Targhee National Forest
Ecological Unit Inventory

Volume 1

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In cooperation with United States Department of Agriculture,
Natural Resources Conservation Service
and
University of Idaho, College of Agriculture

Targhee National Forest
Ecological Unit Inventory

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This inventory 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 fieldwork and technical quality control for this inventory were conducted by the Forest Service. The correlation of soils was conducted by the Natural Resources Conservation Service (formerly the Soil Conservation Service) in consultation with the Forest Service. The Natural Resources Conservation Service has leadership for the Federal portion of the National Cooperative Soil Survey.

Fieldwork for this ecological unit inventory was completed in 1996. Soil names and descriptions were approved in 1997. Unless otherwise indicated, statements in this publication refer to conditions in the Targhee National Forest in 1997. This inventory was made by the Forest Service, in cooperation with the Natural Resources Conservation Service and the University of Idaho College of Agriculture.

Maps in this inventory may be copied without permission. Enlargement of these maps, however, could cause misunderstanding in 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.

All programs and services of the Forest Service and Natural Resources Conservation Service are offered on a nondiscriminatory basis, without regard to race, color, national origin, religion, sex, age, marital status or handicap.

Cover photo: Looking north from the Two Top-Canyon Creek Road (061) towards Targhee Peak northeast of Island Park.

Preface

This document is an ecological unit inventory of the Targhee National Forest. The purpose of the inventory is to define ecological types and to delineate ecological units. An ecological type is a category of land defined for a unique combination of vegetation, soil, topography, geology and climate. Where ecological types are difficult to define, mosaics or ecotones are used. Mosaics are areas with a patchiness of distinct plant associations. Ecotones are a blending of dominant plant association species. Ecological types, mosaics and ecotones can change within short distances, and each differs in its ability to produce vegetation and respond to management. An ecological unit is the mapped delineation of one or more ecological type, mosaic or ecotone as they are found in a repeating pattern across the landscape. The boundaries between ecological units are defined in order to meet management objectives. The ecological units in this report correspond with the landtypes in the USDA Forest Service National Hierarchial Framework.

Forest personnel can use this information to assess the suitability or the limitations of various management practices. Others who are interested in the management of the Targhee National Forest can use this information to more effectively participate in land-use decisions.

This document begins with descriptions of the ecological units, followed by detailed descriptions of each ecological type, mosaic or ecotone. The table section includes plant reference lists, vegetation composition, soil properties and interpretations. Maps of the ecological units for the Targhee National Forest are located at the end of this report.

Acknowledgments

Many people have given their time and effort to produce this ecological unit inventory.

Special recognition is given to Terry Craigg and Marti Crane, who were vital to the formation and documentation of this report.

For their contribution to the field work, we recognize Kaylene Monson and Dick Welch.

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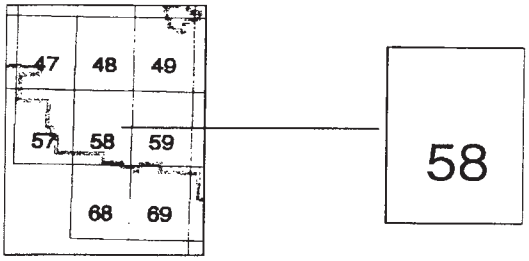
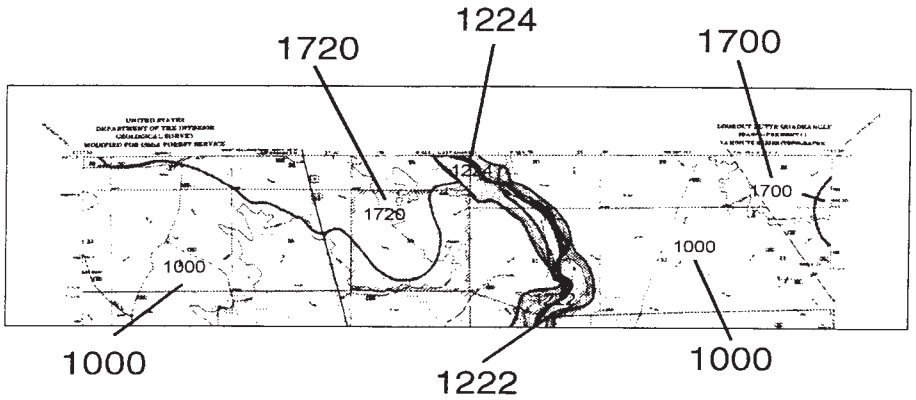
We thank those individuals who provided general support during the years: Jan Albertson, Lynn Bowerman, Becky Craigg, Dave Dillard, Sharon Eyraud, Adrienne Keller, Ronna Simon, Marva Murdoch, Jerry Reese and Donna Winters.

How to Use This Inventory

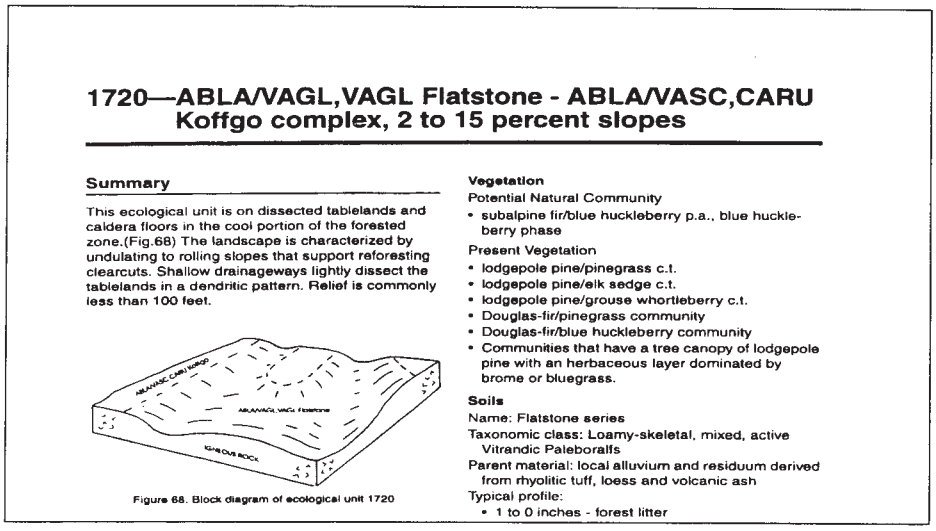
1 Locate your area of interest on the "Index to the Map Sheets." Note the number of the map sheet and turn to that map sheet. An index to the map sheets for the Targhee National Forest precedes the map section. Each map sheet corresponds with a USGS 7.5 minute quadrangle.



2 Ecological units are delineated as polygon(s) and labeled with four digit symbols. Locate your area of interest on the map sheet and note which polygons cover the area.



3 Turn to the "Table of Contents" which lists the name of each ecological unit and the page where that unit is described. Go to the ecological unit description(s). These descriptions present physiographic, vegetation and soil features for each unit.



1720—ABLA/VAGL,VAGL Flatstone - ABLA/VASC,CARU Koffgo complex, 2 to 15 percent slopes

Summary

This ecological unit is on dissected tablelands and caldera floors in the cool portion of the forested zone.(Fig.68) The landscape is characterized by undulating to rolling slopes that support reforesting clearcuts. Shallow drainageways lightly dissect the tablelands in a dendritic pattern. Relief is commonly less than 100 feet.

Figure 68. Block diagram of ecological unit 1720

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.
- Douglas-fir/pinegrass community
- Douglas-fir/blue huckleberry community
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by brome or bluegrass.

Soils

Name: Flatstone series

Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Parent material: local alluvium and residuum derived from rhyolitic tuff, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter

4 Turn to the ecological type, mosaic or ecotone descriptions for more detailed information. At the end of each ecological unit is a heading "Additional Information" that lists the description and page number. These descriptions, indexed in the Table of Contents, provide an ecology discussion and the range in soil characteristics.

ABLA/VAGL,VAGL Flatstone Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase on Flatstone soils. It is on rolling slopes of dissected tablelands and caldera floors in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1720
Landform: dissected tablelands and caldera floors
Parent material: local alluvium and residuum derived from loess, volcanic ash and rhyolitic tuff
Slope: 4 to 15 percent
Elevation: 5900 to 7000 feet
Average annual precipitation: 25 to 35 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Arnica cordifolia*, *Epilobium angustifolium*, *Fragaria virginiana* or *Lupinus argenteus* may be present.

Mid seral conditions support a canopy of *Pinus contorta* and *Pseudotsuga menziesii*. *Abies lasiocarpa* may establish in tree shadows. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare*. *Lonicera utahensis*, *Spiraea betulifolia* or *Vaccinium scoparium* may be present. *Calamagrostis rubescens* or *Carex geyeri* dominate the prominent herbaceous layer. Forbs have high species diversity and may include *Arnica cordifolia*, *Epilobium angustifolium*, *Pedicularis racemosa*, *Pyrola secunda* or *Thalictrum occidentale*.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. The shrub layer has moderate to high cover and is dominated by *Vaccinium globulare*. *Lonicera utahensis*, *Spiraea betulifolia* or *Vaccinium scoparium* may be present. The herbaceous

5 See the Table of Contents for the location of tables containing additional data such as interpretations or vegetation composition. Go to the table of your choice. The plant composition, constancy and coverage tables list all plant species found and their constancy and coverage values for each ecological type, mosaic, or ecotone. The soil interpretations tables list suitability or limitations for specific uses.

ABLA/VAGL,VAGL Flatstone

n=19

Scientific Name	Constancy %	Average Cover %
Tree d.b.h. ≥ 5 inches		
Abies lasiocarpa	5	1.0
Pinus contorta	42	13.0
Pseudotsuga menziesii	26	11.6
Tree d.b.h. < 5 inches		
Abies lasiocarpa	10	0.7
Pinus albicaulis	5	1.5
Pinus contorta	36	7.7
Populus tremuloides	21	2.6
Pseudotsuga menziesii	42	3.6
Shrubs		
Amelanchier alnifolia	10	1.0
Arctostaphylos uva-ursi	21	2.0
Berberis (Mahonia) repens	5	0.5
Ceanothus velutinus	5	2.0
Chimaphila umbellata	15	1.6
Lonicera utahensis	73	7.3
Prunus virginiana var. *melanocarpa*	5	5.0
Rosa acicularis	5	1.0
Rubus parviflorus	5	4.0
Salix sp.	21	2.6
Salix scouleriana	15	2.3
Sorbus scopulina	42	1.8

Scientific Name	Constancy %	Average Cover %
Forbs		
Achillea millefolium	42	1.2
Agoseris glauca	5	0.5
Antennaria corymbosa	10	1.2
Antennaria microphylla	10	3.0
Arnica cordifolia	42	3.0
Aster sp.	26	6.3
Astragalus miser	5	0.5
Calochortus eurycarpus	5	0.5
Campanula rotundifolia	21	0.6
Corallorhiza (Corallorrhiza) sp.	5	1.0
Epilobium angustifolium	78	9.1
Eriophyllum lanatum	5	0.5
Erythronium grandiflorum	10	0.5
Fragaria sp.	5	1.0
Frasera speciosa	5	1.0
Fragaria virginiana	15	2.0
Galium triflorum	5	0.5
Geranium sp.	5	0.5
Geranium viscosissimum	36	2.9
Geum triflorum	5	13.0
Goodyera oblongifolia	5	0.5
Habenaria (Piperia) unalascensis	5	0.5

