from rhyolite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 0.7 inches**Additional Components**

Bendoh and similar soils: 6 percent

Rock outcrop: 4 percent

Liart and similar soils: 3 percent

Eremis and similar soils: 2 percent

5017F—Karloff-Coslaw-Illiano association, 35 to 70 percent slopes, moderately impacted**Map Unit Setting***Elevation:* 5,500 to 7,500 feet*Mean annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days**Component Description****Karloff and similar soils***Composition:* 30 percent*Geomorphic description:*

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent*Elevation:* 5,500 to 7,500 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Very gravelly ashy sandy loam*Depth to restrictive feature:* Bedrock (lithic): 20 to 40 inches*Drainage class:* Well drained*Parent material:* Rhyolite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 2.1 inches**Coslaw and similar soils***Composition:* 30 percent

Geomorphic description:

- Summit on hill
- Mountain

Slope: 35 to 60 percent*Elevation:* 5,500 to 7,500 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Gravelly ashy sandy loam*Depth to restrictive feature:* Bedrock (paralithic): 20 to 40 inches*Drainage class:* Well drained*Parent material:* Colluvium derived from rhyolite over residuum weathered from rhyolite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 1.6 inches**Illiano and similar soils***Composition:* 25 percent*Geomorphic description:*

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 35 to 70 percent*Elevation:* 5,500 to 7,500 feet*Effective annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 70 days*Surface layer texture:* Very flaggy ashy sandy loam*Depth to restrictive feature:* Bedrock (lithic): 10 to 20 inches*Drainage class:* Well drained*Parent material:* Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite*Native plant cover type:* Forest land*Flooding:* None*Available water capacity:* Mainly 0.7 inches**Additional Components**

Bendoh and similar soils: 5 percent

Rock outcrop: 4 percent

Liart and similar soils: 3 percent

Eremis and similar soils: 2 percent

Worock and similar soils: 1 percent

5019F—Illiano-Karloff-Rock outcrop complex, 35 to 70 percent slopes, moderately impacted**Map Unit Setting***Elevation:* 6,700 to 7,700 feet*Mean annual precipitation:* 20 to 30 inches*Frost-free period:* 30 to 60 days

Component Description

Illiano and similar soils

Composition: 40 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 35 to 70 percent

Elevation: 6,700 to 7,700 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very flaggy ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 0.7 inches

Karloff and similar soils

Composition: 20 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 70 percent

Elevation: 6,700 to 7,700 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Rock outcrop, welded tuff

Composition: 15 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Rubble land, welded tuff: 10 percent

Coslaw and similar soils: 6 percent

Bendoh and similar soils: 4 percent

Vitroff and similar soils: 3 percent

Worock and similar soils: 2 percent

5021E—Karloff-Coslaw-Bendoh complex, 15 to 45 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,800 to 7,200 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days

Component Description

Karloff and similar soils

Composition: 40 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent
Elevation: 5,800 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Coslaw and similar soils

Composition: 30 percent
Geomorphic description:

- Summit on hill
- Mountain

Slope: 15 to 45 percent
Elevation: 5,800 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly ashy sandy loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Colluvium derived from rhyolite over residuum weathered from rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.6 inches

Bendoh and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,800 to 7,200 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Additional Components

Rock outcrop: 3 percent
 Eremis and similar soils: 2 percent

5023E—Worock-Elve-Libeg complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,700 to 7,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 35 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,700 to 7,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Elve and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,700 to 7,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly coarse sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Libeg and similar soils

Composition: 30 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 15 to 35 percent

Elevation: 6,700 to 7,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Channery loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 4.4 inches

Additional Components

Judco and similar soils: 3 percent

Redfern and similar soils: 2 percent

5023F—Worock-Elve-Libeg complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 7,200 to 7,600 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 40 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 7,200 to 7,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Elve and similar soils

Composition: 30 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 7,200 to 7,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly coarse sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Libeg and similar soils

Composition: 20 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 35 to 60 percent
Elevation: 7,200 to 7,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Channery loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 4.4 inches

Additional Components

Judco and similar soils: 5 percent
 Bendoh and similar soils: 3 percent
 Redfern and similar soils: 2 percent

5023G—Worock-Elve-Libeg complex, 60 to 85 percent slopes

Map Unit Setting

Elevation: 7,200 to 7,600 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Worock and similar soils

Composition: 40 percent
Geomorphic description: Mountain slope
Slope: 60 to 85 percent
Elevation: 7,200 to 7,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Elve and similar soils

Composition: 30 percent

Geomorphic description: Mountain slope

Slope: 60 to 85 percent

Elevation: 7,200 to 7,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly coarse sandy loam

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 4.1 inches

Libeg and similar soils

Composition: 20 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 60 to 85 percent

Elevation: 7,200 to 7,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Channery loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 4.4 inches

Additional Components

Karloff and similar soils: 5 percent

Rock outcrop: 3 percent

Redfern and similar soils: 2 percent

5024D—Elve-Worock-Lowland complex, 4 to 15 percent slopes**Map Unit Setting**

Elevation: 6,600 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description**Elve and similar soils**

Composition: 45 percent

Geomorphic description: Mountain slope

Slope: 4 to 15 percent

Elevation: 6,600 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly coarse sandy loam
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 4.1 inches

Worock and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 4 to 15 percent
Elevation: 6,600 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Lowland and similar soils

Composition: 15 percent
Geomorphic description:

- Side slope on hill
- Mountainflank on mountain

Slope: 4 to 15 percent
Elevation: 6,600 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Ashy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 5.3 inches

Additional Components

Karloff and similar soils: 5 percent
 Bendoh and similar soils: 3 percent
 Libeg and similar soils: 2 percent

5025E—Redfern-Copenhaver-Rock outcrop complex, 15 to 45 percent slopes

Map Unit Setting

Elevation: 7,200 to 7,800 feet
Mean annual precipitation: 18 to 24 inches
Frost-free period: 30 to 60 days

Component Description

Redfern and similar soils

Composition: 45 percent

Geomorphic description:

- Nose slope summit on hill
- Mountaintop on mountain

Slope: 15 to 45 percent

Elevation: 7,200 to 7,800 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Mixed residuum

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Copenhaver and similar soils

Composition: 30 percent

Geomorphic description: Backslope on hill

Slope: 15 to 45 percent

Elevation: 7,200 to 7,800 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very gravelly loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from quartzite, residuum weathered from andesite, or residuum weathered from basalt

Flooding: None

Available water capacity: Mainly 1.4 inches

Rock outcrop

Composition: 10 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 10 percent

Libeg and similar soils: 3 percent

Karloff and similar soils: 2 percent

5025F—Copenhaver, stony-Libeg, very stony-Rock outcrop complex, 15 to 60 percent slopes

Map Unit Setting

Elevation: 7,200 to 7,800 feet

Mean annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Component Description

Copenhaver and similar soils

Composition: 40 percent

Geomorphic description: Backslope on hill

Slope: 15 to 45 percent

Elevation: 7,200 to 7,800 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly loam

Rock fragments on the soil surface: 0.01 to 0.10 percent stones

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from andesite, residuum weathered from quartzite, or residuum weathered from basalt

Flooding: None

Available water capacity: Mainly 1.2 inches

Libeg and similar soils

Composition: 35 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Riser on terrace

Slope: 25 to 60 percent

Elevation: 7,200 to 7,800 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very gravelly loam

Rock fragments on the soil surface: 0.10 to 3.00 percent stones

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 4.7 inches

Rock outcrop

Composition: 10 percent

Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 10 percent

Redfern and similar soils: 3 percent

Illiano and similar soils: 2 percent

5026E—Elve complex, very stony, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,700 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 55 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,400 to 7,700 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Rock fragments on the soil surface: 0.01 to 0.10 percent boulders and 0.01 to 0.10 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.3 inches

Elve, very cobbly and similar soils

Composition: 35 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,400 to 7,700 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly loam

Rock fragments on the soil surface: 0.10 to 3.00 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.2 inches

Additional Components

Worock and similar soils: 5 percent

Redfern and similar soils: 3 percent

Rock outcrop: 2 percent

5026F—Elve-Cowood complex, very stony, 35 to 60 percent slopes

Map Unit Setting

Elevation: 6,400 to 7,700 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 40 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 6,400 to 7,700 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Rock fragments on the soil surface: 0.01 to 0.10 percent boulders and 0.01 to 0.10 percent stones
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 2.3 inches

Elve, very cobbly, and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 6,400 to 7,700 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly loam
Rock fragments on the soil surface: 0.10 to 3.00 percent stones
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Cowood and similar soils

Composition: 20 percent
Geomorphic description: Backslope on mountain
Slope: 45 to 60 percent
Elevation: 6,400 to 7,700 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very cobbly loam
Rock fragments on the soil surface: 0.10 to 3.00 percent stones
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Colluvium derived from granite over residuum weathered from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.1 inches

Additional Components

Redfern and similar soils: 5 percent
 Rock outcrop: 3 percent
 Illiano and similar soils: 2 percent

5027F—Cowood-Elve, very stony-Rock outcrop association, 35 to 70 percent slopes

Map Unit Setting

Elevation: 6,200 to 7,800 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Cowood and similar soils

Composition: 35 percent
Geomorphic description: Backslope on mountain
Slope: 35 to 70 percent
Elevation: 6,200 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 60 days
Surface layer texture: Very stony loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Colluvium derived from granite over residuum weathered from granite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 1.0 inches

Elve and similar soils

Composition: 35 percent
Geomorphic description: Mountain slope
Slope: 35 to 70 percent
Elevation: 6,200 to 7,800 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly loam
Rock fragments on the soil surface: 0.10 to 3.00 percent stones
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Rock outcrop

Composition: 10 percent
Definition: Rock outcrop consists of exposures of bare bedrock.

Additional Components

Rubble land: 10 percent
 Karloff and similar soils: 6 percent
 Illiano and similar soils: 4 percent

5028E—Bendoh-Karloff complex, 15 to 35 percent slopes**Map Unit Setting**

Elevation: 6,200 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description**Bendoh and similar soils**

Composition: 55 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,200 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.7 inches

Karloff and similar soils

Composition: 35 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent

Elevation: 6,200 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Additional Components

Elve and similar soils: 6 percent

Worock and similar soils: 4 percent

5028F—Bendoh-Karloff-Rock outcrop complex, 35 to 70 percent slopes**Map Unit Setting**

Elevation: 6,000 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Bendoh and similar soils

Composition: 45 percent

Geomorphic description: Mountain slope

Slope: 35 to 70 percent

Elevation: 6,000 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.7 inches

Karloff and similar soils

Composition: 25 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 70 percent

Elevation: 6,000 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Rock outcrop, welded tuff

Composition: 10 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Rubble land, welded tuff: 10 percent

Elve and similar soils: 5 percent

Worock and similar soils: 3 percent

Illiano and similar soils: 2 percent

5029F—Karloff-Judco-Illiano complex, 35 to 70 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,100 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 40 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 70 percent

Elevation: 5,400 to 6,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Judco and similar soils

Composition: 25 percent

Geomorphic description:

- Alluvial fan
- Base slope on hill
- Side slope on hill
- Mountain slope

Slope: 35 to 70 percent

Elevation: 5,400 to 6,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (paralithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.9 inches

Illiano and similar soils

Composition: 25 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 35 to 70 percent

Elevation: 5,400 to 6,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very flaggy ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 0.7 inches

Additional Components

Bendoh and similar soils: 5 percent

Rock outcrop: 3 percent

Coslaw and similar soils: 2 percent

5030F—Tepecreek-Ellena-Caseypeak complex, 35 to 60 percent slopes, very bouldery

Map Unit Setting

Elevation: 6,400 to 7,000 feet

Mean annual precipitation: 15 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Tepecreek and similar soils

Composition: 40 percent

Geomorphic description:

- Side slope on hill
- Mountainflank on mountain

Slope: 35 to 60 percent

Elevation: 6,400 to 7,000 feet

Effective annual precipitation: 15 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Coarse sandy loam

Rock fragments on the soil surface: 0.10 to 3.00 percent boulders

Depth to restrictive feature: Bedrock (lithic): 30 to 60 inches;
Bedrock (paralithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Gravelly colluvium derived from granite or gravelly residuum weathered from granite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

Ellena and similar soils

Composition: 30 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 6,400 to 7,000 feet

Effective annual precipitation: 15 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Coarse sandy loam

Rock fragments on the soil surface: 0.10 to 3.00 percent boulders

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Somewhat excessively drained

Parent material: Granitics

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.0 inches

Caseypeak and similar soils

Composition: 25 percent

Geomorphic description: Mountain

Slope: 35 to 60 percent

Elevation: 6,400 to 7,000 feet

Effective annual precipitation: 15 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly coarse sandy loam

Rock fragments on the soil surface: 0.10 to 3.00 percent boulders

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Residuum weathered from granite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.2 inches

Additional Components

Rock outcrop: 2 percent

Worock and similar soils: 2 percent

Rubble land: 1 percent

5031D—Elve, stony-Karloff-Worock complex, 4 to 15 percent slopes**Map Unit Setting**

Elevation: 6,200 to 6,600 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description**Elve and similar soils**

Composition: 35 percent

Geomorphic description: Mountain slope

Slope: 4 to 15 percent

Elevation: 6,200 to 6,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Cobbly loam

Rock fragments on the soil surface: 0.01 to 0.10 percent stones

Depth to restrictive feature: None noted

Drainage class: Somewhat excessively drained

Parent material: Gravelly loamy colluvium

Flooding: None

Available water capacity: Mainly 2.3 inches

Karloff and similar soils

Composition: 30 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 4 to 15 percent

Elevation: 6,200 to 6,600 feet

Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Worock and similar soils

Composition: 25 percent
Geomorphic description: Mountain slope
Slope: 4 to 15 percent
Elevation: 6,200 to 6,600 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.5 inches