Table of Contents

VOLUME 1

Overview

General Nature of the Inventory Area 9
Concepts 11
Methods 14

Ecological Units

Anatomy of an Ecological Unit Description 20
1000—PICO/VASC Islandpark - PSME/SYAL Potrmound -PICO/ARTRP4 Spliten complex, 0 to 35 percent slopes 23
1046—PICO/ARTRP4 Vadnais - Rock Outcrop complex, 1 to 12 percent slopes 26
1050—Cinder Cones, 15 to 60 percent slopes 28
1106—ABLA/PHMA5 Gany - PSME/BERE,SYOR2 Fritz association, 40 to 70 percent slopes 29
1110—ARTRP4/FEID Raynoldson, 1 to 15 percent slopes 31
1112—ABLA/VAGL,PAMY Huckridge - PSME/OSCH Paleborolls complex, 4 to 35 percent slopes 33
1123—ABLA/CARU,CARU Hopburn - PICO/ARTRP4 Vadnais - Rock Outcrop complex, 1 to 12 percent slopes 36
1125—ARNO4/AGSP Simeroi - ARTRP4/FEID Zeale complex, 4 to 20 percent slopes 38
1126—ARNO4/AGSP Simeroi, 30 to 60 percent slopes 41
1127—ARTRW8/ARARA Simeroi, 4 to 20 percent slopes 43
1128—ARTRP4/FEID Monida - ARTRP4/FEID Zeale complex, 4 to 20 percent slopes 45
1129—PIFL2/LEKI2 Fritz - PSME/JUCO6 Gany association, 40 to 70 percent slopes 48
1130—Alpine Graminoid Fritz, 4 to 30 percent slopes 50
1131—ARARA/FEID Mountainboy, 2 to 8 percent slopes 52
1133—PSME/ARTRV Meegero - ARTRP4/FEID Monida complex, 20 to 50 percent slopes 54
1140—ABLA/THOC Nearl, 8 to 20 percent slopes 57
1144—ABLA/SPBE2 Koffgo, unstable, 15 to 60 percent slopes 59
1145—ARTRP4/FEID Monida - ARTRP4/FEID Zeebar complex, 4 to 30 percent slopes 61
1146—ARTRP4/FEID Zeebar, 4 to 20 percent slopes 64
1147—ARTRP4/FEID Zeebar, 30 to 50 percent slopes 66
1149—PSME/CARU,CARU Edgway, 15 to 40 percent slopes 68
1150—ABLA/CARU,CARU Rhylow - ABLA/CARU,CARU Fitzwil association, 4 to 40 percent slopes 71
1154—PSME/JUCO6 Pikaden - PSME/FEID Pikaden - Rubble Land association, 40 to 65 percent slopes 74
1170—ABLA/Tall Forb Yodal, 4 to 35 percent slopes 76
1172—ABLA/ACGL Gany - ABLA/THOC Katpa - PSME/BERE,SYOR2 Fritz complex, 40 to 70 percent slopes 78
1175—ABLA/Tall Forb Yodal, 35 to 60 percent slopes 81
1204—PSME/ARTRV Povey, 30 to 60 percent slopes 83

1209—Tall Forb Etnass - ABLA/THOC Nearl - PSME/ARTRV Tophat complex, 4 to 30 percent slopes 85
1216—ABLA/ACGL Koffgo - ABLA/ACGL Rhylow - PSME/ARTRV Povey complex, 35 to 60 percent slopes 88
1219—ABLA/PHMA5 Lagall - PSME/ARTRV Povey - PSME/BERE,SYOR2 Fritz complex, 35 to 70 percent slopes 91
1222—ABLA/ACGL Koffgo - PSME/SYAL Lagall - ABLA/ACGL Rhylow complex, 50 to 70 percent slopes 94
1224—ABLA/VAGL,PAMY Huckridge - ABLA/VAGL,PAMY Koffgo - PSME/ARTRV Povey complex, 4 to 50 percent slopes 97
1225—PIAL Lasac - ABLA/VASC,VASC Castan complex, 30 to 60 percent slopes 101
1228—PSME/CARU,CARU Nopla, 2 to 15 percent slopes 103
1230—PSME/SPBE2,CARU Vitricryands, 35 to 60 percent slopes 106
1250—PSME/ARTRV Povey, 4 to 30 percent slopes 108
1270—ABLA/ARTRS2 Cryumbrepts - Rock Outcrop complex, 25 to 60 percent slopes 111
1280—Rubble Land - Low Alpine Forb Cryochrepts, loamy-skeletal - Rock Outcrop complex, 40 to 70 percent slopes 113
1294—ARTRP4/SYOR2/FEID Tetonia - PSME/OSCH Rin complex, 15 to 35 percent slopes 115
1303—ABLA/OSCH,PAMY Edgway - ABLA/THOC Jumpstart - PSME/ARTRV Tophat complex, 15 to 50 percent slopes 117
1307—ABLA/VAGL,PAMY Huckridge, 4 to 20 percent slopes 121
1313—ARTRP4/FEID Cryoborolls, 8 to 35 percent slopes 123
1315—ABLA/OSCH,PAMY Edgway - ABLA/VAGL,PAMY Koffgo - PSME/ARTRV Povey association, 15 to 50 percent slopes 125
1316—ABLA/VAGL,PAMY Koffgo - ABLA/THOC Koffgo - Rock Outcrop complex, 40 to 70 percent slopes 129
1331—Low Alpine Forb Oorang - Rubble Land complex, 4 to 35 percent slopes 132
1332—ARTRP4/FEID Quirt, 15 to 35 percent slopes 134
1333—ARTRP4/FEID Quirt - ARTRP4/SYOR2/FEID Tetonia complex, 4 to 15 percent slopes 136
1400—ARTRP4/ARART Trude, 0 to 4 percent slopes 138
1401—ARTRP4/ARART Trude - ABLA/CACA4,CACA4 Bootjack association, 0 to 2 percent slopes 140
1414—ABLA/VASC,PIAL Winegar - CALE4 Oxyaquic Cryochrepts - Rock Outcrop complex, 4 to 15 percent slopes 142
1430—PSME/SYOR2 Kyway, 4 to 30 percent slopes 145
1505—ARTRP4/SYOR2/FEID Tetonia, 4 to 15 percent slopes 147
1506—PSME/SYAL Lagall, till substratum, 4 to 25 percent slopes 149
1507—ARTRT/AGSP Buist - ABLA/PHMA5 Lagall complex, 35 to 60 percent slopes 151
1516—ABLA/VAGL,VAGL Winegar - ABLA/VASC,CARU Bradco complex, 4 to 15 percent slopes 153
1570—ABLA/VASC,VASC Dashiki - PIAL/CARO5,PICO Lasac association, 2 to 25 percent slopes 156
1573—ABLA/VASC Oleo - PIAL/CARO5,PICO Lasac association, 2 to 25 percent slopes 158
1575—ABLA/CARU,CARU Koffgo - ABLA/VAGL,VAGL Koffgo complex, 8 to 20 percent slopes 160
1576—ABLA/ARCO9,ARCO9 Fitzwil - PIAL/ARTRP4 Fitzwil complex, 4 to 25 percent slopes 162
1585—ABLA/VASC,CARU Rhylow, 15 to 35 percent slopes 165
1592—PSME/SYAL Lagall, 25 to 50 percent slopes 167

1593—ABLA/VAGL,PAMY Koffgo, 30 to 60 percent slopes 169
1594—ABLA/VAGL,VAGL Koffgo, 30 to 60 percent slopes 171
1595—ABLA/VAGL,PAMY Koffgo, 10 to 30 percent slopes 173
1597—ABLA/SPBE2 Koffgo, 35 to 60 percent slopes 175
1600—ABLA/VAGL,VASC Koffgo, 4 to 25 percent slopes 177
1646—ABLA/VAGL,PAMY Huckridge - ABLA/VAGL,PAMY Koffgo - ABLA/OSCH,PAMY Edgway complex, 15 to 50 percent slopes 179
1700—ABLA/VASC,CARU Koffgo, 4 to 15 percent slopes 183
1720—ABLA/VAGL,VAGL Flatstone - ABLA/VASC,CARU Koffgo complex, 2 to 15 percent slopes 185
1730—ABLA/VASC,CARU Koffgo - PICO Perfa association, 2 to 30 percent slopes 188
1760—PSME/ARTRV Fourme, 0 to 4 percent slopes 191
1970—ABLA Cryoboralfs - PSME/BERE,SYOR2 Cryochrepts, fine association, 15 to 70 percent slopes . 193
1999—Valleys, 4 to 25 percent slopes 196
2000—Graminoid Cryaquolls, 0 to 2 percent slopes 197
2020—Graminoid Chickreek - Salix/Graminoid Tepete complex, 0 to 1 percent slopes 199
2040—PICO Perfa - ABLA/CACA4,CACA4 Bootjack association, 0 to 4 percent slopes 201
2604—PIEN/GATR3 Cryofluvents, 0 to 2 percent slopes 204
2606—Salix/Graminoid Cryaquolls and Salix/Graminoid Cryaquolls, poorly drained, 0 to 6 percent slopes 206
2608—ABLA/CACA4,CACA4 Bootjack and Salix/Graminoid Cryaquolls, poorly drained, 0 to 2 percent slopes 209
2609—PIEN Cryaquolls, 2 to 8 percent slopes 212
3000—Pits 214
4028—Greys - Turnerville complex, 1 to 4 percent slopes 215
4029—Greys - Turnerville complex, 4 to 12 percent slopes 217
4030—Greys - Turnerville complex, 12 to 20 percent slopes 219
4057—Hapgood - Sebud complex, 15 to 45 percent slopes 221
4064—Lostine, 4 to 8 percent slopes 223
4076—Maxville, 2 to 8 percent slopes 224
4120—Stamp, 0 to 4 percent slopes 225
4138—Turnerville, 1 to 4 percent slopes 226
4139—Turnerville, 4 to 12 percent slopes 227
4140—Turnerville, 12 to 20 percent slopes 228
4301—Ike - Rock Outcrop - Jimbee association, 10 to 80 percent slopes 229
4302—Jimbee - Rock Outcrop - Ike association, 10 to 90 percent slopes 231

Ecological Types, Mosaics and Ecotones

Anatomy of an Ecological Type, Mosaic or Ecotone 234
ABLA Cryoboralfs Mosaic 237
ABLA/ACGL Gany Ecological Type 240
ABLA/ACGL Koffgo Ecological Type 243
ABLA/ACGL Rhylow Ecological Type 246
ABLA/ARCO9,ARCO9 Fitzwil Ecological Type 249

ABLA/ARTRS2 Cryumbrepts Mosaic....252
ABLA/CACA4,CACA4 Bootjack Ecological Type....255
ABLA/CARU,CARU Fitzwil Ecological Type....258
ABLA/CARU,CARU Hopburn Ecological Type....262
ABLA/CARU,CARU Koffgo Ecological Type....265
ABLA/CARU,CARU Rhylow Ecological Type....268
ABLA/OSCH,PAMY Edgway Ecological Type....271
ABLA/PHMA5 Gany Ecological Type....274
ABLA/PHMA5 Lagall Ecological Type....277
ABLA/SPBE2 Koffgo Ecological Type....280
ABLA/Tall Forb Yodal Mosaic....283
ABLA/THOC Jumpstart Ecological Type....286
ABLA/THOC Katpa Ecological Type....289
ABLA/THOC Koffgo Ecological Type....292
ABLA/THOC Nearl Ecological Type....295
ABLA/VAGL,PAMY Huckridge Ecological Type....298
ABLA/VAGL,PAMY Koffgo Ecological Type....302
ABLA/VAGL,VAGL Flatstone Ecological Type....305
ABLA/VAGL,VAGL Koffgo Ecological Type....308
ABLA/VAGL,VAGL Winegar Ecological Type....311
ABLA/VAGL,VASC Koffgo Ecological Type....314
ABLA/VASC Oleo Ecological Type....317
ABLA/VASC,CARU Bradco Ecological Type....320
ABLA/VASC,CARU Koffgo Ecological Type....323
ABLA/VASC,CARU Rhylow Ecological Type....326
ABLA/VASC,PIAL Winegar Ecological Type....329
ABLA/VASC,VASC Castan Ecological Type....332
ABLA/VASC,VASC Dashiki Ecological Type....335
Alpine Graminoid Fritz Ecological Type....338
ARARA/FEID Mountainboy Ecological Type....340
ARNO4/AGSP Simeroi Ecological Type....343
ARTRP4/ARART Trude Mosaic....346
ARTRP4/FEID Cryoborolls Ecological Type....349
ARTRP4/FEID Monida Ecological Type....352
ARTRP4/FEID Quirt Ecological Type....355
ARTRP4/FEID Raynoldson Ecological Type....358
ARTRP4/FEID Zeale Ecological Type....361
ARTRP4/FEID Zeebar Ecological Type....364
ARTRP4/SYOR2/FEID Tetonia Ecological Type....367
ARTRT/AGSP Buist Ecological Type....370
ARTRW8/ARARA Simeroi Mosaic....373
CALE4 Oxyaquic Cryochrepts Ecological Type....376
Graminoid Chickreek Ecological Type....378

Graminoid Cryaquolls Ecological Type 381
Low Alpine Forb Cryochrepts, loamy-skeletal Ecological Type 384
Low Alpine Forb Oorang Ecological Type 387
PIAL Lasac Mosaic 389
PIAL/ARTRP4 Fitzwil Ecotone 392
PIAL/CARO5,PICO Lasac Ecological Type 396
PICO Perfa Mosaic 399
PICO/ARTRP4 Spliten Ecotone 402
PICO/ARTRP4 Vadnais Ecotone 404
PICO/VASC Islandpark Ecological Type 407
PIEN Cryaquolls Mosaic 410
PIEN/GATR3 Cryofluvents Ecological Type 413
PIFL2/LEKI2 Fritz Ecological Type 416
PSME/ARTRV Fourme Ecotone 419
PSME/ARTRV Meegero Ecotone 422
PSME/ARTRV Povey Ecotone 425
PSME/ARTRV Tophat Ecotone 428
PSME/BERE,SYOR2 Cryochrepts, fine Ecological Type 431
PSME/BERE,SYOR2 Fritz Ecological Type 434
PSME/CARU,CARU Edgway Ecological Type 437
PSME/CARU,CARU Nopla Ecological Type 440
PSME/FEID Pikaden Ecological Type 443
PSME/JUCO6 Gany Ecological Type 446
PSME/JUCO6 Pikaden Ecological Type 449
PSME/OSCH Paleborolls Ecological Type 452
PSME/OSCH Rin Ecological Type 455
PSME/SPBE2,CARU Vitricryands Ecological Type 457
PSME/SYAL Lagall Ecological Type 460
PSME/SYAL Lagall, till substratum Ecological Type 463
PSME/SYAL Potrmound Ecological Type 466
PSME/SYOR2 Kyway Ecological Type 469
Salix/Graminoid Cryaquolls Ecological Type 471
Salix/Graminoid Cryaquolls, poorly drained Ecological Type 474
Salix/Graminoid Tepete Ecological Type 477
Tall Forb Etnass Ecological Type 479
Greys Series 482
Hapgood Series 484
Ike Series 485
Jimbee Series 487
Lostine Series 489
Maxville Series 490
Sebud Series 492
Stamp Series 494

Turnerville Series 496

VOLUME 2

Vegetation Composition Tables

Index to Vegetation Composition Tables 499

Soil Property Tables

Chemical Properties of the Soils 615
Engineering Index Properties 629
Physical Properties of the Soils 649
Soil Features 663
Water Features 669

Soil Interpretation Tables

Building Site Development 677
Construction Materials 685
Recreational Development 693
Sanitary Facilities 703
Vegetation Management 711
Water Management 721

Appendixes

Appendix A. Classification of the Soils 731
Appendix B. Potential Natural Communities 733
Appendix C. Plants Listed By Life-Form and Common Name 737
Appendix D. Plants Listed By Life-Form and Scientific Name 753
Appendix E. Ecological Unit Acreage and Proportionate Extent 769
Appendix F. References 773
Appendix G. Glossary of Terms 779

Map Sheets

Index to Map Sheets 789

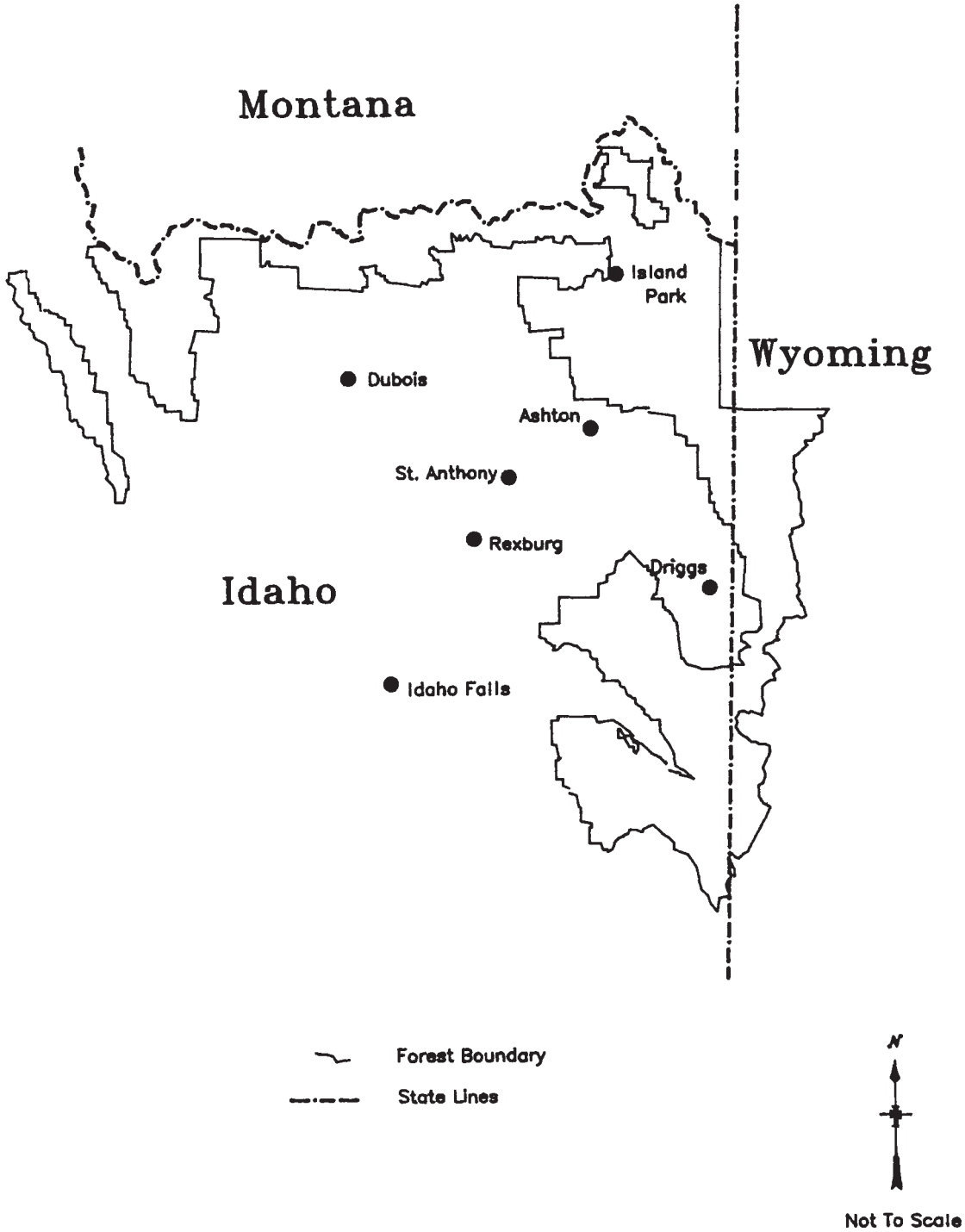


Figure 1. Vicinity Map of the Targhee National Forest

Overview

The Targhee National Forest is located in eastern Idaho and western Wyoming (fig. 1). The Forest occupies a nearly continuous segment of the Upper Snake River Highlands and borders Grand Teton National Park, Yellowstone National Park and the State of Montana. The crescent-shaped Forest averages 8 miles wide by about 220 miles long. Total area is 1.8 million acres.

Terrain on the Targhee National Forest includes basin and range, overthrust and igneous structures. Soils are dominantly cold, rocky, very deep and well drained. They support shrub steppe, forested and alpine communities. Riparian communities and hydric soils are common along drainageways. The lowest point in the inventory area, about 5100 feet, is along the South Fork of the Snake River, 25 miles south of St. Anthony, Idaho. Diamond Peak, the highest point in the inventory area, has an elevation of 12,197 feet and is located about 80 miles west of St. Anthony. Average annual precipitation ranges from about 11 inches on fan remnants and foothills in the western portion of the inventory area to about 50 inches on plateaus and mountain summits along the eastern boundary. Average annual air temperature ranges from 30 to 39 degrees F.

The Targhee National Forest is used mainly for livestock grazing, recreation, timber production, watershed and wildlife habitat. Most of the Forest is open for mineral exploration and development.

General Nature of the Inventory Area

This section provides general information about the inventory area. The drainage, physiography, soil formation and climate are described.

Drainage

The Targhee National Forest is located along the Continental Divide in the uppermost reaches of the Columbia River Basin. The Henry's Fork of the Snake River and its tributaries, Falls River and Teton River, originate on the Forest. Numerous small tributaries enter the South Fork of the Snake River as it passes through the southern extension of the Forest. In the western portion of the Forest, Birch Creek, Crooked Creek, Medicine Lodge Creek, Beaver Creek and Camas Creek drain into closed basins.

Physiography

The physiographic features of the Targhee National Forest are diverse. They reflect various combinations of geologic materials, geomorphic processes and time. The topography ranges from high relief mountains to nearly level outwash plains. Raw geologic materials include massive blocks of limestone in basin and range structures, mixed sedimentary materials in the folded and faulted overthrust structures, and extrusive flows on igneous structures. Mass wasting, glaciation and paraglacial weathering are significant in sculpting these materials. Recent alluvial deposits on floodplains are the youngest land surfaces in the inventory area. The oldest land surfaces may be rounded summits on high relief mountains.