Additional Components

Coslaw and similar soils: 5 percent
 Bendoh and similar soils: 3 percent
 Illiano and similar soils: 2 percent

5031E—Elve, stony-Worock-Karloff complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 6,200 to 7,000 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 45 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 6,200 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Rock fragments on the soil surface: 0.01 to 0.10 percent stones
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.3 inches

Worock and similar soils

Composition: 30 percent

Geomorphic description: Mountain slope

Slope: 15 to 35 percent

Elevation: 6,200 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Gravelly loam

Depth to restrictive feature: None noted

Drainage class: Well drained

Parent material: Gravelly loamy colluvium

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 5.5 inches

Karloff and similar soils

Composition: 15 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent

Elevation: 6,200 to 7,000 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Additional Components

Judco and similar soils: 5 percent

Bendoh and similar soils: 3 percent

Coslaw and similar soils: 2 percent

5031F—Elve-Worock-Karloff complex, 35 to 60 percent slopes, stony

Map Unit Setting

Elevation: 5,600 to 7,000 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Elve and similar soils

Composition: 45 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent
Elevation: 5,600 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Cobbly loam
Rock fragments on the soil surface: 0.01 to 0.10 percent stones
Depth to restrictive feature: None noted
Drainage class: Somewhat excessively drained
Parent material: Gravelly loamy colluvium
Flooding: None
Available water capacity: Mainly 2.3 inches

Worock and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 35 to 60 percent
Elevation: 5,600 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly loam
Rock fragments on the soil surface: 0.01 to 0.10 percent stones
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Gravelly loamy colluvium
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 5.3 inches

Karloff and similar soils

Composition: 20 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent
Elevation: 5,600 to 7,000 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly ashy sandy loam
Rock fragments on the soil surface: 0.01 to 0.10 percent stones
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Additional Components

Judco and similar soils: 3 percent
 Rock outcrop: 1 percent
 Rubble land: 1 percent

5032E—Karloff-Bendoh-Coslaw complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,500 to 6,100 feet
Mean annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 40 percent
Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent
Elevation: 5,500 to 6,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.2 inches

Bendoh and similar soils

Composition: 30 percent
Geomorphic description: Mountain slope
Slope: 15 to 35 percent
Elevation: 5,500 to 6,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Gravelly ashy loam
Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.7 inches

Coslaw and similar soils

Composition: 20 percent
Geomorphic description:

- Summit on hill
- Mountain

Slope: 15 to 35 percent
Elevation: 5,500 to 6,100 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Flaggy ashy sandy loam
Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches
Drainage class: Well drained

Parent material: Colluvium derived from rhyolite over residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Additional Components

Illiano and similar soils: 5 percent

Pax and similar soils: 3 percent

Worock and similar soils: 2 percent

5032F—Karloff-Coslaw-Bendoh complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,500 to 6,600 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 40 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,500 to 6,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.2 inches

Coslaw and similar soils

Composition: 30 percent

Geomorphic description:

- Summit on hill
- Mountain

Slope: 35 to 60 percent

Elevation: 5,500 to 6,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Flaggy ashy sandy loam

Depth to restrictive feature: Bedrock (paralithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Colluvium derived from rhyolite over residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 1.6 inches

Bendoh and similar soils

Composition: 20 percent

Geomorphic description: Mountain slope

Slope: 35 to 60 percent

Elevation: 5,500 to 6,600 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Gravelly ashy loam

Depth to restrictive feature: Bedrock (lithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 6.7 inches

Additional Components

Illiano and similar soils: 5 percent

Judco and similar soils: 2 percent

Rock outcrop: 2 percent

Rubble land: 1 percent

5033F—Illiano-Karloff-Rock outcrop complex, 25 to 70 percent slopes

Map Unit Setting

Elevation: 5,900 to 7,200 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Component Description

Illiano and similar soils

Composition: 45 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 25 to 70 percent

Elevation: 5,900 to 7,200 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very flaggy ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 0.7 inches

Karloff and similar soils

Composition: 20 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 25 to 70 percent

Elevation: 5,900 to 7,200 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 60 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Rock outcrop, welded tuff

Composition: 15 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Rubble land, welded tuff: 15 percent

Bendoh and similar soils: 3 percent

Coslaw and similar soils: 2 percent

5034E—Judco-Karloff-Rock outcrop complex, 8 to 35 percent slopes**Map Unit Setting**

Elevation: 5,600 to 7,100 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description**Judco and similar soils**

Composition: 40 percent

Geomorphic description:

- Alluvial fan
- Base slope on hill
- Side slope on hill
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,600 to 7,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (paralithic): 40 to 60 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.9 inches

Karloff and similar soils

Composition: 30 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,600 to 7,100 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Rock outcrop, welded tuff

Composition: 10 percent

Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Bendoh and similar soils: 6 percent

Coslaw and similar soils: 5 percent

Rubble land, welded tuff: 5 percent

Worock and similar soils: 4 percent

5034F—Karloff-Judco-Rock outcrop complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,800 to 6,900 feet

Mean annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Component Description

Karloff and similar soils

Composition: 40 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,800 to 6,900 feet

Effective annual precipitation: 20 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 2.1 inches

Judco and similar soils

Composition: 30 percent
Geomorphic description:

- Alluvial fan
- Base slope on hill
- Side slope on hill
- Mountain slope

Slope: 35 to 60 percent
Elevation: 5,800 to 6,900 feet
Effective annual precipitation: 20 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very cobbly ashy sandy loam
Depth to restrictive feature: Bedrock (paralithic): 40 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.9 inches

Rock outcrop, welded tuff

Composition: 10 percent
Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Bendoh and similar soils: 5 percent
 Rubble land, welded tuff: 5 percent
 Illiano and similar soils: 4 percent
 Pax and similar soils: 3 percent
 Worock and similar soils: 3 percent

5035E—Pax-Karloff-Illiano complex, 15 to 35 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,250 feet
Mean annual precipitation: 18 to 30 inches
Frost-free period: 30 to 90 days

Component Description

Pax and similar soils

Composition: 45 percent
Geomorphic description:

- Nose slope on hill
- Side slope on hill
- Mountaintop on mountain

- Mountainflank on mountain
- Ridge

Slope: 15 to 35 percent

Elevation: 5,400 to 6,250 feet

Effective annual precipitation: 18 to 30 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.2 inches

Karloff and similar soils

Composition: 30 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 15 to 35 percent

Elevation: 5,400 to 6,250 feet

Effective annual precipitation: 18 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Illiano and similar soils

Composition: 15 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 15 to 35 percent

Elevation: 5,400 to 6,250 feet

Effective annual precipitation: 18 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very flaggy ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Gravelly residuum weathered from unspecified tuff or gravelly
residuum weathered from rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 0.7 inches

Additional Components

Judco and similar soils: 5 percent

Macabre and similar soils: 5 percent

5035F—Pax-Karloff-Illiano complex, 35 to 60 percent slopes

Map Unit Setting

Elevation: 5,400 to 6,250 feet

Mean annual precipitation: 18 to 30 inches

Frost-free period: 30 to 90 days

Component Description

Pax and similar soils

Composition: 45 percent

Geomorphic description:

- Nose slope on hill
- Side slope on hill
- Mountaintop on mountain
- Mountainflank on mountain
- Ridge

Slope: 35 to 60 percent

Elevation: 5,400 to 6,250 feet

Effective annual precipitation: 18 to 30 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.2 inches

Karloff and similar soils

Composition: 30 percent

Geomorphic description:

- Backslope on hill
- Mountain slope

Slope: 35 to 60 percent

Elevation: 5,400 to 6,250 feet

Effective annual precipitation: 18 to 30 inches

Frost-free period: 30 to 70 days

Surface layer texture: Very gravelly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 2.1 inches

Illiano and similar soils

Composition: 15 percent

Geomorphic description:

- Head slope summit on hill
- Nose slope summit on hill
- Mountaintop on mountain

Slope: 35 to 60 percent

Elevation: 5,400 to 6,250 feet
Effective annual precipitation: 18 to 30 inches
Frost-free period: 30 to 70 days
Surface layer texture: Very flaggy ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Gravelly residuum weathered from unspecified tuff or gravelly residuum weathered from rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 0.7 inches

Additional Components

Litag and similar soils: 5 percent
 Nivean and similar soils: 3 percent
 Rock outcrop: 1 percent
 Rubble land: 1 percent

5036D—Litag-Pax-Nivean complex, 4 to 15 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,600 to 6,000 feet
Mean annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days

Component Description

Litag and similar soils

Composition: 40 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain

Slope: 4 to 15 percent
Elevation: 5,600 to 6,000 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly ashy sandy clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Pax and similar soils

Composition: 30 percent
Geomorphic description:

- Nose slope on hill
- Side slope on hill
- Mountaintop on mountain

- Mountainflank on mountain
- Ridge

Slope: 4 to 15 percent

Elevation: 5,600 to 6,000 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Flooding: None

Available water capacity: Mainly 3.2 inches

Nivean and similar soils

Composition: 20 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 4 to 15 percent

Elevation: 5,600 to 6,000 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Flaggy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Rhyolite

Flooding: None

Available water capacity: Mainly 0.9 inches

Additional Components

Karloff and similar soils: 5 percent

Macabre and similar soils: 5 percent

5036E—Pax-Nivean-Litag complex, 15 to 35 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,300 to 6,200 feet

Mean annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Component Description

Pax and similar soils

Composition: 45 percent

Geomorphic description:

- Nose slope on hill
- Side slope on hill
- Mountaintop on mountain
- Mountainflank on mountain
- Ridge

Slope: 15 to 35 percent

Elevation: 5,300 to 6,200 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very cobbly ashy sandy loam
Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.2 inches

Nivean and similar soils

Composition: 25 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 35 percent
Elevation: 5,300 to 6,200 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Flaggy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 0.9 inches

Litag and similar soils

Composition: 20 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain

Slope: 15 to 35 percent
Elevation: 5,300 to 6,200 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly ashy sandy clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 6.5 inches

Additional Components

Macabre and similar soils: 5 percent
 Judco and similar soils: 3 percent
 Rock outcrop: 1 percent
 Rubble land: 1 percent

5036F—Pax-Nivean-Litag complex, 35 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,700 to 6,400 feet

Mean annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Component Description

Pax and similar soils

Composition: 35 percent

Geomorphic description:

- Nose slope on hill
- Side slope on hill
- Mountaintop on mountain
- Mountainflank on mountain
- Ridge

Slope: 35 to 60 percent

Elevation: 5,700 to 6,400 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Very cobbly ashy sandy loam

Depth to restrictive feature: Bedrock (lithic): 20 to 40 inches

Drainage class: Well drained

Parent material: Rhyolite

Native plant cover type: Forest land

Flooding: None

Available water capacity: Mainly 3.2 inches

Nivean and similar soils

Composition: 35 percent

Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 35 to 60 percent

Elevation: 5,700 to 6,400 feet

Effective annual precipitation: 18 to 24 inches

Frost-free period: 70 to 90 days

Surface layer texture: Flaggy sandy loam

Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches

Drainage class: Well drained

Parent material: Rhyolite

Flooding: None

Available water capacity: Mainly 0.9 inches

Litag and similar soils

Composition: 20 percent

Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain

Slope: 35 to 60 percent

Elevation: 5,700 to 6,400 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Gravelly ashy sandy clay loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 6.5 inches

Additional Components

Judco and similar soils: 4 percent
 Macabre and similar soils: 3 percent
 Rock outcrop: 2 percent
 Rubble land: 1 percent

5037E—Macabre-Nivean-Rock outcrop complex, 15 to 45 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 6,100 feet
Mean annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days

Component Description

Macabre and similar soils

Composition: 45 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 45 percent
Elevation: 5,400 to 6,100 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very cobbly ashy sandy clay loam
Depth to restrictive feature: Bedrock (lithic): 20 to 60 inches
Drainage class: Well drained
Parent material: Rhyolite
Native plant cover type: Forest land
Flooding: None
Available water capacity: Mainly 3.1 inches

Nivean and similar soils

Composition: 30 percent
Geomorphic description:

- Nose slope on hill
- Mountaintop on mountain
- Ridge

Slope: 15 to 45 percent
Elevation: 5,400 to 6,100 feet

Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Flaggy sandy loam
Depth to restrictive feature: Bedrock (lithic): 10 to 20 inches
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 0.9 inches

Rock outcrop, welded tuff

Composition: 15 percent
Definition: This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.

Additional Components

Judco and similar soils: 5 percent
 Pax and similar soils: 3 percent
 Litag and similar soils: 2 percent

5038F—Litag-Arlen-Rock outcrop complex, 25 to 60 percent slopes, moderately impacted

Map Unit Setting

Elevation: 5,400 to 5,900 feet
Mean annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days

Component Description

Litag and similar soils

Composition: 30 percent
Geomorphic description:

- Alluvial fan
- Side slope on hill
- Mountainbase on mountain

Slope: 25 to 50 percent
Elevation: 5,400 to 5,900 feet
Effective annual precipitation: 18 to 24 inches
Frost-free period: 70 to 90 days
Surface layer texture: Very gravelly ashy sandy loam
Depth to restrictive feature: None noted
Drainage class: Well drained
Parent material: Rhyolite
Flooding: None
Available water capacity: Mainly 5.2 inches

Arlen and similar soils

Composition: 30 percent

Geomorphic description:

- Head slope on hill
- Nose slope on hill
- Mountaintop on mountain

Slope: 25 to 60 percent*Elevation:* 5,400 to 5,900 feet*Effective annual precipitation:* 18 to 24 inches*Frost-free period:* 70 to 90 days*Surface layer texture:* Very cobbly ashy sandy loam*Depth to restrictive feature:* Bedrock (lithic): 10 to 20 inches*Drainage class:* Well drained*Parent material:* Residuum weathered from rhyolite or residuum weathered from tuff*Flooding:* None*Available water capacity:* Mainly 0.7 inches**Rock outcrop, welded tuff***Composition:* 30 percent*Definition:* This component consists mainly of exposed areas of welded tuff, rhyolitic tuff, and/or tuffaceous volcanic rocks.**Additional Components**

Macabre and similar soils: 5 percent

Nivean and similar soils: 3 percent

Pax and similar soils: 2 percent

LDF—Landfill**Component Description****Landfill***Composition:* 100 percent*Definition:* Areas of accumulated waste products of human habitation that can be above or below natural ground level**M-W—Water, miscellaneous****Component Description****Water, miscellaneous***Composition:* 100 percent*Definition:* Areas of sewage lagoons, industrial waste pits, fish hatcheries, etc.**W—Water****Component Description****Water***Composition:* 100 percent

Use and Management of the Soils

This soil survey is an inventory and evaluation of the soils in the survey area. It can be used to adjust land uses to the limitations and potentials of natural resources and the environment. Also, it can help to prevent soil-related failures in land uses.