High relief mountains are prominent along the Forest skyline. They rise 4000 to 6000 feet above the adjacent landscape. The mountains are associated with basin and range, or overthrust structures and are composed of hard sedimentary bedrock, commonly limestone. Rounded alpine summits and sawtoothed ridges abruptly give way to cirques and deep valleys. The valleys in the eastern portion of the Forest are U-shaped and have abundant springs and creeks. In the western portion of the Forest, V-shaped drainageways with intermittent stream channels predominate. High relief mountains rise as isolated peaks in the Bitterroot Range and Henry's Lake Mountains, form the backbone of the Big Hole Mountains and Snake River Range, and dominate the Beaverhead Mountains and Lemhi Range. The high relief mountains are bordered by mountains with moderate relief, fan remnants, foothills or dissected tablelands.

Foothills and mountains with moderate relief are common throughout many areas of the Forest. They rise 500 to 4000 feet above the adjacent terrain. The foothills and mountains are associated with igneous and overthrust structures that consist of geologic materials having intermediate hardness. Rhyolite and rhyolitic tuff are the dominant igneous rocks. They are commonly associated with extrusive flows and dissected shields. Remnants of extrusive flows mantle the overthrust in many areas. Thin strata of limestone, conglomerate, sandstone, siltstone, shale and other sedimentary rocks are common in the overthrust. Stratum thickness is often 5 to 200 feet.

The topography is multistructured. Hard sedimentary strata form dominant ridges and remnant volcanic caps form small plateaus. The ridges and plateaus break into subordinate ridges that further divide into low spur ridges and shallow draws. Drainage patterns are complex. Springs and creeks are abundant on the sedimentary materials and sparse on the igneous materials. Mass movements are common on overthrust structures. The Caribou Mountains are overthrust, Big Bend Ridge north of Ashton is a dissected shield, and portions of the Big Hole Mountains, Snake River Range, Centennial Mountains and west slope of the Teton Range have remnant extrusive flows mantling the overthrust structures.

Fan remnants are common in the western portion of the inventory area. They consist of unconsolidated calcareous alluvium and are associated with basin and range structure. Intermittent stream channels are present in some inset fans. Fan remnants cap overthrust materials near Monida Pass on the Montana state line.

Dissected tablelands are common throughout the central portion of the inventory area. They are composed of extrusive igneous materials with intermediate hardness. Rhyolite and rhyolitic tuff are the dominant rock types. The low relief topography is dissected by incised, V-shaped drainageways. The larger drainageways have perennial creeks and the smaller drainageways have intermittent stream channels. Most summits lack surface water. An exception is east of Ashton, Idaho in the Falls River Basin where streams and pothole lakes are abundant. A thin layer of glacial till mantles the tablelands in this area.

Plateaus are present in the northeastern portion of the inventory area. They rise 300 to 800 feet above the adjacent tablelands. The plateaus have igneous structure and are composed of unconsolidated extrusive flows dominated by tephra. They are lightly dissected by shallow drainageways with intermittent stream channels. Surface streams are only present during peak snowmelt periods.

The Island Park area occupies a caldera floor. A caldera is a large, basin-shaped depression formed by the collapse of a volcano. Following the collapse, extrusive flows in the crater built the caldera floor. The upper 75 feet of the floor is basalt, a hard igneous rock. The caldera floor lacks surface drainage features. Some areas have intermittent and perennial ponds fed by snowmelt. Several small cinder cones are present.

Floodplains and outwash plains are small, yet significant, features of the Forest. River and stream floodplains occur throughout the inventory area and vary in width from about 40 feet to one quarter mile. They consist of mixed alluvium. In the northeastern portion of the Forest outwash plains are intermixed with dissected tablelands and extend onto the caldera floor. These outwash plains are composed of a thin mantle of alluvium derived from tephra. A watertable fed by springs or snowmelt is common.

Formation of the Soils

Soils are formed through the combined effects of five principal factors: parent material, climate, topography, biological activity and time. These soil-forming factors are interdependent. The differences in soils are attributed to the relative importance or strength of the various factors.

The two dominating parent materials on the Forest are loess and local bedrock. Loess is a silt-size, calcareous material that is influenced by volcanic ash. Carried by winds blowing across the Snake River Plain, loess continues to settle upon the landscape. Loess dominates the fine-earth fraction of most soils. Rock fragments, broken from nearby bedrock by chemical weathering or frost shattering, are abundant in many of the soils. Soils with abundant limestone fragments tend to be alkaline and those with rhyolite or rhyolitic tuff fragments are acidic. Most soils are greater than 60 inches deep to bedrock.

Climate and topography are closely intertwined influences in soil formation. Microclimates result from changes in aspect, air drainage, elevation and slope. South facing sideslopes have more dynamic wet-dry and freeze-thaw cycles than north facing sideslopes. These cycles result in stronger horizon development and greater mixing of loess and rock fragments. Continuously shaded north facing sideslopes are more moist and cool than south facing sideslopes. Parent materials weather slowly in cool temperatures. Moist conditions allow for greater leaching.

Biological activity plays a major role in profile differentiation. Organic matter accumulation, profile mixing, nutrient cycling and structural stability are all enhanced by the activities of soil organisms and vegetation.

Time is an important factor in soil formation. The physical and chemical changes brought about by the other soil-forming factors are slow. The effect of time on soil formation in the inventory area is generally

evident in the degree of alteration of parent material by the climate, topography and biological activity. Soils are considered to be older if their horizons are more distinctly different in color, texture, reaction, structure or other properties. An exception may be if the parent material or a high water table primarily determines the features of the soil. Soils that have few or indistinct horizon differences are considered to be younger. Soils stay relatively young as a result of deposition on floodplains or soil creep and mass wasting on steep sideslopes. The oldest soils on the Forest may be on fan remnants and rounded mountain summits.

Climate

Targhee National Forest is known for having warm, dry to moist summers and cold, moist winters. This climatic pattern is produced by the movements of Pacific and Arctic air systems interacting with topography. Pacific air masses have the strongest year round influence. Low pressure Pacific systems moving off the Snake River Plain are forced by the mountains to rise, cool and release precipitation. This orographic uplift effect is most pronounced in the eastern portion of the Forest. The cloud cover associated with low pressure Pacific systems has a moderating affect on air temperature. Broad daily temperature extremes and a clear sky are common when high pressure systems are over the Forest. Arctic air masses occasionally move over the Continental Divide during the winter season. These cold systems may cause severe temperature inversions when associated with high pressure, or blizzard conditions when associated with low pressure.

Limited climatic data are available for the Forest. Snow telemetry (SNOTEL) data collection sites have recently been established at White Elephant, Crab Creek and Pine Creek Pass. SNOTEL sites, Snow Course sites and Streamflow forecast points provide information on snow depth, precipitation, snow water equivalent, air temperature, and stream and reservoir flow levels. These stations are operated by the USDA Natural Resources Conservation Service. Some temperature and precipitation data are available from the Island Park Ranger District and from Grand Targhee ski resort.

The average annual precipitation increases from west to east across the Targhee National Forest. Foothills and fan remnants in the western portion average 11 inches per year with most of the precipitation occurring in the winter season. Mountains and plateaus in the eastern portion of the Forest average 50 inches of annual precipitation. In these areas the precipitation is evenly distributed throughout the year. Total annual snowfall measurements are variable. Records show 182 to 533 inches per year at the Grand Targhee ski resort and excess of 200 inches per year in the Island Park area. Bechler River Ranger Station, in the southwest corner of Yellowstone National Park and about one mile outside the Forest boundary, has a 262 inch snowfall average for a 20 year time span. The amount of precipitation per inch of snowfall is approximately 1/10 to 1/15 of an inch.

A broad range in air temperatures exist on the Forest. They reflect the influences of elevation, prevailing air masses and season. In summer the daily high temperature can exceed 90 degrees F at lower elevations and reach the 70 to 80 degrees F range at higher elevations. In winter the daily low temperature may fall to 20 or 30 degrees F below zero when high pressure Arctic systems are present over the Forest or hover around 20 to 30 degrees F above zero when low pressure Pacific air masses pass over the region. The average annual air temperature for the inventory area ranges between 30 to 39 degrees F.

Prevailing winds are from the southwest. Highest average wind speeds occur in the months of March, April and May; lowest average speeds occur in July, August and September. Maximum relative humidity generally corresponds with lowest temperatures on the Forest. Relative humidity in the summer averages 65 to 75 percent in the early morning hours and decreases to 25 to 30 percent or less by late afternoon. During the winter months relative humidity in the morning averages 80 to 90 percent and averages 70 to 80 percent by late afternoon.

Concepts

Purpose

The purpose of this inventory is to define ecological types and to delineate ecological units. An ecological type is a category of land defined for a unique combination of vegetation, soil, topography, geology and climate. Where ecological types are difficult to define, mosaics or ecotones are used. Mosaics are areas with a patchiness of distinct plant associations. Ecotones are a blending of dominant plant association species. Ecological types, mosaics and ecotones can change within short distances, and each differs in its ability to produce vegetation and respond to management. An ecological unit is the mapped delineation of one or more ecological type,

mosaic or ecotone as they are found in a repeating pattern across the landscape. The boundaries between ecological units are defined in order to meet management objectives. The ecological units in this report correspond with the landtypes in the USDA Forest Service National Hierarchical Framework of Ecological Units and with an Order 3 mapping intensity in the National Cooperative Soil Survey.

Ecological types, Mosaics or Ecotones

Ecological types, mosaics and ecotones are named for a vegetation and a soils component. The vegetation part uses a code system that reflects the scientific name of the potential natural community. A potential natural community is the biotic community that would be established and maintained over time under present environmental conditions if all successional sequences were completed without additional human-caused disturbance. Three categories of communities are used to identify potential natural communities. These categories are: plant association (p.a.), community type (c.t.) and community. The p.a. and c.t. are published descriptions. The term community is used when p.a. or c.t. does not apply.

The soil part uses names from a soils classification system and is commonly at the series category. Higher taxonomic categories are used when the soils have a more broad range in characteristics.

Ecological units

Ecological units are assigned a map symbol and have a three part name. The first part is named for the components. The second part reflects the kind of unit. The third part is slope.

The components are ecological types, mosaics, ecotones or miscellaneous areas such as rubble land or rock outcrops. The named components comprise 75 to 95 percent of the unit. The remaining 5 to 25 percent are contrasting inclusions. Contrasting inclusions are areas where the soils, vegetation or landform position differ significantly from the named components. They are often ecological types, mosaics, ecotones or miscellaneous areas from adjacent units.

The kind of unit may be a complex, an association, consociation or undifferentiated group. Those units that have two or three components in a regularly repeating pattern are called a complex or an association. At a scale of 1:24,000 the components in a complex are too small to clearly separate into polygons. An association can be separated at this scale but is displayed as a unit with multiple components to simplify the legend. The names of single component units do not signify the kind of unit (consociation). Ecological units 2606 and 2608 are undifferentiated groups. Undifferentiated groups are two component units with common features that do not always occur together in the same delineation. They are named with "and" separating the components and do not signify the kind of unit.

Ecological units are displayed on the map sheets as polygons and lines. Most units are delineated as polygons. Areas too narrow to delineate as polygons are identified by line units. These narrow areas are commonly associated with riparian zones.

National Hierarchical Framework of Ecological Units

The USDA Forest Service developed the National Hierarchical Framework of Ecological Units (fig. 2) to provide a standardized method for classifying, mapping and describing ecological units at various geographic planning and analysis scales. The method was formally adopted in 1993 (ECOMAP). Subsection and landtype levels are addressed in this inventory. Subsections are displayed on the accompanying map (fig. 3). The ecological units of this inventory correspond with the landtypes in the National Hierarchical system.

Ecological zones

The Targhee National Forest is divided into ecological zones (fig. 4 and fig. 5) that suggest differences in climate, topography and vegetation. Major zones are the alpine, forested and shrub steppe. Finer divisions of these areas reflect relative climatic differences. The transitional areas between major zones are ecotones.

Soils Classification

Soils are classified according to the *Keys to Soil Taxonomy, Seventh Edition* developed by the USDA Natural Resources Conservation Service. This is the system used by the National Cooperative Soil Survey and has six categories of soils classification. Categories beginning with the most broad to the more refined are the order, suborder, great group, subgroup, family and series. Classification is based on soil properties observed in the field and laboratory measurements. Most of the soils in this inventory are classified to the series level; a few are classified to the great group, subgroup or family

National Hierarchical Framework of Ecological Units

Planning and analysis scale	Ecological units	Purpose, objectives and common use	Common size range	Targhee National Forest
Ecoregion Global	Domain	Broad applicability for modeling and sampling, strategic planning and assessment, and international planning	Millions to tens of thousands of square miles	Dry
Ecoregion Continental	Division			Temperate Steppe Regime Mountains
Ecoregion Regional	Province			Southern Rocky Mountain Steppe-Open Woodland-Coniferous Forest-Alpine Meadow; Middle Rocky Mountain Steppe-Coniferous Forest-Alpine Meadow
Subregion	Section	Strategic, multi-forest, statewide, and multi-agency analysis	Thousands to tens of square miles	Yellowstone Highlands, Overthrust Mountains, Beaverhead Mountains
	Subsection			Big Hole Mountains; Caribou Range Mountains; Centennial Mountains; Island Park; Lemhi/Medicine Lodge; Madison-Pitchstone Plateaus; Teton Range
Landscape	Landtype association	Forest and watershed analysis and planning	Thousands to hundreds of acres	20
Land unit	Landtype	Project and management area analysis and planning	Hundreds to less than ten acres	81 ecological units
	Landtype phase			not identified

Figure 2. The Hierarchical Framework provides a standardized method for classifying, mapping and describing ecological units at various geographic scales.

categories. A table listing the classification of all soils in the inventory area begins on page 731.

Of the eleven soil orders, eight are represented in the Targhee National Forest. Mollisols, Alfisols and Inceptisols are dominant; Vertisols, Histosols, Entisols, Andisols and Aridisols are also present.

The most common subgroup categories in the inventory are Typic and Vitrandic. Classification into the Vitrandic subgroup was determined by laboratory analyses on soils collected throughout the forested zone and extrapolated to similar soils within this vegetation zone.

Both cryic and frigid soil temperature regimes are recognized in the inventory area. Most soils are cryic. Frigid soils occur along the margins of the Forest and are known as the Buist, Ike, Lostine and Simeroi series. Ike and Simeroi soils are found in the western portion of the Forest on fan remnants and south facing sideslopes of foothills. Lostine soils are in the central portion of the Forest on dissected tablelands. Buist soils are in the southern portion of the forest on south facing sideslopes of dissected tablelands. These frigid soils support shrub steppe communities.

Soils in this inventory are classified in the xeric, udic, aridic and aquic soil moisture regimes. Xeric and udic soils predominate in the Forest. The xeric soils are equally distributed in the forested and shrub steppe zones and udic soils are primarily found in forested and alpine zones. Boundaries between these two moisture regimes correspond closely with vegetational patterns and to a lesser extent with topographic features. Simeroi and Ike soils classify as aridic and are found in the Lemhi-Medicine Lodge subsection. Aquic soils are scattered throughout the Forest.

Most soils on the Forest are in a mixed mineralogy class. A few are classified as glassy, amorphic, carbonatic or smectitic. Soils with a glassy or amorphic class occur in areas bordering Yellowstone National Park. Parent materials of the glassy soils are strongly influenced by tephra. The amorphic soils

developed in local alluvium derived from loess, volcanic ash and glacial till. Soils with a carbonatic or smectitic class are widely distributed throughout the inventory area. The carbonatic soils occur in areas receiving less than 28 inches of average annual precipitation and developed in local alluvium or colluvium derived from limestone and loess. Parent materials of the smectitic soils are strongly influenced by shale.

Cation exchange activity classes apply to soils of mixed mineralogy. Active and superactive classes are recognized on this Forest. The superactive class is most extensive and is commonly associated with soils having thick, dark colored surface layers or mixed parent materials. Soils in the active class are light colored, strongly leached and have little organic matter. They consistently have parent materials of loess, volcanic ash and rhyolitic tuff. The activity class was determined by laboratory analyses on soils collected throughout the inventory area and was extrapolated to similar soils.

Vegetation Classification and Nomenclature

The Targhee National Forest borders two floristic provinces. Primary references used for classification and nomenclature include the following: *Vascular Plants of the Pacific Northwest*, by Hitchcock et al. 1955-69; *The Monocotyledons, Volume 6 of Intermountain Flora: Vascular Plants of the Intermountain West*, by Cronquist et al. 1994; and *Vascular Plants of Wyoming*, by Dorn 1992.

Taxonomic nomenclature for trees, shrubs and forbs follows Hitchcock et al. 1955-69. Graminoid nomenclature follows Cronquist et al. 1994. Some exceptions include:

Lesquerella species follow Dorn 1992.

Osmorhiza depauperata is combined with *Osmorhiza chilensis* because the two species commonly occur together, have similar ecology and are difficult to distinguish without mature fruit.

Sagebrush nomenclature follows *Sagebrush - Grass Habitat Types of Southern Idaho,* by Hironaka et al. 1983; and unpublished nomenclature developed by Alma Winward (personal communication 1991-1996).

Stipa columbiana is combined with *Stipa occidentalis* and follows Hitchcock et al. 1955-69.

Thalictrum species identified in conifer stands are listed as *Thalictrum occidentalis* and those identified in aspen stands are listed as *Thalictrum fendleri* because of the difficulty in distinguishing the two species without mature fruit.

Common names follow the PLANTS Database 1996. An exception is the *Poa* species that follow Cronquist et al. 1994.

Methods

Preparation

Reference materials were obtained from many sources in June 1991. These materials included: habitat and community guides, geologic reports, climatic maps, adjacent soil surveys, aerial photographs, 7.5 minute orthophoto quadrangles, and unpublished soil inventories.

Black and white aerial photographs with a scale of 1:40,000 were used as base maps. Most of the photographs were from 1974 and 1980 flights; a few were from 1975, 1981 and 1990. These photos were obtained from the National High Altitude Photography (NHAP) program. The effective map area was identified for each photo and was quad centered. Match lines to adjacent photos were added with the aid of a stereoscope.

A preliminary ecological unit legend based on observable patterns in vegetation, soils, climate, topography or geology was determined. Representative polygons were delineated on the photographs.

Documentation

Field work began with ground-truthing the preliminary legend and polygons. Ground-truthing was used to define or verify unit composition and polygon extent. Sample sites were chosen by first identifying the distribution of the ecological unit concept. A representative polygon in the central portion of the concept area was sampled first. Polygons near the margins of the concept were sampled next. If data from this sampling disproved the original concept, then additional polygons were sampled. As work progressed, the legend was continuously updated.

Sample sites were chosen in the identified polygon as being representative of the ecological type, mosaic or ecotone concept. Specific sites for traverse stops or detailed vegetation plot and soil

pedon descriptions were selected based on landform position and present vegetation. Uniform vegetation as near to potential (climax) as possible was preferred. Hybrid plant communities, microsites, slope breaks and areas impacted by recent disturbance were avoided. The ecological types, mosaics and ecotones were documented by collecting over 1000 detailed descriptions.

Detailed vegetation descriptions were collected using a modified version of the Region 1 Ecodata plot method. The documentation focused on the identification and visual cover estimates of each plant species within a 1/10 acre circular plot. Herbarium specimens of less well known species were collected for reference. Tree cover was estimated in two size classes that include those trees less than 5 inches in diameter at breast height (seedlings and saplings) and those greater than 5 inches in diameter at breast height (pole, medium, large and huge). Habitat type and community type guides were used, where applicable, to identify the present community and predict the potential natural community.

Detailed soil pedon descriptions were collected within the boundary of the vegetation plot using standard soil survey procedures. The documentation focused on thickness, color, texture, structure, consistence, roots, pores, rock fragment content, and other special features of each horizon. Most pedons were described to a depth of greater than 40 inches for hand excavated pits and to a depth of 60 inches or more for backhoe excavated pits. Voucher box samples were collected for reference. Each pedon was classified according to the *Keys to Soil Taxonomy, Seventh Edition.*

Additional site data included landform position, slope and aspect. Elevation, legal description (U.S. Public Land Survey), latitude and longitude (Geographic Coordinate System) were determined from 7.5 minute orthophoto quadrangles. The latitude and longitude of numerous sites were located using a global positioning system. Each site was permanently located on the base maps with a pinhole.

Compilation

Following each field season the classifications were finalized and data was compiled. The classification of the less well known herbarium specimens were validated with the aid of a dissecting scope and plant keys. Lab analysis was performed on selected soil samples to determine particle-size, cation exchange capacity, base saturation, and extractable aluminum plus 1/2 iron. Data from these analyses were used to confirm soil classification.

The detailed vegetation descriptions and additional site data were stored in an electronic database (R:BASE). Detailed soil descriptions were traditionally organized. The data was manually compiled to define or update ecological unit descriptions, ecological type, mosaic and ecotones descriptions and tables for soil interpretations and soil properties. Vegetation composition tables and plant lists were processed electronically. Base maps were finalized and the data transferred to a geographic information system (ARC/INFO). Four interim reports were distributed for customer review and comment.

Outside Assistance

The Forest Service regional office and the Natural Resources Conservation Service (NRCS) provided technical assistance and quality control throughout the inventory. Field and office reviews were held each year. During these visits staff from the regional office and NRCS reviewed descriptions and classifications; assisted in interpreting references; and provided guidance in documenting and displaying complex ecological patterns. A significant contribution of the regional office was clarifying identification and classification of sagebrush.

The NRCS National Soil Survey Laboratory in Lincoln, Nebraska provided full characterization analysis on 18 pedons. They also provided grab sample analysis on 24 pedons and 17 additional soil horizons. The grab sample analysis included determinations of particle size, base saturation, organic carbon or andic soil properties. This lab data was critical for the final classification of many soils in the inventory.

The NRCS generated the first draft of the soil properties and interpretation tables. They also provided leadership in the correlation of the soils within the National Cooperative Soil Survey Program.