In preparing a soil survey, soil scientists, conservationists, engineers, and others collect extensive field data about the nature and behavioral characteristics of the soils. They collect data on erosion, droughtiness, flooding, and other factors that affect various soil uses and management. Field experience and collected data on soil properties and performance are used as a basis in predicting soil behavior.

Information in this section can be used to plan the use and management of soils for crops and pasture; as forestland; as sites for buildings, sanitary facilities, highways and other transportation systems, and parks and other recreational facilities; for agricultural waste management; and as wildlife habitat. It can be used to identify the potentials and limitations of each soil for specific land uses and to help prevent construction failures caused by unfavorable soil properties.

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

Contractors can use this survey to locate sources of 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, camp areas, playgrounds, lawns, and trees and shrubs.

In this soil survey, recreational interpretations that rate the soils for potential use as camp areas, paths and trails, picnic areas, and playgrounds are not provided because of the degree that the soils have been impacted. Onsite evaluation is required to determine the suitability of the soils for recreational uses.

Interpretive Ratings

The interpretive tables in this survey rate the soils in the survey area for various uses. Many of the tables identify the limitations that affect specified uses and indicate the severity of those limitations. The ratings in these tables are both verbal and numerical.

Rating Class Terms

Rating classes are expressed in the tables in terms that indicate the extent to which the soils are limited by all of the soil features that affect a specified use or in terms that indicate the suitability of the soils for the use. Thus, the tables may show limitation classes or suitability classes. Terms for the limitation classes are *not limited*, *somewhat limited*, and *very limited*. The suitability ratings are expressed as *well suited*, *moderately suited*, *poorly suited*, and *unsuited* or as *good*, *fair*, and *poor*.

Numerical Ratings

Numerical ratings in the tables indicate the relative severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.00 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use and the point at which the soil feature is not a limitation. The limitations appear in order from the most limiting to the least limiting. Thus, if more than one limitation is identified, the most severe limitation is listed first and the least severe one is listed last.

Agronomy

Crops and Pasture

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

Planners of management systems for individual fields or farms should consider the detailed information given in the description of each soil under the heading "Detailed Soil Map Units." Specific information can be obtained from the local office of the Natural Resources Conservation Service or the Cooperative Extension Service.

Cropland Management

Management concerns affecting the use of the detailed soil map units in the survey area for constructing grassed waterways, vegetating grassed waterways and filter strips, and installing sprinkler irrigation are shown in the table, "Cropland Management."

A *grassed waterway* is a natural or constructed waterway, typically broad and shallow, seeded to grass as protection against erosion. The grassed waterway conducts surface water away from cropland.

A *filter strip* is a trench with a sand or gravel bottom used to filter water.

Sprinkler irrigation is a method to apply water to soils to assist in the production of crops. Water is sprayed over the soil surface through pipes or nozzles from a pressure system.

Land Capability Classification

Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. Crops that require special management are excluded. The soils are grouped according to their limitations for field crops, the risk of damage if they are used for crops, and the way they respond to management. The criteria used in grouping the soils do not include major and generally expensive landforming that would change slope, depth, or other characteristics of the soils, nor do they include possible but unlikely major reclamation projects. Capability classification is not a substitute for interpretations designed to show suitability and limitations of groups of soils for rangeland, for forestland, or for engineering purposes.

In the capability system, soils are generally grouped at three levels—capability class, subclass, and unit.

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

Class 1 soils have slight limitations that restrict their use.

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

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

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

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

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

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

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

Capability subclasses are soil groups within one class. They are designated by adding a small letter, *e*, *w*, *s*, or *c*, to the class numeral, for example, 2e. The letter *e* shows that the main hazard is the risk of erosion unless close-growing plant cover is maintained; *w* shows that water in or on the soil interferes with plant growth or cultivation (in some soils the wetness can be partly corrected by artificial drainage); *s* shows that the soil is limited mainly because it is shallow, droughty, or stony; and *c*, used in only some parts of the United States, shows that the chief limitation is climate that is very cold or very dry.

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

The acreage of soils in each capability class or subclass is shown in the table, "Land Capability and Yields per Acre of Crops and Pasture." The capability classification of map units in this survey area is given in the section "Detailed Soil Map Units" and in the yields table.

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 and Important Farmland," at the end of this section.

Prime Farmland

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

Prime farmland, as defined by the U.S. Department of Agriculture, is land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is available for these uses. It could be cultivated land, pastureland, forestland, or other land, but it is not urban or built-up land or water areas. The soil qualities, growing season, and moisture supply are those needed for the soil to economically produce sustained high yields of crops when proper management, including water management, and acceptable farming methods are applied. In general, prime farmland has an adequate and dependable

supply of moisture from precipitation or irrigation, a favorable temperature and growing season, acceptable acidity or alkalinity, an acceptable salt and sodium content, and few or no rocks. It is permeable to water and air. It is not excessively erodible or saturated with water for long periods, and it either is not frequently flooded during the growing season or is protected from flooding. Slope ranges mainly from

0 to 6 percent. More detailed information about the criteria for prime farmland is available at the local office of the Natural Resources Conservation Service.

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

The map units in the survey area that are considered prime farmland are listed in the "Prime and Important Farmland" table. This list does not constitute a recommendation for a particular land use. On some soils included in the list, measures that overcome a hazard or limitation, such as flooding, wetness, and droughtiness, are needed. Onsite evaluation is needed to determine whether or not the hazard or limitation has been overcome by corrective measures. The extent of each listed map unit is shown in the "Acreage and Proportionate Extent of the Soils" table. The location is shown on the detailed soil maps. The soil qualities that affect use and management are described under the heading "Detailed Soil Map Units."

Additional Farmland of Statewide Importance

Some areas other than areas of prime 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.

Farmland of statewide importance is included in the list of prime farmland. Criteria are available in the Field Office Technical Guide, Section II, which is available in local offices of the Natural Resources Conservation Service and online at <http://www.nrcs.usda.gov/technical/efotg/>.

Rangeland

Glen P. Green, District Conservationist—Deer Lodge, Natural Resources Conservation Service, prepared this section.

Rangeland makes up about 52 percent of the land area in the Deer Lodge County Area. Agricultural income is derived primarily from cattle raised in cow-calf and cow-calf/yearling operations. Sheep and hog farming represent a small component of the overall livestock produced in the soil survey area.

On most operations, the forage produced on rangeland is supplemented through grazing on other land uses. These include woodlands, irrigated and dry tame pastures, hayland aftermath, and some crop stubble. In winter, livestock are fed hay that is produced on the unit or purchased locally. A 5- to 6-month winter feed period is common throughout the area.

Achieving healthy, sustainable rangelands through proper grazing management of native rangelands is an important management concern in the area. Implementation of rotational grazing systems is necessary to improve and/or maintain the kinds and amounts of native plants that make up the historic native plant communities. Similarity index is often less than 50 percent on greater than 50 percent of the rangeland acres. Similarity index represents the degree of similarity the present plant community has to the historic climax plant community. When the similarity index is less than 50 percent, that means less than 50 percent of the plants that currently occupy a particular ecological site are the same plants that would occupy that site at historic climax. Forage production on many of the ecological sites in the survey area is below the potential of what those sites are able to produce when in their historic climax condition. Much of the acreage was once dominated by tall-growing and high-producing bunchgrasses. Presently it is dominated by low-producing native grasses, introduced grasses, weeds, and brush. The amount of forage produced on these low similarity index sites can be as low as one-third of the potential annual production.

Another important concern is the invasion of noxious weeds and brush. Spotted knapweed is the most common noxious weed throughout the soil survey area. It continues to spread by a number of methods, primarily by vehicles. Additional noxious weeds that pose a resource concern include whitetop, Canada thistle, leafy spurge (in the Galen and Warm Springs areas), rubber rabbitbrush (in the northeastern part of the county), and big sagebrush and little sagebrush (in the Big Hole area).

Restoring soil chemical properties and native vegetation in the area north and east of the town of Anaconda are additional resource concerns. When the Anaconda Copper Company operated a smelter plant east of Anaconda, the smelter fallout increased soil surface acidity over the years. Native vegetation was virtually eliminated because of the changes in soil chemistry and plant nutrient availability. Those affected areas are slowly recovering, mainly with basin wildrye and redtop colonization and reproduction. However, the presence and density of noxious weeds in those areas has also increased.

In areas that have similar climate and topography, differences in the kind and amount of vegetation produced on rangeland 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 forestland 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.

Naturalized pasture is defined as forestland that is used primarily for the production of forage for grazing by livestock rather than for the production of wood products. Overstory trees are removed or managed to promote the native and introduced understory vegetation occurring on the site. This vegetation is managed for its forage value through the use of grazing management principles.

The table “Rangeland and Forest Understory Production and Plant Composition” at the end of this section shows, for each soil, the ecological site; the total annual production of vegetation in favorable, normal, and unfavorable years; the characteristic native vegetation; and the average percentage of each species. Explanation of the column headings in this table follows.

An *ecological site* is the product of all the environmental factors responsible for its development. It has characteristic soils that have developed over time throughout the soil development process; a characteristic hydrology, particularly infiltration and runoff, that has developed over time; and a characteristic plant community (kind and amount of vegetation). The hydrology of the site is influenced by development of the soil and plant community. The vegetation, soils, and hydrology are all interrelated. Each is influenced by the others and influences the development of the others. The plant community on an ecological site is typified by an association of species that differs from that of other ecological sites in the kind and/or proportion of species or in total production. Descriptions of ecological sites are provided in the Field Office Technical Guide, which is available in local offices of the Natural Resources Conservation Service and online at <http://www.glti.nrcs.usda.gov/technical/publications/nrph.html>.

Total dry-weight production is the amount of vegetation that can be expected to grow annually in a well-managed area 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 fruits 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. Yields are adjusted to a common percent of air-dry moisture content.

Characteristic native vegetation—the grasses, forbs, and shrubs that make up most of the potential natural plant community on each soil—is listed by common name. Under *rangeland 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.

Rangeland Condition

Rangeland condition is based on a comparison of the present plant community with the potential natural plant community on a particular ecological 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 may 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 similarity index and rangeland trend. Range similarity index is determined by comparing the present plant community with the potential natural plant community on a particular rangeland ecological site. The more closely the existing community resembles the potential community, the higher the range similarity index. Rangeland trend is defined as the direction of change in an existing plant community relative to the potential natural plant community. Further information about the range similarity index and rangeland trend is available in chapter 4 of the "National Range and Pasture Handbook" (USDA, 2003).

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, control of undesirable brush species, conservation of water, and control of erosion. Sometimes, however, an area with a range similarity index 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 has 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 practices include developing livestock watering facilities, fencing, properly locating salt and mineral supplements, constructing livestock trails in steeply sloping areas, and riding or herding. The table, "Rangeland Improvement," shows, for each map unit, the limitations to the range improvements of fencing and developing pond reservoir areas.

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 topography, type of grazing animals, and 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 practices 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. Capability classes are designated by the numbers 1 through 8. The numbers indicate progressively greater limitations and narrower choices for practical use. Many soils in capability classes 1 through 4 are suited to such practices as seeding, mechanical brush and weed control, and water spreading. Those soils 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 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 absorption of more moisture and production of more desirable plants. Mechanical renovation, brush management, and timely deferment of grazing allow recovery of desired plants.

Seeding may be needed in areas where 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.

Forestland Understory Management

Understory vegetation consists of grasses, forbs, shrubs, and other plants. If well managed, some forestland can produce enough understory vegetation to support grazing of livestock or wildlife, or both, without damage to the trees.

Forest understory production can be influenced by controlling canopy density in addition to the management of stocking rates, distribution, and season of use. Often both the forestland and range resources can be enhanced through thinning the overstory to canopy levels that optimize both timber and forage production. Broadcast seeding of disturbed areas soon after timber harvest can improve forage quantity and quality and reduce the chances of undesirable plants occupying the site.

Steepness of slopes and distance to drinking water are severe grazing management problems in much of the mountain and foothill areas. Variations in primary season of use, production levels, and plant communities because of elevation and aspect changes present additional challenges. Long, steep slopes provide limited access to livestock. Less sloping areas are subject to overuse.

Grazing should be delayed until the soil is firm enough to withstand trampling and the plants have matured enough to withstand grazing pressure.

Riparian areas should be protected from overuse by livestock. Misuse results in deterioration of protective vegetation, reduction of streambank stability, and excessive erosion. Developing off-stream-watering locations can successfully prevent cattle from overgrazing riparian areas and encourage better livestock distribution.

Forestland

Brian Dougherty, Soil Scientist, and Tim Wiersum, Forester, Natural Resources Conservation Service, prepared this section.

Forest Resource Statistics

Forests are among the most important natural resources of Deer Lodge County, supplying timber, grazing, clean water, wildlife habitat, recreation, and natural beauty. Soil surveys are important to apply various forest practices effectively while minimizing the impacts on soil, water, and related resources. For example, stands of trees on certain soils will respond better to thinning; some soils are susceptible to slumping and excessive erosion after road building and harvesting, and other soils will require special effort to harvest and reforest.

About 160,000 acres are forested, or nearly 56 percent of the total survey area. Forestland ownership is as follows:

Private	59%
Federal	10%
State	31%

Most of the forested acreage is commercial forestland capable of growing more than 20 cubic feet per acre per year at culmination of mean annual increment of growth. Forestland above 8,000 feet elevation, dominated by whitebark pine, is generally considered noncommercial.

Forested Areas

In the survey area, forestland ranges in elevation from 4,500 to over 8,500 feet. Mean annual precipitation varies from 10 to 40 inches. The valleys consist of grasslands with forests of black cottonwood, quaking aspen, and lodgepole pine; Douglas-fir occurs in the draws and bordering streams and rivers.

Above the valley floor, grasslands give way to forest. Mostly, variations in soils and climate cause forest stands to differ. Temperature and moisture are important climatic factors affecting forest growth and composition. Forest productivity is low on dry sites and high on moist sites. Elevation and aspect are topographic features that further influence temperature and moisture. The Douglas-fir type occupies the warm-dry end of the climatic gradient while subalpine fir occupies the cool-wet end at the highest elevations. Lodgepole pine is the most common tree species. Other common trees are whitebark pine, Engelmann spruce, and Rocky Mountain juniper.

Forest understory plant communities exhibit the same diversity. Bluebunch wheatgrass, rough and Idaho fescues, and arrowleaf balsamroot predominate on warmer, drier sites. Pinegrass, elk sedge, heartleaf arnica, common snowberry, white spiraea, twinflower, mallow ninebark, and Saskatoon serviceberry are common in more moderate environments. Pinegrass, common beargrass, grouse whortleberry, dwarf and blue huckleberry, common snowberry, and white spiraea typify the cool-moist forest types.

The vegetation and soils around Anaconda are contaminated from the former smelter emissions that contained heavy metals and sulfur compounds. This contamination affected plant and soil biotic life. Soils have eroded and are now slowly recovering.

Parent Materials

Soils have developed from several different parent materials, including granite, limestone, quartzite, argillite, and several volcanics (basalt, andesite, rhyolite, and tuffs).

Soils derived from granitic parent materials weather into coarse-textured soils that are potentially erosive. Typical soils weathered from granite are Ambrant, Elkner, and Rochester. These soils occur throughout the area from warm-dry to cool-moist forests.

Soils derived from limestone parent materials are medium- to fine-textured soils with lime like Helmville, Relyea, Whitecow, and Whitore. Wherever lime is near the surface, such as in the Whitecow and Whitore soils, it gives Douglas-fir a distinct competitive advantage over other species on these soils. The medium-textured soils like Helmville, Whitecow, and Whitore are relatively stable and ideal for road construction. Relyea, a fine-textured soil, does have trafficability concerns. Forest productivity is rated low to moderate on the medium-textured soils and moderate on the Relyea soils.

Quartzites break down to medium- to coarse-textured soils like Elve and Evaro. These soils are stable with good trafficability and moderate productivity.

Argillite parent materials form medium-textured soils. Worock is a typical soil. These soils are similar to quartzite soils except for having slightly more clay in the subsoil. Productivity is slightly higher than on quartzite soils.

Volcanic parent materials form fine- to medium-textured soils. Typical soils are Bignell, Danaher, Loberg, Worock, and Yreka. Compaction and poor trafficability are potential limitations on the finer-textured soils such as Bignell and Danaher. These forest soils are some of the more productive in the survey area.

Forestland Management and Productivity

Soil Interpretations

To aid those who manage forestland in the soil survey area, soil interpretations relating to forestland use and management have been developed. Items considered for interpretation are:

1. Conservation tree/shrub suitability groups,
2. Construction limitations for haul roads/log landings,
3. Hand planting suitability,
4. Harvest equipment suitability,
5. Log landing suitability,
6. Mechanical planting suitability,
7. Mechanical site preparation (deep),
8. Mechanical site preparation (surface),
9. Potential erosion hazard (off-road/off trail),
10. Potential erosion hazard (road/trail),
11. Potential for seedling mortality,
12. Road suitability (natural surface),
13. Soil rutting hazard, and
14. Potential fire damage hazard.

Forestland management information for each forested soil is contained in the “Forestland Management” and “Forestland Productivity” tables. Definitions, ratings, and assumptions are explained in the following paragraphs

Soil Rating and Limitations

Soil rating and limitations have been developed for *Limitations Affecting Construction of Haul Roads and Log Landings, Suitability for Log Landings, Soil Rutting Hazard, Hazard of Off-road and Off-trail Erosion, Hazard of Erosion on Roads and Trails, Suitability for Roads (Natural Surface), Suitability for Hand Planting and Mechanical Planting, Suitability for Use of Harvesting Equipment, Suitability for Mechanical Site Preparation (Surface and Deep), Potential for Damage to Soil by Fire, and Potential for Seedling Mortality*. The ratings and assumptions for the hazards or risks of soil loss from unsurfaced roads/trails are illustrated below.

1. Ratings assess:

- a. The force that natural precipitation events have to dislodge and move soil materials on roads, trails, and firebreaks.
- b. Activities on roads and trails that result in bare ground, compaction, and reshaping of the soil surface.
- c. Use by trucks, skidders, off-road vehicles, and other similar equipment.
- d. The impact on compacted, bare road, trail surface using the representative value for slope gradient of the soil component.

2. Ratings assume that roads and trails are generally linear, continuous, and narrow and range up to 7.5 meters in width.

3. Ratings do not assess frozen or snow-covered soil.

4. Definition of ratings:

- a. Not limited: Little or no erosion is likely.
- b. Limited: Some erosion is likely; occasional maintenance may be needed; simple erosion control measures may be needed.
- c. Very limited: Significant erosion can be expected; roads require frequent maintenance; costly erosion control measures are needed.

5. Soil rating criteria: Primary soil features considered in making this rating were slope, soil erodibility factor, and percent rock fragments.

In the “Forestland Management” tables, the values listed indicate severity of the criteria limitations, with 0.00 being not limited and 1.00 being very limited.

Forestland Management

In the “Forestland Management” tables, the soils are rated for the erosion hazard, equipment limitation, seedling mortality, windthrow hazard, and plant competition.

Ratings of the erosion hazard indicate the risk of soil loss in well-managed forests. These ratings were made on the basis of the timber harvested by clearcutting and the slash burned. It is assumed reasonable care was used in logging; i.e. skid trails did not concentrate water, disturbance was not excessive, and some slash remained to cover the surface. Major soil features considered in making this rating include slope, soil depth, soil texture, and surface stoniness. The rating 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.

Ratings of equipment limitation reflect the characteristics and conditions of the soil that restrict use of equipment generally needed in forest management. Equipment limitations in this survey area were related to logging operations, specifically, difficulties encountered in yarding logs and their influence on soil properties. Primary soil features considered in making this rating were slope, soil texture, soil depth, seasonal soil wetness, and stoniness. The rating 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 indicate the degree to which the soil limits tree seedling survival. Plant competition is not considered in the ratings. The ratings apply to one- or two-year-old seedlings from good stock that are properly planted during periods of average rainfall. As interpreted in this survey, the evaluation period begins at the time of planting. For natural regeneration, the evaluation period was considered to begin a year after germination. Soil features used in this rating include slope, soil depth, soil texture, aspect, and annual precipitation. 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.

Ratings of windthrow hazard consider soil characteristics that affect the development of tree roots and the ability of the soil to hold trees firmly. Soils on north slopes that remain moist into the spring and those having a high basal area that limit root development were considered moderately prone to windthrow even though the soil materials provided a good anchoring medium for tree roots. On drier sites, clayey soils without rock fragments were considered in this category. Soils that have a high water table within 20 inches of the surface long enough to inhibit root development were considered severely susceptible to windthrow. The rating 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.

Ratings of plant competition indicate the degree to which understory plants are expected to encroach and affect the establishment of tree seedlings on different kinds of soil, when openings are made in the canopy. In making ratings for plant competition, if adequate regeneration usually occurs on a soil within 5 years, the limitation was considered slight. Features used in making this rating include slope, presence of clayey subsoils, annual precipitation, and the presence of rhizomatous plants in the forest understory. The rating 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.

Forestland Productivity

Site index and yield tables can be used to develop estimates of potential growth for adapted tree species on different soils. Yield estimates in the "Forestland Productivity" table are expressed as average annual cubic feet per acre at CMAI—that point in time when the average annual yield is greatest.

Expected tree growth rate and the diversity of trees on a site are determined by a combination of elevation, aspect, soils, and climate. The ability of soils to support tree growth is dependent on variability in soil depth, fertility, texture, and available water capacity.

The “Forestland Productivity” table includes the columns *Common Trees*, *Site Index*, *Volume of Wood Fiber*, and *Trees to Manage*. The column, *Common Trees*, refers to the trees most commonly encountered on the different soils. They are selected on the basis of growth rate, quality, value, and marketability. For the more common trees, particularly those of commercial value, site index values have been determined.

Site Index is a value that ranks soil productivity for a specified tree species. It is determined by taking height measurements and concluding the age of selected trees within stands of a given species (Alexander, 1966). This index is the average height, in feet, that dominant and codominant trees of a given species attain in a specified number of years. The specified number of years (base age) may be different for different species. The site index applies to fully stocked, even-aged, unmanaged stands. The site indexes shown in the “Forestland Productivity” table are averages based on measurements made at sites that are representative of the soil series. The higher the site index number is, the more productive the soil for that species is.

The site index base age is 100 years for Engelmann spruce, lodgepole pine, and ponderosa pine, and 50 years for Douglas-fir, grand fir, and western larch. Since different base ages are used for different species, site index values are not directly comparable from one species to another. Site index values were computed from the following references: Engelmann spruce (Alexander, 1967), lodgepole pine (Alexander, 1966), ponderosa pine (Meyer, 1938), Douglas-fir (Brickell, 1968), grand fir (Haig, 1932), and western larch (Cummings, 1937).

The *Trees to Manage* column in the “Forestland Productivity” table lists trees adapted to the site. The first listed tree species will likely be the most productive.

Yields

The column, *Volume of Wood Fiber*, in the “Forestland Productivity” table lists the average annual yield estimates in board feet (Scribner’s log rule) per acre for selected tree species. Overstory yield estimates were determined for most species from average annual yield versus site index curves developed through adjustment of data presented in yield tables published from several different sources. Average annual yield values were computed at the culmination of mean annual increment.

“Yield of Even-aged Stands of Ponderosa Pine” (Meyer, 1938) was used for estimating the yields of Douglas-fir, ponderosa pine, and western larch. Board-foot yield estimates are based on all trees greater than 11.6 inches in diameter breast height (DBH). Total cubic foot yield estimates are based on trees 0.6 inches and more DBH inside bark, including top and stump.

Yield estimates for Engelmann spruce were based on managed stand yield tables (Edminster, 1978). The tables developed by Edminster represent an initial stand basal area of 120 square feet per acre and a 20-year thinning interval. Board-foot values in the table are based on trees 8 inches DBH and larger down to a 6-inch top. Cubic-foot volumes are based upon the whole tree, ground to top.

“Yield Tables for Managed Stands of Lodgepole Pine in Colorado and Wyoming” (Myers, 1967) was used to estimate the board foot yield of lodgepole pine. Board-foot volumes in the reference are based on Scribner’s log rule and include all trees larger than 10 inches DBH to an 8-inch top diameter inside bark. Total cubic-foot yield estimates are based on “Gross and Net Yield Tables for Lodgepole Pine” (Dahms, 1964). In this reference, total cubic-foot volume estimates (inside bark) are based on all trees with DBH inside the bark of more than 1 inch with tops and stumps included.

Soils with potential forest productivity greater than 85 cubic feet per acre per year CMAI are recognized as prime timberland (USDA Statement on Land Use Policy, Departmental Regulation 9500-3). Maintaining these lands in forest uses is encouraged because of their high productivity.

Forest Understory

Forest understory information can be found in the “Rangeland” section of the manuscript with the use of the “Rangeland and Forest Understory Production and Plant Composition” table. The forest understory information consists of a listing of the understory plant species expected to occur beneath a forest canopy, an estimate of the associated understory production in favorable and unfavorable years, and the habitat type or ecological site description that would best describe the climax plant community.

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. The kind and abundance of wildlife depend largely on the amount and distribution of food, cover, and water. Wildlife habitat can be created or improved by planting appropriate vegetation, by maintaining the existing plant cover, or by promoting the natural establishment of desirable plants.

Elements of Wildlife Habitat

The following paragraphs describe the elements of wildlife habitat.

Grain and seed crops are domestic grains and seed-producing herbaceous plants. Soil properties and features that affect the growth of grain and seed crops are depth of the root zone, texture of the surface layer, available water capacity, wetness, slope, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of grain and seed crops are barley, oats, rye, and wheat.

Grasses and legumes are domestic perennial grasses and herbaceous legumes. Soil properties and features that affect the growth of grasses and legumes are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, flooding, and slope. Soil temperature and soil moisture also are considerations. Examples of grasses and legumes are alfalfa, brome grass, clover, crownvetch, fescue, orchardgrass, reed canarygrass, timothy, and trefoil.

Wild herbaceous plants are native or naturally established forbs and grasses, including weeds. Soil properties and features that affect the growth of these plants are depth of the root zone, texture of the surface layer, available water capacity, wetness, surface stoniness, and flooding. Soil temperature and soil moisture also are considerations. Examples of wild herbaceous plants are blackberry, blueberry, bluestem, dandelion, fescue, goldenrod, Indiangrass, lambsquarters, nightshade, ragweed, and wheatgrass.