Figure 3. Subsections of the Targhee National Forest

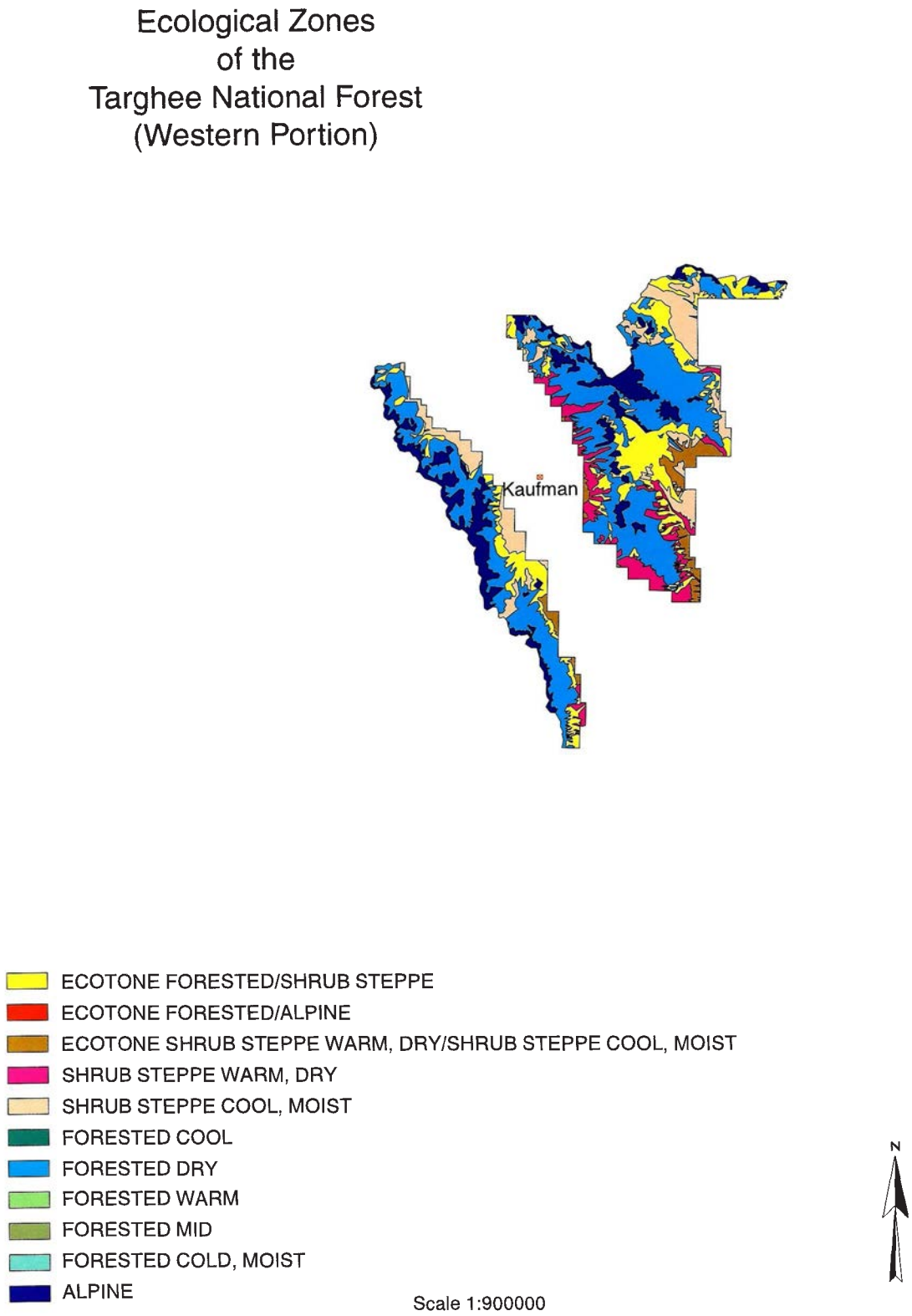


Figure 4. Ecological Zones of the Targhee National Forest (Western Portion)

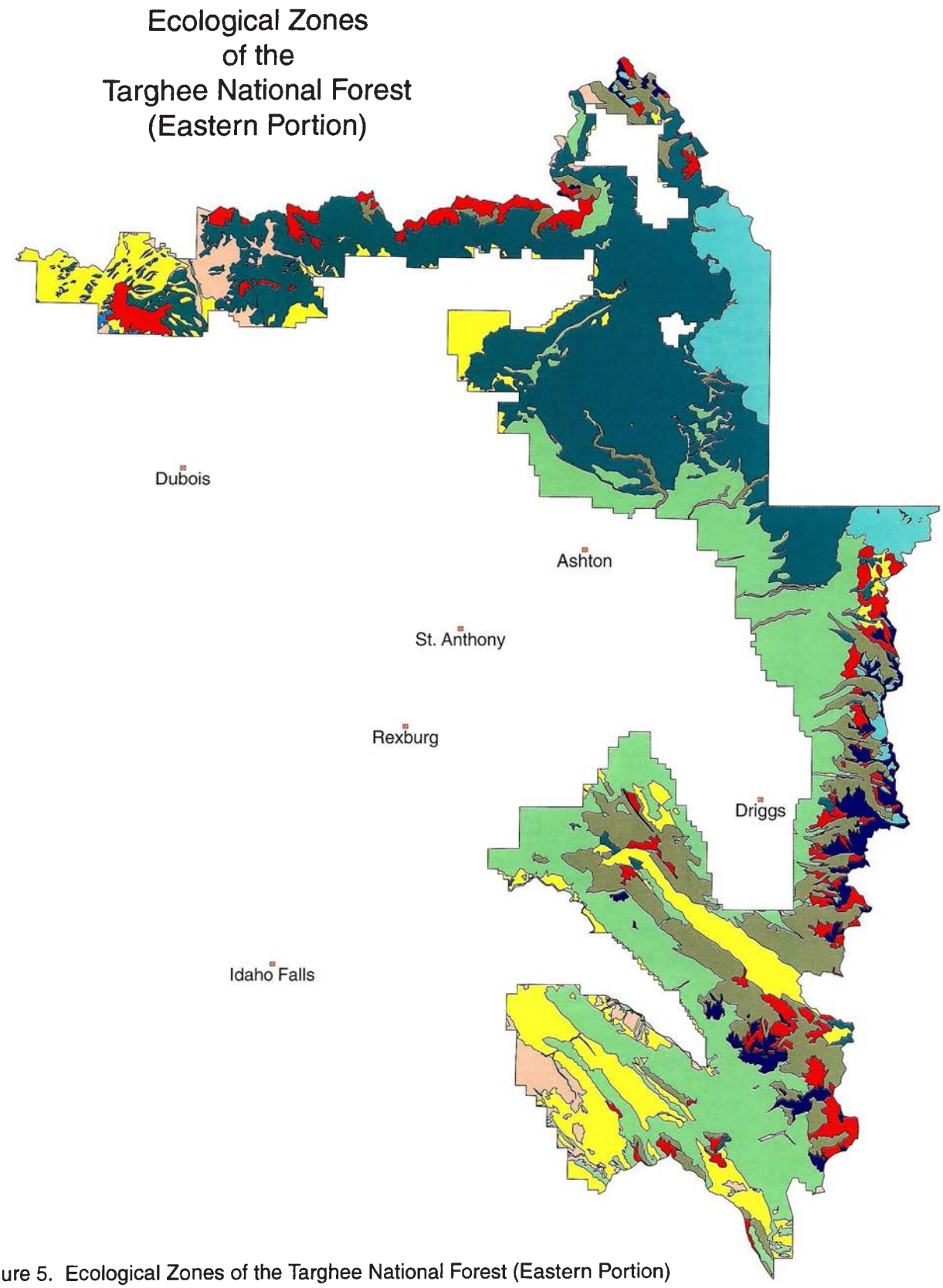


Figure 5. Ecological Zones of the Targhee National Forest (Eastern Portion)

Anatomy of an Ecological Unit Description

Map Symbol

Ecological unit name

Summary of unit topography, climatic zone and dominant vegetation.

Diagram showing relative position of each ecological type on the landform.

Physiographic features of the whole unit.

Ecological types and percentage of each. An ecological unit may include up to 3 ecological types plus contrasting inclusions.

1573—ABLA/VASC Oleo - PIAL/CARO5,PICO Lasac association, 2 to 25 percent slopes

Summary

This ecological unit is on plateaus in the cold, moist portion of the forested zone (fig. 60). The landscape is characterized by undulating to rolling slopes that support reforesting clearcuts and closed canopy forests. Slopes are lightly dissected by shallow, incised drainageways and clusters of low knolls.

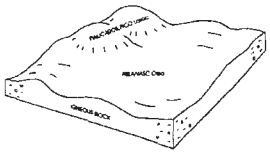


Figure 60. Block diagram of ecological unit 1573.

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: plateaus
Elevations: 6800 to 8200 feet
Average annual precipitation: 50 inches
Average annual air temperature: 32 degrees F
Geology: igneous

Ecological Unit Composition

75 percent - ABLA/VASC Oleo Ecological Type
15 percent - PIAL/CARO5,PICO Lasac Ecological Type
10 percent - contrasting inclusions

ABLA/VASC Oleo (75%)

Setting

Slopes: 2 to 15 percent
Landform position: sideslopes, swales and ridges

Vegetation

Potential Natural Community
- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase or pinegrass phase

Present Vegetation
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.

Soils

Name: Oleo series
Taxonomic class: Ashy, glassy Alfic Vitricryands
Parent material: local alluvium derived from loess and tephra
Typical profile:
- 1 to 0 inches - forest litter
- 0 to 2 inches - dark grayish brown silt loam
- 2 to 10 inches - brown silt loam
- 10 to 28 inches - light yellowish brown silt loam
- 28 to 60 inches - pale brown gravelly silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches:11.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 5

PIAL/CARO5,PICO Lasac (15%)

Setting

Slopes: 4 to 25 percent
Landform position: knolls and south-facing sideslopes of drainages

Vegetation

Potential Natural Community
- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation
- lodgepole pine/Ross' sedge c.t.
- Herbaceous communities dominated by an open layer of Ross' sedge or elk sedge.

Soils

Name: Lasac series

Continuation of first ecological type description.

Description of the second ecological type includes setting, vegetation and soil sections.

Description of the first ecological type includes setting, vegetation and soil sections.

Running header

1573—ABLA/VASC Oleo - PIAL/CARO5,PICO Lasac association, 2 to 25 percent slopes

Taxonomic class: Ashy-skeletal, glassy Vitrandic Cryochrepts
Parent material: local alluvium derived from tephra and loess
Typical profile:
- 0 to 6 inches - dark grayish brown gravelly sandy loam
- 6 to 12 inches - light yellowish brown gravelly coarse sandy loam
- 12 to 20 inches - very pale brown very gravelly loamy sand
- 20 to 60 inches - variegated very gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.2
T factor: 5

Contrasting Inclusions (10%)

Inclusion 1
Slope: 4 to 25 percent
Landform position: north facing sideslopes of shallow drainageways
Potential Natural Community
- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.

Soils: Soils like Oleo that have greater than 35 percent rock fragments in the subsoil.

Inclusion 2
Slope: 2 to 12 percent
Landform position: sideslopes, swales and ridges
Potential Natural Community
- subalpine fir/grouse whortleberry p.a., whitebark pine phase

Present Vegetation
- subalpine fir/grouse whortleberry p.a., limberpine phase

Soils: Soils like Oleo that are more moist and cool.
Comment: This inclusion occurs at the upper elevation range of the ecological unit.

Management and Limitations

- Pond reservoir areas are severely limited because of seepage.
- Revegetating cut and fill slopes is severely limited because the soils are too stony.