Deciduous trees and woody understory produce bark, buds, catkins, foliage, nuts or other fruit, and twigs. Soil properties and features that affect the growth of deciduous trees and shrubs are depth of the root zone, available water capacity, and wetness. Examples of deciduous trees and woody understory are American elm, birch, boxelder, green ash, maple, oak, poplar, and willow. Examples of fruit-producing shrubs that are suitable for planting on soils that have good potential for these plants are American plum, chokecherry, crabapple, hawthorn, honeysuckle, redosier dogwood, serviceberry, and silver buffaloberry.

Coniferous plants furnish browse and seeds. Soil properties and features that affect the growth of coniferous trees, shrubs, and ground cover are depth of the root zone, available water capacity, and wetness. Examples of coniferous plants are cedar, fir, hemlock, juniper, larch, pine, spruce, and yew.

Shrubs are bushy woody plants that produce fruit, buds, twigs, bark, and foliage. Soil properties and features that affect the growth of shrubs are depth of the root zone, available water capacity, salinity, and soil moisture. Examples of shrubs are big sagebrush, bitterbrush, mountain mahogany, and snowberry.

Wetland plants are annual and perennial wild herbaceous plants that grow on moist or wet sites. Submerged or floating aquatic plants are excluded. Soil properties and features affecting wetland plants are texture of the surface layer, wetness, reaction, salinity, slope, and surface stoniness. Examples of wetland plants are arrowhead, bulrush, cattail, pickerelweed, rushes, sedges, smartweed, water plantain, wild millet, and wildrice.

Shallow-water areas have an average depth of less than 5 feet. Some are naturally wet areas. Others are created by dams, levees, or other water-control structures. Soil properties and features affecting shallow water areas are depth to bedrock, wetness, surface stoniness, slope, and permeability. Examples are beaver ponds, muskrat marshes, waterfowl feeding areas, wildlife watering developments, and other wildlife ponds.

Kinds of Wildlife Habitat

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

Habitat for woodland wildlife consists of areas of coniferous and/or deciduous plants and associated grasses, legumes, and wild herbaceous plants. Wildlife attracted to woodland areas include black bear, deer, elk, owl, porcupine, raccoon, ruffed grouse, thrush, tree squirrel, wild turkey, and woodpecker.

Habitat for wetland wildlife consists of open, marshy or swampy, shallow-water areas. Some of the wildlife attracted to wetland areas include beaver, bittern, duck, geese, heron, kingfisher, mink, muskrat, otter, and rail.

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

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 data in the tables described under the heading "Soil Properties."

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 between the surface and a depth of 5 to 7 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 particle-size distribution, liquid limit, plasticity index, soil reaction, depth to bedrock, hardness of bedrock within 5 to 7 feet of the surface, soil wetness, depth to a water table, ponding, 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

Soil properties influence the development of building sites, including the selection of the site, the design of the structure, construction, performance after construction, and maintenance. The “Building Site Development” table shows the degree and kind of soil limitations that affect shallow excavations, dwellings with and without basements, small commercial buildings, and local roads and streets.

The ratings in the table are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect building site development. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the table indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Shallow excavations are trenches or holes dug to a maximum depth of 5 or 6 feet for graves, utility lines, open ditches, or other purposes. The ratings are based on the soil properties that influence the ease of digging and the resistance to sloughing. Depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, the amount of large stones, and dense layers influence the ease of digging, filling, and compacting. Depth to the seasonal high water table, flooding, and ponding may restrict the period when excavations can be made. Slope influences the ease of using machinery. Soil texture, depth to the water table, and linear extensibility (shrink-swell potential) influence the resistance to sloughing.

Dwellings are single-family houses of three stories or less. For dwellings without basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. For dwellings with basements, the foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of about 7 feet. The ratings for dwellings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility. Compressibility is inferred from the Unified classification. The properties that affect the ease and amount of excavation include depth to a water table, ponding, flooding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

Small commercial buildings are structures that are less than three stories high and do not have basements. The foundation is assumed to consist of spread footings of reinforced concrete built on undisturbed soil at a depth of 2 feet or at the depth of maximum frost penetration, whichever is deeper. The ratings are based on the soil properties that affect the capacity of the soil to support a load without movement and on the properties that affect excavation and construction costs. The properties that affect the load-supporting capacity include depth to a water table, ponding, flooding, subsidence, linear extensibility (shrink-swell potential), and compressibility (which is inferred from the Unified classification). The properties that affect the ease and

amount of excavation include flooding, depth to a water table, ponding, slope, depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, and the amount and size of rock fragments.

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 soil material stabilized by lime or cement; and a surface of flexible material (asphalt), rigid material (concrete), or gravel with a binder. The ratings are based on the soil properties that affect the ease of excavation and grading and the traffic-supporting capacity. The properties that affect the ease of excavation and grading are depth to bedrock or a cemented pan, hardness of bedrock or a cemented pan, depth to a water table, ponding, flooding, the amount of large stones, and slope. The properties that affect the traffic-supporting capacity are soil strength (as inferred from the AASHTO group index number), subsidence, linear extensibility (shrink-swell potential), the potential for frost action, depth to a water table, and ponding.

Lawns and landscaping require soils on which turf and ornamental trees and shrubs can be established and maintained. The properties that affect plant growth are reaction; depth to a water table; ponding; depth to bedrock or a cemented pan; available water capacity in the upper 40 inches; content of salts, sodium, or calcium carbonate; and sulfidic materials. The properties that affect trafficability are flooding; depth to a water table; ponding; slope; stoniness; and the amount of sand, clay, or organic matter in the surface layer. The soils in this survey area have not been rated for potential use for lawns and landscaping because of the degree that the soils have been impacted. Onsite evaluation is required to determine the suitability of the soils for use for lawns and landscaping.

Sanitary Facilities

The "Sanitary Facilities" tables show the degree and kind of soil limitations that affect septic tank absorption fields, sewage lagoons, sanitary landfills, and daily cover for landfill. The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Septic tank absorption fields are areas in which effluent from a septic tank is distributed into the soil through subsurface tiles or perforated pipe. Only that part of the soil between depths of 24 and 60 inches is evaluated. The ratings are based on the soil properties that affect absorption of the effluent, construction and maintenance of the system, and public health. Permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, and flooding affect absorption of the effluent. Stones and boulders, ice, and bedrock or a cemented pan interfere with installation. Subsidence interferes with installation and maintenance. Excessive slope may cause lateral seepage and surfacing of the effluent in downslope areas.

Some soils are underlain by loose sand and gravel or fractured bedrock at a depth of less than 4 feet below the distribution lines. In these soils, the absorption field may not adequately filter the effluent, particularly when the system is new. As a result, the ground water may become contaminated.

Sewage lagoons are shallow ponds constructed to hold sewage while aerobic bacteria decompose the solid and liquid wastes. Lagoons should have a nearly level floor surrounded by cut slopes or embankments of compacted soil. Nearly impervious soil material for the lagoon floor and sides is required to minimize seepage and contamination of ground water. Considered in the ratings are slope, permeability, depth to a water table, ponding, depth to bedrock or a cemented pan, flooding, large stones, and content of organic matter.

Soil permeability is a critical property affecting the suitability for sewage lagoons. Most porous soils eventually become sealed when they are used as sites for sewage lagoons. Until sealing occurs, however, the hazard of pollution is severe. Soils that have a permeability rate of more than 2 inches per hour are too porous for the proper functioning of sewage lagoons. In these soils, seepage of the effluent can result in contamination of the ground water. Ground-water contamination is also a hazard if fractured bedrock is within a depth of 40 inches, if the water table is high enough to raise the level of sewage in the lagoon, 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. If the lagoon is to be uniformly deep throughout, the slope must be gentle enough and the soil material must be thick enough over bedrock or a cemented pan to make land smoothing practical.

A *trench sanitary landfill* is an area where solid waste is placed in successive layers in an excavated trench. The waste is spread, compacted, and covered daily with a thin layer of soil excavated at the site. When the trench is full, a final cover of soil material at least 2 feet thick is placed over the landfill. The ratings in the table are based on the soil properties that affect the risk of pollution, the ease of excavation, trafficability, and revegetation. These properties include permeability, depth to bedrock or a cemented pan, depth to a water table, ponding, slope, flooding, texture, stones and boulders, highly organic layers, soil reaction, and content of salts and sodium. Unless otherwise stated, the ratings apply only to that part of the soil within a depth of about 6 feet. For deeper trenches, onsite investigation may be needed.

Hard, nonrippable bedrock, creviced bedrock, or highly permeable strata in or directly below the proposed trench bottom can affect the ease of excavation and the hazard of ground-water pollution. Slope affects construction of the trenches and the movement of surface water around the landfill. It also affects the construction and performance of roads in areas of the landfill.

Soil texture and consistence affect the ease with which the trench is dug and the ease with which the soil can be used as daily or final cover. They determine the workability of the soil when dry and when wet. Soils that are plastic and sticky when wet are difficult to excavate, grade, or compact and are difficult to place as a uniformly thick cover over a layer of refuse.

The soil material used as the final cover for a trench landfill should be suitable for plants. It should not have excess sodium or salts and should not be too acid. The surface layer generally has the best workability, the highest content of organic matter, and the best potential for plants. Material from the surface layer should be stockpiled for use as the final cover.

In an *area sanitary landfill*, solid waste is placed in successive layers on the surface of the soil. The waste is spread, compacted, and covered daily with a thin layer of soil from a source away from the site. A final cover of soil material at least 2 feet thick is placed over the completed landfill. The ratings in the table are based

on the soil properties that affect trafficability and the risk of pollution. These properties include flooding, permeability, depth to a water table, ponding, slope, and depth to bedrock or a cemented pan.

Flooding is a serious problem because it can result in pollution in areas downstream from the landfill. If permeability is too rapid or if fractured bedrock, a fractured cemented pan, or the water table is close to the surface, the leachate can contaminate the water supply. Slope is a consideration because of the extra grading required to maintain roads in the steeper areas of the landfill. Also, leachate may flow along the surface of the soils in the steeper areas and cause difficult seepage problems.

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 ratings in the table also apply to the final cover for a landfill. They are based on the soil properties that affect workability, the ease of digging, and the ease of moving and spreading the material over the refuse daily during wet and dry periods. These properties include soil texture, depth to a water table, ponding, rock fragments, slope, depth to bedrock or a cemented pan, reaction, and content of salts, sodium, or lime.

Loamy or silty soils that are free of large stones and excess gravel are the best cover for a landfill. Clayey soils may be sticky and difficult to spread; sandy soils are subject to wind erosion.

Slope affects the ease of excavation and of moving the cover material. Also, it can influence runoff, erosion, and reclamation of the borrow area.

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 the final cover for a landfill should be suitable for plants. It should not have excess sodium, salts, or lime and should not be too acid.

Agricultural Waste Management

Soil properties are important considerations in areas where soils are used as sites for the treatment and disposal of organic waste and wastewater. Selection of soils with properties that favor waste management can help to prevent environmental damage.

The "Agricultural Waste Management" tables show the degree and kind of soil limitations affecting the treatment of agricultural waste, including municipal and food-processing wastewater and effluent from lagoons or storage ponds. Municipal wastewater is the waste stream from a municipality. It contains domestic waste and may contain industrial waste. It may have received primary or secondary treatment. It is rarely untreated sewage. Food-processing wastewater results from the preparation of fruits, vegetables, milk, cheese, and meats for public consumption. In places, it is high in content of sodium and chloride. In the context of these tables, the effluent in lagoons and storage ponds is from facilities used to treat or store food-processing wastewater or domestic or animal waste. Domestic and food-processing wastewater is very dilute, and the effluent from the facilities that treat or store it commonly is very low in content of carbonaceous and nitrogenous material; the content of nitrogen commonly ranges from 10 to 30 milligrams per liter. The wastewater from animal waste treatment lagoons or storage ponds, however, has much higher concentrations of these materials, mainly because the manure has not been diluted as much as the domestic waste. The content of nitrogen in this wastewater generally ranges from 50 to 2,000 milligrams per liter. When wastewater is applied, checks should be made to ensure that nitrogen, heavy metals, and salts are not added in excessive amounts.

The ratings in the tables are for waste management systems that not only dispose of and treat organic waste or wastewater but also are beneficial to crops (application of manure and food-processing waste, application of sewage sludge, and disposal of wastewater by irrigation) and for waste management systems that are designed only for the purpose of wastewater disposal and treatment (overland flow of wastewater, rapid infiltration of wastewater, and slow rate treatment of wastewater).

The ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect agricultural waste management. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

Application of manure and food-processing waste not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. Manure is the excrement of livestock and poultry, and food-processing waste is damaged fruit and vegetables and the peelings, stems, leaves, pits, and soil particles removed in food preparation. The manure and food-processing waste are either solid, slurry, or liquid. Their nitrogen content varies. A high content of nitrogen limits the application rate. Toxic or otherwise dangerous wastes, such as those mixed with the lye used in food processing, are not considered in the ratings.

The ratings are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the waste is applied, and the method by which the waste is applied. The properties that affect absorption include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, and available water capacity. The properties that affect plant growth and microbial activity include reaction, the sodium adsorption ratio, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Application of sewage sludge not only disposes of waste material but also can improve crop production by increasing the supply of nutrients in the soils where the material is applied. In the context of this table, sewage sludge is the residual product of the treatment of municipal sewage. The solid component consists mainly of cell mass, primarily bacteria cells that developed during secondary treatment and have incorporated soluble organics into their own bodies. The sludge has small amounts of sand, silt, and other solid debris. The content of nitrogen varies. Some sludge has constituents that are toxic to plants or hazardous to the food chain, such as heavy metals and exotic organic compounds, and should be analyzed chemically prior to use.