PIAL/CARO5,PICO Lasac
- Severe rill or gully erosion on exposed soil has been observed following a single rain event.
- Severe hydrophobic conditions in the soil surface layers have been observed after fires. These hydrophobic conditions increase surface runoff and the potential for erosion on all slope positions.
- Fencing is severely limited because the soils are too rocky.
- Shallow excavations are severely limited because cutbanks cave.

Additional Information

- ABLA/VASC Oleo Ecological Type description on page 317.
- PIAL/CARO5, PICO Lasac Ecological Type description on page 396.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

Continuation of second ecological type description.

Contrasting inclusions are small areas within the ecological unit that differ in their characteristics from the main ecological types. Up to 5 inclusions may be described.

Continuation of inclusions

Management statements and severe limitations for some activities or uses associated with the whole ecological unit.

Management statements and severe limitations for some activities or uses associated with a specific ecological type.

Additional information

1000—PICO/VASC Islandpark - PSME/SYAL Potrmound - PICO/ARTRP4 Spliten complex, 0 to 35 percent slopes

Summary

This ecological unit is on a caldera floor in the cool portion of the forested zone (fig. 6). The landscape is characterized by a mosaic of pressure ridges and swales with undulating to rolling slopes that support reforesting clearcuts. Relief between ridgecrests and swales is less than 20 feet. Surface drainage features are commonly absent.

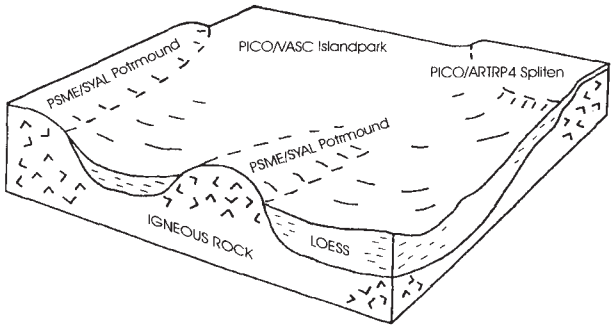


Figure 6. Block diagram of ecological unit 1000.

Ecological Unit Setting

Subsection: Island Park
Landform: caldera floor
Elevations: 5900 to 6400 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

60 percent - PICO/VASC Islandpark Ecological Type
20 percent - PSME/SYAL Potrmound Ecological Type
15 percent - PICO/ARTRP4 Spliten Ecotone
5 percent - contrasting inclusions

PICO/VASC Islandpark (60%)

Setting

Slopes: 0 to 8 percent
Landform position: sideslopes and swales

Vegetation

Potential Natural Community

- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/elk sedge c.t.
- lodgepole pine/pinegrass c.t.
- lodgepole pine/grouse whortleberry c.t.
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by non-native grasses and sedges.
- Herbaceous communities dominated by elk sedge or non-native grasses.

Soils

Name: Islandpark series
Taxonomic class: Coarse-silty, mixed, active Vitrandic Paleboralfs
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 0 to 6 inches - grayish brown silt loam
- 6 to 36 inches - very pale brown silt loam
- 36 to 65 inches - very pale brown loam
- 65 to 75 inches - brown clay loam
- 75 inches - hard basalt bedrock

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.5 inches
AWC, surface to 60 inches: 13.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32
T factor: 5

PSME/SYAL Potrmound (20%)

Setting

Slopes: 4 to 35 percent
Landform position: ridges and sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation
- quaking aspen-lodgepole pine/whortleleaf snowberry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- Douglas-fir/common snowberry p.a.

Soils

Name: Potrmound series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Parent material: loess, volcanic ash and residuum derived from basalt

Typical profile:
- 0 to 30 inches - dark grayish brown extremely stony loam
- 30 to 39 inches - pale brown extremely stony loam
- 39 inches - hard fractured basalt bedrock

Depth class: moderately deep (20 to 40 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 1.5 inches

AWC, surface to hard fractured basalt bedrock: 2.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.05

T factor: 2

PICO/ARTRP4 Spliten (15%)

Setting

Slopes: 0 to 4 percent

Landform position: ridges and shoulders

Vegetation

Potential Natural Community

An ecotone of:
- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- Communities that have a shrub layer of mountain big sagebrush or antelope bitterbrush with an herbaceous layer dominated by one or more of the following: Idaho fescue, California brome, prairie Junegrass, other native or non-native grasses or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium lodgepole pine.

Soils

Name: Spliten series

Taxonomic class: Loamy, mixed, superactive Lithic Cryoborolls

Parent material: loess and residuum derived from basalt

Typical profile:
- 0 to 3 inches - brown cobbly loam
- 3 to 12 inches - yellowish brown cobbly loam
- 12 inches - hard basalt bedrock

Depth class: shallow (less than 20 inches)

Permeability: moderate

AWC, surface to hard basalt bedrock: 1.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.24

T factor: 1

Contrasting Inclusions (5%)

Inclusion 1

Slope: 0 to 4 percent

Landform position: ridges, shoulders and sideslopes

Potential Natural Community
- lodgepole pine/elk sedge c.t.

Present Vegetation
- Herbaceous communities dominated by elk sedge or non-native grasses.

Soils: Soils like Spliten that are 20 to 40 inches deep to hard bedrock.

Inclusion 2

Slope: 0 to 2 percent

Landform position: swales

Potential Natural Community
- grass and sedge dominated communities

Present Vegetation
- Herbaceous communities dominated by tufted hairgrass, fowl bluegrass, Buxbaum's sedge, Sierran hare sedge or blister sedge.

Soils: Soils like Islandpark that are somewhat poorly drained (Cryaquoll soils).

Inclusion 3

Landform position: ridges

Rock: Rock outcrops that consist of surface level exposures.

Management and Limitations

- Off-road vehicle use is severely limited because the soils compact easily.

PICO/VASC Islandpark

- Revegetating cut and fill slopes is severely limited because the soils are too acid.

PSME/SYAL Potrmound

- Activities severely limited because the soils are too stony or rocky include: off-road vehicle use, unsurfaced roads and parking areas, fencing, revegetating cut and fill slopes, and the use of heavy equipment for woodland harvest and mechanical site preparation.
- Pond reservoir areas are severely limited because of seepage.
- Dwellings without basements and septic tank absorption fields are severely limited because of depth to rock or large stones.
- Shallow excavations are severely limited because of depth to rock and large stones.
- Foot and saddlestock trails are severely limited because of large stones.
- Camp and picnic areas are severely limited because of slope and large or small stones.

PICO/ARTRP4 Spliten

- Tree windthrow hazard is severe because the soil has a restrictive layer.
- Activities severely limited because of depth to rock include: fencing, camp and picnic areas, dwellings without basements, unsurfaced roads and parking areas, off-road vehicle use, shallow excavations, pond reservoir areas, revegetating cut and fill slopes, and septic tank absorption fields.

Additional Information

- PICO/VASC Islandpark Ecological Type description on page 407.
- PSME/SYAL Potrmound Ecological Type description on page 466.
- PICO/ARTRP4 Spliten Ecotone description on page 402.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1046—PICO/ARTRP4 Vadnais - Rock Outcrop complex, 1 to 12 percent slopes

Summary

This ecological unit is on plains in a broad transitional area between the cool, moist portion of the shrub steppe zone and the cool portion of the forested zone (fig. 7). The landscape is characterized by undulating to rolling slopes that support communities dominated by sagebrush. Surface drainage features are commonly absent.

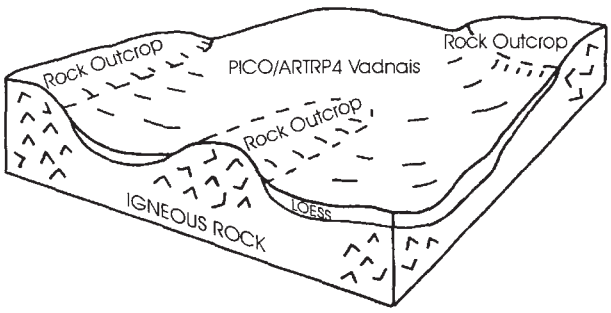


Figure 7. Block diagram of ecological unit 1046.

Ecological Unit Setting

Subsection: Island Park
Landform: plains
Elevations: 6400 to 6900 feet
Average annual precipitation: 22 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

70 percent - PICO/ARTRP4 Vadnais Ecotone
15 percent - Rock Outcrop
15 percent - contrasting inclusions

PICO/ARTRP4 Vadnais (70%)

Setting

Slopes: 1 to 12 percent
Landform position: all positions

Vegetation

Potential Natural Community
An ecotone of:

- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush or antelope bitterbrush with an herbaceous layer dominated by one or more of the following: bluebunch wheatgrass, prairie Junegrass, timber oatgrass, other native or non-native grasses.
- Shrub dominated communities that have widely dispersed seedling through medium lodgepole pine.

Soils

Name: Vadnais series
Taxonomic class: Fine-loamy, mixed, superactive Argic Pachic Cryoborolls
Parent material: local alluvium derived from eolian materials
Typical profile:

- 0 to 12 inches - brown silt loam
- 12 to 30 inches - yellowish brown loam
- 30 inches - hard basalt bedrock

Depth class: moderately deep (20 to 40 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to hard basalt bedrock: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 2

Rock Outcrop (15%)

Setting

Landform position: all positions

Vegetation

Present Vegetation

- lichens
- Dispersed communities that are common along fractures in the bedrock are dominated by an open shrub layer of mountain big sagebrush with an herbaceous layer of native or non-native grasses.

Rock

Name: Rock Outcrop

Features: Rock outcrops consist of exposed pressure ridges and nearly level flows of hard basalt bedrock.

Contrasting Inclusions (15%)

Inclusion 1

Slope: 1 to 12 percent

Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush with an herbaceous layer dominated by one or more of the following: bluebunch wheatgrass, prairie junegrass, timber oatgrass, other native or non-native grasses.

Soils: Soils like Vadnais that have 5 to 20 percent cobbles, stones or boulders in the surface layer and greater than 35 percent rock fragments in the subsoil.

Comment: This inclusion occurs in the North Antelope Flat area.

Inclusion 2

Slope: 1 to 12 percent

Landform position: all positions

Potential Natural Community

An ecotone of:

- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush with an herbaceous layer dominated by one or more of the following: bluebunch wheatgrass, prairie junegrass, timber oatgrass, other native or non-native grasses.
- Shrub dominated communities that have widely dispersed seedling through medium lodgepole pine.

Soils: Soils like Vadnais that are greater than 40 inches deep to hard bedrock.

Inclusion 3

Slope: 1 to 12 percent

Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush with an herbaceous layer dominated by one or more of the following: bluebunch wheatgrass, prairie junegrass, timber oatgrass, other native or non-native grasses.

Soils: Loamy soils that are less than 20 inches deep to hard bedrock.

Management and Limitations

- Shallow excavations are severely limited because of depth to rock.
- The use of heavy equipment for rangeland management is severely limited because of rock outcrops.

PICO/ARTRP4 Vadnais

- Off-road vehicle use is severely limited because the soils compact easily. The greatest potential for soil compaction occurs during periods of high soil moisture in late spring and early autumn.
- Unsurfaced roads and parking areas are severely limited because the soil has low strength.
- Mud holes and puddles commonly develop in depressions on unsurfaced roads during snowmelt periods and after large rain events.