The content of water in the sludge ranges from about 98 percent to less than 40 percent. The sludge is considered liquid if it is more than about 90 percent water, slurry if it is 50 to 90 percent water, and solid if it is less than 50 percent water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, the rate at which the sludge is applied, and the method by which the sludge is applied. The properties that affect absorption, plant growth, and microbial activity include permeability, depth to a water table, ponding, the sodium adsorption ratio, depth to bedrock or a cemented pan, available water capacity, reaction, salinity, and bulk density. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood that wind erosion or water erosion will transport the waste material from the application site. Stones, cobbles, a water table, ponding, and flooding can hinder the application of sludge. Permanently frozen soils are unsuitable for waste treatment.

Application of wastewater by irrigation not only disposes of municipal wastewater and wastewater from food-processing plants, lagoons, and storage ponds but also can improve crop production by increasing the amount of water available to crops. The ratings in the table are based on the soil properties that affect the design, construction, management, and performance of the irrigation system. The properties that affect design and management include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, slope, and flooding. The properties that affect construction include stones, cobbles, depth to bedrock or a cemented pan, depth to a water table, and ponding. The properties that affect performance include depth to bedrock or a cemented pan, bulk density, the sodium adsorption ratio, salinity, reaction, and the cation-exchange capacity, which is used to estimate the capacity of a soil to adsorb heavy metals. Permanently frozen soils are not suitable for disposal of wastewater by irrigation.

Overland flow of wastewater is a process in which wastewater is applied to the upper reaches of sloped land and allowed to flow across vegetated surfaces, sometimes called terraces, to runoff-collection ditches. The length of the run generally is 150 to 300 feet. The application rate ranges from 2.5 to 16.0 inches per week. It commonly exceeds the rate needed for irrigation of cropland. The wastewater leaves solids and nutrients on the vegetated surfaces as it flows downslope in a thin film. Most of the water reaches the collection ditch, some is lost through evapotranspiration, and a small amount may percolate to the ground water.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, and the design and construction of the system. Reaction and the cation-exchange capacity affect absorption. Reaction, salinity, and the sodium adsorption ratio affect plant growth and microbial activity. Slope, permeability, depth to a water table, ponding, flooding, depth to bedrock or a cemented pan, stones, and cobbles affect design and construction. Permanently frozen soils are unsuitable for waste treatment.

Rapid infiltration of wastewater is a process in which wastewater applied in a level basin at a rate of 4 to 120 inches per week percolates through the soil. The wastewater may eventually reach the ground water. The application rate commonly exceeds the rate needed for irrigation of cropland. Vegetation is not a necessary part of the treatment; hence, the basins may or may not be vegetated. The thickness of the soil material needed for proper treatment of the wastewater is more than 72 inches. As a result, geologic and hydrologic investigation is needed to ensure proper design and performance and to determine the risk of ground-water pollution.

The ratings in the table are based on the soil properties that affect the risk of pollution and the design, construction, and performance of the system. Depth to a water table, ponding, flooding, and depth to bedrock or a cemented pan affect the risk of pollution and the design and construction of the system. Slope, stones, and cobbles also affect design and construction. Permeability and reaction affect performance. Permanently frozen soils are unsuitable for waste treatment.

Slow rate treatment of wastewater is a process in which wastewater is applied to land at a rate normally between 0.5 inch and 4.0 inches per week. The application

rate commonly exceeds the rate needed for irrigation of cropland. The applied wastewater is treated as it moves through the soil. Much of the treated water may percolate to the ground water, and some enters the atmosphere through evapotranspiration. The applied water generally is not allowed to run off the surface. Waterlogging is prevented through either control of the application rate or through the use of tile drains, or both.

The ratings in the table are based on the soil properties that affect absorption, plant growth, microbial activity, erodibility, and the application of waste. The properties that affect absorption include the sodium adsorption ratio, depth to a water table, ponding, available water capacity, permeability, depth to bedrock or a cemented pan, reaction, the cation-exchange capacity, and slope. Reaction, the sodium adsorption ratio, salinity, and bulk density affect plant growth and microbial activity. The wind erodibility group, the soil erodibility factor K, and slope are considered in estimating the likelihood of wind erosion or water erosion. Stones, cobbles, a water table, ponding, and flooding can hinder the application of waste. Permanently frozen soils are unsuitable for waste treatment.

Construction Materials

The "Construction Materials" tables give information about the soils as potential sources of sand and gravel, reclamation material, and roadfill. Normal compaction, minor processing, and other standard construction practices are assumed.

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 "Construction Materials" tables, only the likelihood of finding material in suitable quantity is evaluated. The suitability of the material for specific purposes is not evaluated, nor are factors that affect excavation of the material. The properties used to evaluate the soil as a source of sand or gravel are gradation of grain sizes (as indicated by the Unified classification of the soil), the thickness of suitable material, and the content of rock fragments. If the bottom layer of the soil contains sand or gravel, the soil is considered a likely source regardless of thickness. The assumption is that the sand or gravel layer below the depth of observation exceeds the minimum thickness.

The soils are rated *good*, *fair*, or *poor* as potential sources of sand and gravel. A rating of *good* or *fair* means that the source material is likely to be in or below the soil. The bottom layer and the thickest layer of the soils are assigned numerical ratings. These ratings indicate the likelihood that the layer is a source of sand or gravel. The number 0.00 indicates that the layer is a poor source. The number 1.00 indicates that the layer is a good source. A number between 0.00 and 1.00 indicates the degree to which the layer is a likely source.

The soils are rated *good*, *fair*, or *poor* as potential sources of reclamation material and roadfill. The features that limit the soils as sources of these materials are specified in the tables. The numerical ratings given after the specified features indicate the degree to which the features limit the soils as sources of reclamation material or roadfill. The lower the number, the greater the limitation.

Reclamation material is used in areas that have been drastically disturbed by surface mining or similar activities. When these areas are reclaimed, layers of soil material or unconsolidated geological material, or both, are replaced in a vertical sequence. The reconstructed soil favors plant growth. The ratings in the table do not apply to quarries and other mined areas that require an offsite source of reconstruction material. The ratings are based on the soil properties that affect erosion and stability of the surface and the productive potential of the reconstructed soil. These properties include the content of sodium, salts, and calcium carbonate;

reaction; available water capacity; erodibility; texture; content of rock fragments; and content of organic matter and other features that affect fertility.

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

The ratings are for the whole soil, from the surface to a depth of about 5 feet. It is assumed that soil layers will be mixed when the soil material is excavated and spread.

The ratings are based on the amount of suitable material and on soil properties that affect the ease of excavation and the performance of the material after it is in place. The thickness of the suitable material is a major consideration. The ease of excavation is affected by large stones, depth to a 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 AASHTO classification of the soil) and linear extensibility (shrink-swell potential).

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. Toxic substances, soil reaction, and the properties that are inferred from soil texture, such as available water capacity and fertility, affect plant growth. The ease of excavating, loading, and spreading is affected by rock fragments, slope, depth to a water table, soil texture, and thickness of suitable material. Reclamation of the borrow area is affected by slope, depth to a water table, rock fragments, depth to bedrock or a cemented pan, and toxic material. The soils in this survey area have not been rated for potential use as topsoil because of the degree that the soils have been impacted. Onsite evaluation is required to determine the suitability of the soils for use as topsoil.

Water Management

The "Water Management" table 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 ratings are both verbal and numerical. Rating class terms indicate the extent to which the soils are limited by all of the soil features that affect these uses. *Not limited* indicates that the soil has features that are very favorable for the specified use. Good performance and very low maintenance can be expected. *Somewhat limited* indicates that the soil has features that are moderately favorable for the specified use. The limitations can be overcome or minimized by special planning, design, or installation. Fair performance and moderate maintenance can be expected. *Very limited* indicates that the soil has one or more features that are unfavorable for the specified use. The limitations generally cannot be overcome without major soil reclamation, special design, or expensive installation procedures. Poor performance and high maintenance can be expected.

Numerical ratings in the tables indicate the severity of individual limitations. The ratings are shown as decimal fractions ranging from 0.01 to 1.00. They indicate gradations between the point at which a soil feature has the greatest negative impact on the use (1.00) and the point at which the soil feature is not a limitation (0.00).

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. Embankments that have zoned construction (core and shell) are not considered. In this table, the soils are rated as a source of material for embankment fill. The ratings apply to the soil material below the surface layer to a depth of about 5 feet. It is assumed that soil layers will be uniformly mixed and compacted during construction.

The ratings do not indicate the ability of the natural soil to support an embankment. Soil properties to a depth even greater 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 permanent water table. Excluded are ponds that are fed 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.

Soil Properties

Data relating to soil properties are collected during the course of the soil survey.

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

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

The estimates of soil properties are shown in tables. They include engineering index properties, physical and chemical properties, and pertinent soil and water features.

Engineering Index Properties

The “Engineering Index Properties” table gives the engineering classifications and the range of index properties for the layers of each soil in the survey area.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. “Loam,” for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, “gravelly.” Textural terms are defined in the “Glossary.”

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2001) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2000).

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

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

Physical Properties

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

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

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

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

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

Moist bulk density is the weight of soil (oven-dry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at $1/3$ - or $1/10$ -bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage

and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity refers to the ability of a soil to transmit water or air. The term “permeability,” as used in soil surveys, indicates saturated hydraulic conductivity (K_{sat}). The estimates in the table indicate the rate of water movement, in micrometers per second ($\mu\text{m}/\text{sec}$), 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 soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. Volume change is influenced by the amount and type of clay minerals in the soil. Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In the “Physical Properties of the Soils” table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of organic matter in a soil can be maintained by returning crop residue to the soil. Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (K_w and K_f) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and permeability. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor K_w indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor K_f indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

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

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1

are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are as follows:

1. Coarse sands, sands, fine sands, and very fine sands.
2. Loamy coarse sands, loamy sands, loamy fine sands, loamy very fine sands, ash material, and sapric soil material.
3. Coarse sandy loams, sandy loams, fine sandy loams, and very fine sandy loams.
- 4L. Calcareous loams, silt loams, clay loams, and silty clay loams.
4. Clays, silty clays, noncalcareous clay loams, and silty clay loams that are more than 35 percent clay.
5. Noncalcareous loams and silt loams that are less than 20 percent clay and sandy clay loams, sandy clays, and hemic soil material.
6. Noncalcareous loams and silt loams that are more than 20 percent clay and noncalcareous clay loams that are less than 35 percent clay.
7. Silts, noncalcareous silty clay loams that are less than 35 percent clay, and fibric soil material.
8. Soils that are not subject to wind erosion because of rock fragments on the surface or because of surface wetness.

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Chemical Properties

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

Depth to the upper and lower boundaries of each layer is indicated.

Cation-exchange capacity is the total amount of extractable bases 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. The ability to retain cations reduces the hazard of ground-water pollution.

Effective cation-exchange capacity refers to the sum of extractable bases plus aluminum expressed in terms of milliequivalents per 100 grams of soil. It is determined for soils that have pH of less than 5.5.

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

Calcium carbonate equivalent is the percent of carbonates, by weight, in the fraction of the soil less than 2 millimeters in size. The availability of plant nutrients is influenced by the amount of carbonates in the soil. Incorporating nitrogen fertilizer into calcareous soils helps to prevent nitrite accumulation and ammonium-N volatilization.

Gypsum is expressed as a percent, by weight, of hydrated calcium sulfates in the fraction of the soil less than 20 millimeters in size. Gypsum is partially soluble in

water. Soils that have a high content of gypsum may collapse if the gypsum is removed by percolating water.

Salinity is a measure of soluble salts in the soil at saturation. It is expressed as the electrical conductivity of the saturation extract, in millimhos per centimeter at 25 degrees C. Estimates are based on field and laboratory measurements at representative sites of nonirrigated soils. The salinity of irrigated soils is affected by the quality of the irrigation water and by the frequency of water application. Hence, the salinity of soils in individual fields can differ greatly from the value given in the table. Salinity affects the suitability of a soil for crop production, the stability of soil if used as construction material, and the potential of the soil to corrode metal and concrete.

Sodium adsorption ratio (SAR) is a measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration. Soils that have SAR values of 13 or more may be characterized by an increased dispersion of organic matter and clay particles, reduced permeability and aeration, and a general degradation of soil structure.

Water Features

The "Water Features" table gives estimates of various water features. The estimates are used in land use planning that involves engineering considerations.

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The four hydrologic soil groups are:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

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

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas.

The *months* in the table indicate the portion of the year in which the feature is most likely to be a concern.

Water table refers to a saturated zone in the soil. The table indicates, by month, depth to the top (*upper limit*) and base (*lower limit*) of the saturated zone in most years. Estimates of the upper and lower limits are based mainly on observations of the water table at selected sites and on evidence of a saturated zone, namely grayish colors or mottles (redox features) in the soil. A saturated zone that lasts for less than a month is not considered a water table.

Ponding is standing water in a closed depression. Unless a drainage system is installed, the water is removed only by percolation, transpiration, or evaporation. The table indicates *surface water depth* and the *duration* and *frequency* of ponding. Duration is expressed as *very brief* if less than 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, rare, occasional, and frequent. *None* means that ponding is not probable; *rare* that it is unlikely but possible under unusual weather conditions (the chance of ponding is nearly 0 percent to 5 percent in any year); *occasional* that it occurs, on average, once or less in 2 years (the chance of ponding is 5 to 50 percent in any year); and *frequent* that it occurs, on average, more than once in 2 years (the chance of ponding is more than 50 percent in any year).

Flooding is the temporary inundation of an area caused by overflowing streams, by runoff from adjacent slopes, or by tides. Water standing for short periods after rainfall or snowmelt is not considered flooding, and water standing in swamps and marshes is considered ponding rather than flooding.

Duration and *frequency* are estimated. Duration is expressed as *extremely brief* if 0.1 hour to 4 hours, *very brief* if 4 hours to 2 days, *brief* if 2 to 7 days, *long* if 7 to 30 days, and *very long* if more than 30 days. Frequency is expressed as none, very rare, rare, occasional, frequent, and very frequent. *None* means that flooding is not probable; *very rare* that it is very unlikely but possible under extremely unusual weather conditions (the chance of flooding is less than 1 percent in any year); *rare* that it is unlikely but possible under unusual weather conditions (the chance of flooding is 1 to 5 percent in any year); *occasional* that it occurs infrequently under normal weather conditions (the chance of flooding is 5 to 50 percent in any year); *frequent* that it is likely to occur often under normal weather conditions (the chance of flooding is more than 50 percent in any year but is less than 50 percent in all months in any year); and *very frequent* that it is likely to occur very often under normal weather conditions (the chance of flooding is more than 50 percent in all months of any year).

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

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

Soil Features

The "Soil Features" table gives estimates of various soil features. The estimates are used in land use planning that involves engineering considerations.

A *restrictive layer* is a nearly continuous layer that has one or more physical, chemical, or thermal properties that significantly impede the movement of water and air through the soil or that restrict roots or otherwise provide an unfavorable root environment. Examples are bedrock, cemented layers, dense layers, and frozen layers. The table indicates the hardness and thickness of the restrictive layer, both of which significantly affect the ease of excavation. *Depth to top* is the vertical distance from the soil surface to the upper boundary of the restrictive layer.

Subsidence is the settlement of organic soils or of saturated mineral soils of very low density. Subsidence generally results from either desiccation and shrinkage or oxidation of organic material, or both, following drainage. Subsidence takes place gradually, usually over a period of several years. The table shows the expected initial subsidence, which usually is a result of drainage, and total subsidence, which results from a combination of factors.

Potential for frost action is the likelihood of upward or lateral expansion of the soil caused by the formation of segregated ice lenses (frost heave) and the subsequent collapse of the soil and loss of strength on thawing. Frost action occurs when moisture moves into the freezing zone of the soil. Temperature, texture, density, 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 to pavements and other rigid structures.

Risk of corrosion pertains to potential soil-induced electrochemical or chemical action that corrodes or weakens uncoated steel or concrete. The rate of corrosion of uncoated steel is related to such factors as soil moisture, particle-size distribution, acidity, and electrical conductivity of the soil. The rate of corrosion of concrete is based mainly on the sulfate and sodium content, texture, moisture content, and acidity of the soil. Special site examination and design may be needed if the combination of factors results in a severe hazard of corrosion. The steel or concrete in installations that intersect soil boundaries or soil layers is more susceptible to corrosion than the steel or concrete in installations that are entirely within one kind of soil or within one soil layer.

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

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

References

- Alexander, R.R., 1966. Site indexes for lodgepole pine with corrections for stand density; instructions for field use. U.S. Department of Agriculture, Forest Service. Rocky Mountain Forest and Range Experiment Station Research Paper, RP-24.
- Alexander, R.R. 1967. Site indexes for Engelmann spruce. U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station Research Paper, RP-32.
- American Association of State Highway and Transportation Officials (AASHTO). 2000. Standard specifications for transportation materials and methods of sampling and testing. 20th edition, 2 volumes.
- American Society for Testing and Materials (ASTM). 2001. Standard classification of soils for engineering purposes. ASTM Standard D 2487-00.
- Brickell, J.E. 1968. A method for constructing site index curves from measurements of tree age and height—Its application to inland Douglas-fir. U.S. Department of Agriculture, Forest Service, Intermountain Research Station Research Paper INT-RP-47.
- Cummings, L.J. 1937. Larch-Douglas-fir board foot yield tables. U.S. Department of Agriculture, Forest Service. Rocky Mountain Forest and Range Experiment Station. Applied Forestry Note 78.
- Dahms, W.G. 1964. Gross and net yield tables for lodgepole pine. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station, Portland, OR, Research Paper PNW-8.
- Edminster, Carleton B., 1978. RMYLD: computation of yield tables for even-aged and two-storied stands. U.S. Department of Agriculture, Forest Service. Rocky Mountain Forest and Range Experiment Station Research Paper RP-199.
- Haig, I.T. 1932. Second-growth yield, stand and volume tables for the western white pine type. U.S. Department of Agriculture, Forest Service. Northern Rocky Mountain Forest Experiment Station Technical Bulletin 323.
- Harrison, J.E., A.B. Griggs, and J.D. Wells. 1986. Geologic and structure maps of the Wallace 1° x 2° quadrangle, Montana and Idaho: Montana Bureau of Mines and Geology Montana Atlas Series 4-A, scale 1:250,000.
- McCulloch, R.B. 1993. Montana mining directory - 1992. Montana Bureau of Mines and Geology Bulletin 131.

- Meyer, W.H. 1938 and 1961. Yield of even-aged stands of ponderosa pine. U.S. Department of Agriculture, Technical Bulletin 630. Washington, DC.
- Myers, C.A. 1967. Yield tables for managed stands of lodgepole pine in Colorado and Wyoming. U.S. Department of Agriculture, Forest Service. Rocky Mountain Forest and Range Experiment Station Research Paper RM-RP-26.
- Rowan, L.C., C.M. Trautwein, and T.L. Purdy. 1991. Maps showing the association of linear features with metallic mines and prospects in the Butte 1 degree x 2 degrees quadrangle, Montana. U.S. Geological Survey, Miscellaneous Investigations Series Map I-2050-B, scale 1:250000.
- Soil Survey Division Staff. 1993. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.
- Soil Survey Staff. 1998. Keys to soil taxonomy. 8th edition. U.S. Department of Agriculture, Natural Resources Conservation Service.
- Soil Survey Staff. 1999. Soil taxonomy: A basic system of soil classification for making and interpreting soil surveys. 2nd edition. Natural Resources Conservation Service. U.S. Department of Agriculture Handbook 436.
- United States Department of Agriculture, Natural Resources Conservation Service. Montana Field Office Technical Guide, Section II.
(<http://www.nrcs.usda.gov/technical/efotg/>)
- United States Department of Agriculture, Natural Resources Conservation Service. National forestry handbook, title 190.
(<http://soils.usda.gov/technical/nfhandbook/>)
- United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI.
(<http://soils.usda.gov/technical/handbook/>)
- United States Department of Agriculture, Natural Resources Conservation Service. 2003. National range and pasture handbook.
(<http://www.glti.nrcs.usda.gov/technical/publications/nrph.html>)
- Weidman, R.M. 1988. The Greater Missoula Area - Guidebook for the 13th Annual Tobacco Root Geological Society Field Conference, Missoula, MT.

Glossary

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

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

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

Alkali (sodic) soil. (See Sodic (alkali) soil.)

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 hillslopes.

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

Alpha,alpha-dipyridyl. A dye that when dissolved in 1N ammonium acetate is used to detect the presence of reduced iron (Fe II) in the soil. A positive reaction indicates a type of redox feature.

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

Aquic conditions. Current soil wetness characterized by saturation, reduction, and redox features.

Argillite. Weakly metamorphosed mudstone or shale.

Aspect. The direction in which a slope faces.

Association, soil. A group of soils or miscellaneous areas geographically associated in a characteristic repeating pattern and defined and delineated as a single map unit.

Available water capacity (available moisture capacity). The capacity of soils to hold water available for use by most plants. It is commonly defined as the difference between the amount of soil water at field moisture capacity and the amount at wilting point. It is commonly expressed as inches of water per inch of soil. The capacity, in inches, in a 60-inch profile or to a limiting layer is expressed as:

Very low	0 to 3.75
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.

Backslope. The geomorphic component that forms the steepest inclined surface and principal element of many hillslopes. Backslopes in profile are commonly steep and linear and descend to a footslope. In terms of gradational process, backslopes 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, and K), expressed as a percentage of the total cation-exchange capacity.
- Base slope.** A geomorphic component of hills consisting of the concave to linear (perpendicular to the contour) slope that, regardless of the lateral shape, forms an apron or wedge at the bottom of a hillside dominated by colluvium and slope-wash sediments (for example, slope alluvium).
- Bedding 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 cobbles or gravel. 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 1 foot wide, 1 foot long, and 1 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.
- Bouldery.** Refers to a soil with .01 to 0.1 percent of the surface covered with boulders.
- Bouldery soil material.** Soil that is 15 to 35 percent, by volume, rock fragments that are dominated by fragments larger than 24 inches (60 centimeters) in diameter.
- Breaks.** The steep and 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, felled trees generally are reeled in while one end is lifted or the entire log is suspended.
- Calcareous soil.** A soil containing enough calcium carbonate (commonly combined with magnesium carbonate) to effervesce visibly when treated with cold, dilute hydrochloric acid.

- Caliche.** A more or less cemented deposit of calcium carbonate in soils of warm-temperate, subhumid to arid areas. Caliche occurs as soft, thin layers in the soil or as hard, thick beds directly 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.
- 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 material.** 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 through the use of chemicals.
- Chiseling.** Tillage with an implement having one or more soil-penetrating points that shatter or loosen hard, compacted layers to a depth below normal plow depth.
- 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 millimeters 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 the adjacent stands.
- Climax plant community.** The stabilized plant community on a particular site. The plant cover reproduces itself and does not change so long as the environment remains the same.
- 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 has 15 to 35 percent, by volume, rounded or partially rounded rock fragments 3 to 10 inches (7.6 to 25 centimeters) in diameter. Very cobbly soil material has 35 to 60 percent of these rock fragments, and extremely cobbly soil material has more than 60 percent.

- 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.
- COLE (coefficient of linear extensibility).** (See Linear extensibility.)
- Colluvium.** Soil material or rock fragments, or both, moved by creep, slide, or local wash and deposited at the base of steep slopes.
- Commercial forest.** Forestland 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 or subangular rock fragments more than 2 millimeters in diameter. It commonly has a matrix of sand and finer-textured material. Conglomerate is the consolidated equivalent of gravel.
- Conservation cropping system.** Growing crops in combination with needed cultural and management practices. In a good conservation cropping system, the soil-improving crops and practices more than offset the effects of the soil-depleting crops and practices. Cropping systems are needed on all tilled soils. Soil-improving practices in a conservation cropping system include the use of rotations that contain grasses and legumes and the return of crop residue to the soil. Other practices include the use of green manure crops of grasses and legumes, proper tillage, adequate fertilization, and weed and pest control.
- Conservation tillage.** 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.** Refers to the degree of cohesion and adhesion of soil material and its resistance to deformation when ruptured. Consistence includes resistance of soil material to rupture and to penetration; plasticity, toughness, and stickiness of puddled soil material; and the manner in which the soil material behaves when subject to compression. Terms describing consistence are defined in the "Soil Survey Manual" (Soil Survey Division Staff, 1993).
- 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.
- Crop residue management.** Returning crop residue to the soil, which helps to maintain soil structure, organic matter content, and fertility and helps to control erosion.
- Cropping system.** Growing crops according to a planned system of rotation and management practices.
- Cross-slope farming.** Deliberately conducting farming operations on sloping farmland in such a way that tillage is across the general slope.
- Crown.** The upper part of a tree or shrub, including the living branches and their foliage.
- Culmination of the mean annual increment (CMAI).** The average annual increase per acre in the volume of a stand. Computed by dividing the total volume of the stand by its age. As the stand increases in age, the mean annual increment continues to increase until mortality begins to reduce the rate of increase. The point where the stand reaches its maximum annual rate of growth is called the culmination of the mean annual increment.
- Cutbanks cave (in tables).** The walls of excavations tend to cave in or slough.
- Decreasers.** The most heavily grazed climax range plants. Because they are the most palatable, they are the first to be destroyed by overgrazing.
- 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, soil.** Generally, the thickness of the soil over bedrock. Very deep soils are more than 60 inches deep over bedrock; deep soils, 40 to 60 inches; moderately deep, 20 to 40 inches; shallow, 10 to 20 inches; and very shallow, less than 10 inches.
- 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 to the dip of the underlying bedrock.
- Diversion (or diversion terrace).** A ridge of earth, generally a terrace, built to protect downslope areas by diverting runoff from its natural course.
- Divided-slope farming.** A form of field stripcropping in which crops are grown in a systematic arrangement of two strips, or bands, across the slope to reduce the hazard of water erosion. One strip is in a close-growing crop that provides protection from erosion, and the other strip is in a crop that provides less protection from erosion. This practice is used where slopes are not long enough to permit a full stripcropping pattern to be used.
- 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 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.

Ecological site. An area where climate, soil, and relief are sufficiently uniform to produce a distinct natural plant community. An ecological site is the product of all the environmental factors responsible for its development. It is typified by an association of species that differ from those on other ecological sites in kind and/or proportion of species or in total production.

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

Endosaturation. A type of saturation of the soil in which all horizons between the upper boundary of saturation and a depth of 2 meters are saturated.

Eolian 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.

Episaturation. A type of saturation indicating a perched water table in a soil in which saturated layers are underlain by one or more unsaturated layers within 2 meters of the surface.

- Erosion.** The wearing away of the land surface by water, wind, ice, or other geologic agents and by such processes as gravitational creep.
- Erosion (geologic).* Erosion caused by geologic processes acting over long geologic periods and resulting in the wearing away of mountains and the building up of such landscape features as flood plains and coastal plains. Synonym: natural erosion.
- Erosion (accelerated).* Erosion much more rapid than geologic erosion, mainly as a result of human or animal activities or of a catastrophe in nature, such as 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. Synonym: scarp.
- 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 individual trees. A range of 20 years is allowed.
- 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.** Area cleared of flammable material to stop or help control creeping or running fires. It also serves as a line from which to work and to facilitate the movement of firefighters and equipment. Designated roads also serve as firebreaks.
- First bottom.** The normal flood plain of a stream, subject to frequent or occasional flooding.
- Flaggy soil material.** Material that has, by volume, 15 to 35 percent flagstones. Very flaggy soil material has 35 to 60 percent flagstones, and extremely flaggy soil material has more than 60 percent flagstones.
- Flagstone.** A thin fragment of sandstone, limestone, slate, shale, or (rarely) schist 6 to 15 inches (15 to 38 centimeters) long.
- Flood plain.** A nearly level alluvial plain that borders a stream and is subject to flooding unless protected artificially.
- Fluvial.** Of or pertaining to rivers; produced by river action, as a fluvial plain.

- Foothill.** A steeply sloping upland that has relief of as much as 1,000 feet (300 meters) and fringes a mountain range or high-plateau escarpment.
- Footslope.** The geomorphic component that forms the inner, gently inclined surface at the base of a hillslope. The surface profile is dominantly concave. In terms of gradational processes, a footslope is a transitional zone between an upslope site of erosion (backslope) and a downslope site of deposition (toeslope).
- 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.** 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.** Gravel, sand, and silt, commonly stratified, deposited by glacial meltwater.
- Glacial till.** 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.** 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.
- 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 (7.6 centimeters) in diameter. An individual piece is a pebble.
- Gravelly soil material.** Soil that is 15 to 35 percent, by volume, rounded or angular rock fragments up to 3 inches (7.6 centimeters) in diameter. Very gravelly soil is 35 to 60 percent gravel, and extremely gravelly soil is more than 60 percent gravel by volume.
- Grazable forestland.** Land capable of sustaining livestock grazing by producing forage of sufficient quantity during one or more stages of secondary forest succession.

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

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

Gully. A 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.

Gypsum. A mineral consisting of hydrous calcium sulfate.

Habitat type. An aggregation of all land areas capable of producing similar climax plant communities.

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.

Head slope. A geomorphic component of hills consisting of a laterally concave area of a hillside, especially at the head of a drainageway. The overland waterflow is converging.

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. An explanation of the subdivisions is given in the "Soil Survey Manual" (Soil Survey Division Staff, 1993). 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.

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

B horizon.—The mineral horizon below an A or E horizon. The B horizon is in part a layer of transition from the overlying A to the underlying C horizon. The B horizon also has distinctive characteristics, such as (1) accumulation of clay, sesquioxides, humus, or a combination of these; (2) prismatic or blocky structure; (3) redder or browner colors than those in the A horizon; or (4) a combination of these.

C horizon.—The mineral horizon or layer, excluding indurated bedrock, that is little affected by soil-forming processes and does not have the properties typical of the overlying soil material. The material of a C horizon may be either like or unlike that in which the solum formed. If the material is known to differ from that in the solum, an Arabic numeral, commonly a 2, precedes the letter C.

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

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

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

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

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

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

Impacted, moderately. Moderately impacted soils generally have good ground coverage, but species present are mainly restricted to those tolerant of the effects of surface mining and smelting activities.

Impacted, severely. Severely impacted soils have substantial barren areas, and the species present are only those that can tolerate the extreme effects of surface mining and smelting activities.

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.

Increasesers. Species in the climax vegetation that increase in amount as the more desirable plants are reduced by close grazing. Increasesers commonly are the shorter plants and the less palatable to livestock.

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

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

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

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

irrigation application. The rate of water intake, in inches per hour, is expressed as follows:

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

Interfluve. An elevated area between two drainageways that sheds water to those drainageways.

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. 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.

Linear extensibility. Refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. Linear extensibility is used to determine the shrink-swell potential of soils. It is an expression of the volume change between the water content of the clod at $1/3$ - or $1/10$ -bar tension (33kPa or 10kPa tension) and oven dryness. Volume change is influenced by the amount and type of clay minerals in the soil. The volume change is the percent change for the whole soil. If it is expressed as a fraction, the resulting value is COLE, coefficient of linear extensibility.

Liquid limit. The moisture content at which the soil passes from a plastic to a liquid state.

Loam. Soil material that is 7 to 27 percent clay particles, 28 to 50 percent silt particles, and less than 52 percent sand particles.

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 wind.

Low-residue crops. Such crops as corn used for silage, peas, beans, and potatoes. Residue from these crops is not adequate to control erosion until the next crop in the rotation is established. These crops return little organic matter to the soil.

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.

Masses. Concentrations of substances in the soil matrix that do not have a clearly defined boundary with the surrounding soil material and cannot be removed as a discrete unit. Common compounds making up masses are calcium carbonate, gypsum or other soluble salts, iron oxide, and manganese oxide. Masses consisting of iron oxide or manganese oxide generally are considered a type of redox concentration.

Mean annual increment (MAI). The average annual increase in volume of a tree during its entire life.

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.

Miscellaneous water. A sewage lagoon, an industrial waste pit, a fish hatchery, or a similar water area.

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.
- Mollic epipedon.** A thick, dark, humus-rich surface horizon (or horizons) that has high base saturation and pedogenic soil structure. It may include the upper part of the subsoil.
- 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.** Areas of color that differ from the matrix color. These colors are commonly attributes retained from the geologic parent material. (See Redox features for indications of poor aeration and impeded drainage.)
- Mountain.** A natural elevation of the land surface, rising more than 1,000 feet above surrounding lowlands, commonly of restricted summit area (relative to a plateau) and generally having steep sides. A mountain can occur as a single, isolated mass or in a group forming a chain or range.
- 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.
- Naturalized pasture.** Forestland that is used primarily for the production of forage for grazing by livestock rather than for the production of wood products. Overstory trees are removed or managed to promote the native and introduced understory vegetation occurring on the site. This vegetation is managed for its forage value through the use of grazing management principles.
- Neutral soil.** A soil having a pH value of 6.6 to 7.3. (See Reaction, soil.)
- Nose slope.** A geomorphic component of hills consisting of the projecting end (laterally convex area) of a hillside. The overland waterflow is predominantly divergent.
- 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. The content of organic matter in the surface layer is described as follows:
- | | |
|----------------------|-----------------------|
| Very low | less than 0.5 percent |
| Low | 0.5 to 1.0 percent |
| Moderately low | 1.0 to 2.0 percent |
| Moderate | 2.0 to 4.0 percent |
| High | 4.0 to 8.0 percent |
| Very high | more than 8.0 percent |
- 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 movement of water through the soil.
- Permeability.** The quality of the soil that enables water or air to move downward through the profile.

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 to 2.0 inches
Moderately rapid	2.0 to 6.0 inches
Rapid	6.0 to 20 inches
Very rapid	more than 20 inches

- pH value.** A numerical designation of acidity and alkalinity in soil. (See Reaction, soil.)
- Phase, soil.** A subdivision of a soil series based on features that affect its use and management, such as slope, stoniness, and flooding.
- Piping (in tables).** Formation of subsurface tunnels or pipelike cavities by water moving through the soil.
- Plastic limit.** The moisture content at which a soil changes from semisolid to plastic.
- Plasticity index.** The numerical difference between the liquid limit and the plastic limit. The range of moisture content within which the soil remains plastic.
- 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. Unless the soils are artificially drained, the water can be removed only by percolation or evapotranspiration.
- Poorly graded.** Refers to a coarse-grained soil or soil material consisting mainly of particles of nearly the same size. Because there is little difference in size of the particles, density can be increased only slightly by compaction.
- Potential natural community (PNC).** The biotic community that would become established on an ecological site if all successional sequences were completed without interferences by man under the present environmental conditions. Natural disturbances are inherent in its development. The PNC may include acclimatized or naturalized nonnative species.
- 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. (See Similarity index.)

Range site. (See Ecological site.)

Rangeland. Land on which the potential natural vegetation is predominantly grasses, grasslike plants, forbs, or shrubs suitable for grazing or browsing. It includes natural grasslands, savannas, many wetlands, some deserts, tundras, and areas that support certain forb and shrub communities.

Reaction, soil. A measure of acidity or alkalinity of a soil, expressed 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:

Ultra acid	less than 3.5
Extremely acid	3.5 to 4.4
Very strongly acid	4.5 to 5.0
Strongly acid	5.1 to 5.5
Moderately acid	5.6 to 6.0
Slightly acid	6.1 to 6.5
Neutral	6.6 to 7.3
Slightly alkaline	7.4 to 7.8
Moderately alkaline	7.9 to 8.4
Strongly alkaline	8.5 to 9.0
Very strongly alkaline	9.1 and higher

Recessional moraine. A moraine formed during a temporary but significant halt in the retreat of a glacier.

Red beds. Sedimentary strata that are mainly red and are made up largely of sandstone and shale.

Redox concentrations. Nodules, concretions, soft masses, pore linings, and other features resulting from the accumulation of iron or manganese oxide. An indication of chemical reduction and oxidation resulting from saturation.

Redox depletions. Low-chroma zones from which iron and manganese oxide or a combination of iron and manganese oxide and clay has been removed. These zones are indications of the chemical reduction of iron resulting from saturation.

Redox features. Redox concentrations, redox depletions, reduced matrices, a positive reaction to alpha,alpha-dipyridyl, and other features indicating the chemical reduction and oxidation of iron and manganese compounds resulting from saturation.

- Reduced matrix.** A soil matrix that has low chroma in situ because of chemically reduced iron (Fe II). The chemical reduction results from nearly continuous wetness. The matrix undergoes a change in hue or chroma within 30 minutes after exposure to air as the iron is oxidized (Fe III). A type of redox feature.
- 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 generally is 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, boulders, stones, cobbles, and gravel.
- Rock outcrop.** Exposures of bare bedrock other than lava flows and rock-lined pits.
- 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 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 |
- Salty water (in tables).** Water that is too salty for consumption by livestock.
- Sand.** As a soil separate, individual rock or mineral fragments from 0.05 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.
- Saturation.** Wetness characterized by zero or positive pressure of the soil water. Under conditions of saturation, the water will flow from the soil matrix into an unlined auger hole.

- 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 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 transitional zone from the backslope to the summit of a hill or mountain. The surface is dominantly convex in profile and erosional in origin.
- Shrink-swell (in tables).** The shrinking of soil when dry and the swelling when wet. Shrinking and swelling can damage roads, dams, building foundations, and other structures. It can also damage plant roots.
- Side slope.** A geomorphic component of hills consisting of a laterally planar area of a hillside. The overland waterflow is predominantly parallel.
- 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 millimeters) to the lower limit of very fine sand (0.05 millimeters). 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.

- Similarity index.** A similarity index is the percentage of a specific vegetation state plant community that is presently on the site.
- 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.
- Slickspot.** 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 intake (in tables).** The slow movement of water into the soil.
- Slow refill (in tables).** The slow filling of ponds, resulting from restricted permeability in 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 $\text{Ca}^{++} + \text{Mg}^{++}$. The degrees of sodicity and their respective ratios are:

Slight	less than 13:1
Moderate	13-30:1
Strong	more than 30:1

Sodium adsorption ratio (SAR). A measure of the amount of sodium (Na) relative to calcium (Ca) and magnesium (Mg) in the water extract from saturated soil paste. It is the ratio of the Na concentration divided by the square root of one-half of the Ca + Mg concentration.

Soft bedrock. Bedrock that can be excavated with trenching machines, backhoes, small rippers, and other equipment commonly used in construction.

Soil. A natural, three-dimensional body at the earth's surface. It is capable of supporting plants and has properties resulting from the integrated effect of climate and living matter acting on earthy parent material, as conditioned by relief 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 material below the solum. 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 tillage, or stones cover .01 to 0.1 percent of the surface. Very stony means that 0.1 to 3.0 percent of the surface is covered with stones. Extremely stony means that 3 to 15 percent of the surface is covered with stones.

Stony soil material. Soil that is 15 to 35 percent, by volume, rock fragments that are dominated by fragments 10 to 24 inches (25 to 60 centimeters) in diameter.

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 wind erosion and water erosion after harvest, during preparation of a seedbed for the next crop, and during the early growing period of the new crop.
- 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.** Any surface soil horizon (A, E, AB, or EB) below the surface layer.
- Summer fallow.** The tillage of uncropped land during the summer to control weeds and allow storage of moisture in the soil for the growth of a later crop. A practice common in semiarid regions, where annual precipitation is not enough to produce a crop every year. Summer fallow is frequently practiced before planting winter grain.
- Summit.** 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.
- Taxadjuncts.** Soils that cannot be classified in a series recognized in the classification system. Such soils are named for a series they strongly resemble and are designated as taxadjuncts to that series because they differ in ways too small to be of consequence in interpreting their use and behavior.
- Terminal moraine.** A belt of thick glacial drift that generally marks the termination of important glacial advances.
- Terrace.** An embankment, or ridge, constructed across sloping soils on the contour or at a slight angle to the contour. The terrace intercepts surface runoff so that water soaks into the soil or flows slowly to a prepared outlet. A terrace in a field generally is built so that the field can be farmed. A terrace intended mainly for drainage has a deep channel that is maintained in permanent sod.
- Terrace (geologic).** An old alluvial plain, ordinarily flat or undulating, bordering a river, a lake, or the sea.
- Terracette.** Small, irregular step-like forms on steep hillslopes, especially in pasture, formed by creep or erosion of surficial materials that may or may not be induced by trampling of livestock such as sheep or cattle.
- 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.
- Toeslope.** The outermost inclined surface at the base of a hill. Toeslopes 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.
- Unstable fill (in tables).** Risk of caving or sloughing on banks of fill material.
- Upland.** 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.
- Variation.** 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.
- Water-spreading.** 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 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.

Accessibility Statement

This document is not accessible by screen-reader software. The Natural Resources Conservation Service (NRCS) is committed to making its information accessible to all of its customers and employees. If you are experiencing accessibility issues and need assistance, please contact our Helpdesk by phone at 1-800-457-3642 or by e-mail at ServiceDesk-FTC@ftc.usda.gov. For assistance with publications that include maps, graphs, or similar forms of information, you may also wish to contact our State or local office. You can locate the correct office and phone number at <http://offices.sc.egov.usda.gov/locator/app>.