Additional Information

- PICO/ARTRP4 Vadnais Ecotone description on page 404.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1050—Cinder Cones, 15 to 60 percent slopes

Summary

This ecological unit is on cinder cones in the cool portion of the forested zone. The landscape is characterized by low relief cones that support forests of mixed conifers. Closed canopy forests are common on moist north facing sideslopes and open canopy forests are common on dry south facing sideslopes. Cone remnants with one dominant aspect are represented in some areas. Small quarry pits are present.

Ecological Unit Setting

Subsection: Island Park
Landform: cinder cones
Elevations: 6300 to 7100 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

The vegetation and soil features of this ecological unit are diverse. Specific ecological types that repeat predictably across the unit were not identified.

Vegetation

Present Vegetation

Observed on north facing slopes:

- subalpine fir/blue huckleberry p.a., blue huckleberry phase
- subalpine fir/grouse whortleberry p.a., pinegrass phase
- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.

Observed on south facing sideslopes:

- lodgepole pine/pinegrass c.t.
- Douglas-fir/pinegrass community
- Douglas-fir/white spirea community
- Douglas-fir/whortleleaf snowberry community

Soils

Loamy soils that have a moderately acid to slightly acid reaction and are 20 to 40 inches deep to cinders were observed.
Parent material: local alluvium or colluvium derived from loess and cinders
Permeability: moderate
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 4.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none

Management and Limitations

- The diversity of this ecological unit requires project-specific investigation to determine the limitations for any given area.

1106—ABLA/PHMA5 Gany - PSME/BERE,SYOR2 Fritz association, 40 to 70 percent slopes

Summary

This ecological unit is on mountains in the warm portion of the forested zone (fig. 8). The landscape is characterized by very steep, high relief mountains which have moist north facing and dry south facing sideslopes. Commonly the north facing sideslopes support closed canopy forests of mixed conifers. The south facing sideslopes support open canopy forests of mixed conifers over a layer of curlleaf mountain mahogany with variable cover. Spur ridges and draws moderately dissect the sideslopes in dendritic and parallel patterns. Rock outcrops are common on south facing slopes. Large scale rock slides are common in some areas.

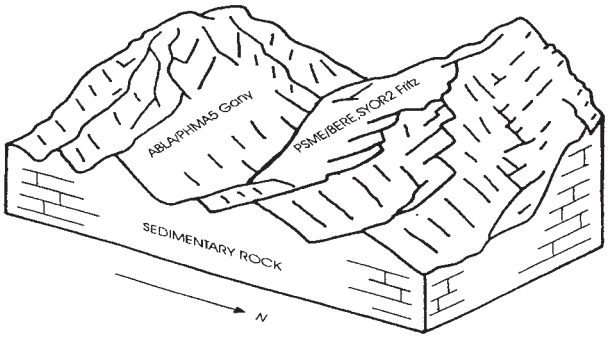


Figure 8. Block diagram of ecological unit 1106.

Ecological Unit Setting

Subsection: Big Hole Mountains and Teton Range
Landform: mountains
Elevations: 5200 to 8000 feet
Average annual precipitation: 22 inches
Average annual air temperature: 38 degrees F
Geology: sedimentary

Ecological Unit Composition

50 percent - ABLA/PHMA5 Gany Ecological Type
30 percent - PSME/BERE,SYOR2 Fritz Ecological Type
20 percent - contrasting inclusions

ABLA/PHMA5 Gany (50%)

Setting

Slopes: 40 to 70 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/mallow ninebark p.a.

Present Vegetation

- Douglas-fir/mallow ninebark community
- subalpine fir/mallow ninebark p.a.

Soils

Name: Gany series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Cryoborolls
Parent material: local alluvium or colluvium derived from limestone and loess
Typical profile:

- 2 to 0 inches: forest litter
- 0 to 8 inches: dark grayish brown gravelly silt loam
- 8 to 19 inches: brown extremely gravelly loam
- 19 to 62 inches: brown extremely gravelly loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 5.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 3

PSME/BERE, SYOR2 Fritz (30%)

Setting

Slopes: 40 to 70 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Communities that have a dispersed to open tree canopy dominated by Douglas-fir with an open to closed shrub layer dominated by curlleaf mountain mahogany. Other trees and shrubs present in these communities include: limber pine, Rocky Mountain juniper, bigtooth maple, whortleleaf snowberry and mountain big sagebrush.
- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase
- mountain big sagebrush/bluebunch wheatgrass community

Soils

Name: Fritz series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Parent material: local alluvium or colluvium derived from limestone and loess

Typical profile:

- 0 to 5 inches - brown gravelly silt loam
- 5 to 11 inches - brown gravelly silt loam
- 11 to 39 inches - light gray very gravelly loam
- 39 to 45 inches - white very cobbly sandy loam
- 45 inches - hard limestone bedrock

Depth class: deep (40 to 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.0 inches

AWC, surface to hard limestone bedrock: 4.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 45 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- curlleaf mountain mahogany/bluebunch wheatgrass p.a.

Present Vegetation

- Communities that have a dispersed to open tall shrub layer of curlleaf mountain mahogany with an herbaceous layer dominated by bluebunch wheatgrass, arrowleaf balsamroot or annual forbs.
- Herbaceous communities that are dominated by bluebunch wheatgrass.

Soils: Loamy soils that have carbonates and are less than 20 inches deep to hard bedrock.

Inclusion 2

Slope: 45 to 70 percent

Landform position: north facing shoulders, footslopes and draws

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation

- subalpine fir/Rocky Mountain maple p.a.
- Tall shrub communities dominated by Rocky Mountain maple or Greene mountainash.

Soils: Soils like Gany that are more moist.

Inclusion 3

Landform position: all positions

Present Vegetation

- lichens and mat rockspirea

Rock: Rock outcrops that consist of surface level exposures, irregular cliffs and fins or linear cliffs more than 100 feet in height.

Inclusion 4

Landform position: south facing sideslopes

Rock: Rubble Land that consists of angular pebbles or cobbles derived from limestone. Scree is commonly represented.

Management and Limitations

- This ecological unit has a high potential for avalanches. Avalanche chutes and runout areas occur in draws.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Revegetating cut and fill slopes is severely limited because of slope.

Additional Information

- ABLA/PHMA5 Gany Ecological Type description on page 274.
- PSME/BERE,SYOR2 Fritz Ecological Type description on page 434.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1110—ARTRP4/FEID Raynoldson, 1 to 15 percent slopes

Summary

This ecological unit is on fan remnants and stream terraces in the cool, moist portion of the shrub steppe zone (fig. 9). The landscape is characterized by undulating to concave slopes that support communities dominated by sagebrush or grasses. Low terrace escarpments and narrow, incised floodplains lightly dissect the landscape. Privately owned inholdings occur in some areas of this unit.

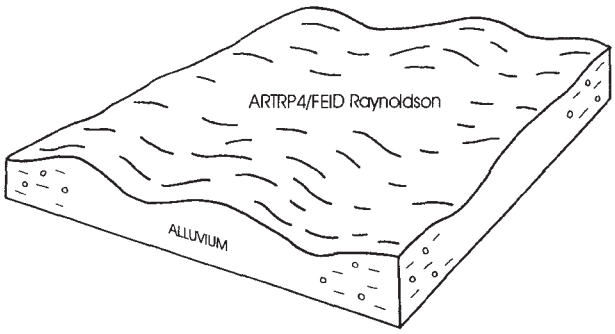


Figure 9. Block diagram of ecological unit 1110.

Ecological Unit Setting

Subsection: Big Hole Mountains, Caribou Range Mountains and Centennial Mountains
Landform: fan remnants and stream terraces
Elevations: 5000 to 7400 feet
Average annual precipitation: 20 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

85 percent - ARTRP4/FEID Raynoldson Ecological Type
15 percent - contrasting inclusions

ARTRP4/FEID Raynoldson (85%)

Setting

Slopes: 1 to 15 percent
Landform position: all positions

Vegetation

Potential Natural Community
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Rocky Mountain juniper.
- Herbaceous communities dominated by non-native grasses.

Soils

Name: Raynoldson series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Pachic Cryoborolls
Parent material: mixed alluvium
Typical profile:
- 0 to 4 inches - brown gravelly loam
- 4 to 16 inches - brown gravelly loam
- 16 to 29 inches - brown very gravelly loam
- 29 to 44 inches - pale brown extremely gravelly sandy loam
- 44 to 60 inches - variegated extremely gravelly loamy sand

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 1 to 15 percent
Landform position: all positions

Potential Natural Community

An ecotone of:
- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.
- quaking aspen/whortleleaf snowberry/pinegrass c.t.

- quaking aspen/Kentucky bluegrass c.t.
- mountain big sagebrush/Kentucky bluegrass community
- Herbaceous communities dominated by brome and orchardgrass.

Soils: Soils like Raynoldson that have less than 35 percent rock fragments in the subsoil.

Inclusion 2

Slope: 20 to 60 percent

Landform position: stream terrace escarpments

Potential Natural Community

- mountain big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of rabbitbrush with an herbaceous layer dominated by annual forbs.

Soils: Soils like Raynoldson that have a dark colored surface layer less than 16 inches thick.

Inclusion 3

Slope: 0 to 4 percent

Landform position: incised floodplains

Potential Natural Community

- Engelmann's spruce/fragrant bedstraw c.t.

Present Vegetation

- narrowleaf cottonwood/Kentucky bluegrass c.t.
- narrowleaf cottonwood/redosier dogwood c.t.

Soils: Frequently flooded soils that have a loamy surface layer 7 to 20 inches thick over a layer of stratified extremely gravelly loamy sand or sand texture.

Comment: The riparian communities represented by this inclusion commonly occur in narrow bands less than 40 feet in width.

Inclusion 4

Slope: 2 to 15 percent

Landform position: all positions

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils like Raynoldson that have a very gravelly clay loam or very gravelly sandy clay loam texture in the subsoil.

Management and Limitations

- Shallow excavations are severely limited because cutbanks cave.
- Pond reservoir areas and sanitary landfills are severely limited because of seepage.
- Off-road vehicle use is severely limited because the soils erode easily.

Additional Information

- ARTRP4/FEID Raynoldson Ecological Type description on page 358.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1112—ABLA/VAGL,PAMY Huckridge - PSME/OSCH Paleborolls complex, 4 to 35 percent slopes

Summary

This ecological unit is on unstable foothills in the warm portion of the forested zone (fig. 10). The topography is lightly to moderately dissected in a dendritic pattern by spur ridges, draws and shallow drainageways. Slopes are rolling to hilly. Forests of mixed conifers and quaking aspen are commonly supported. Mass movements are common.

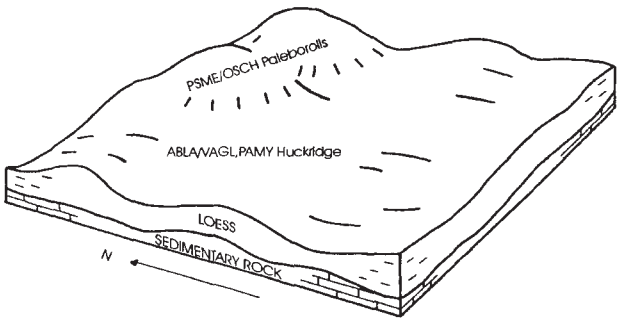


Figure 10. Block diagram of ecological unit 1112.

Ecological Unit Setting

Subsection: Big Hole Mountains and Caribou Range Mountains
Landform: foothills
Elevations: 5400 to 7400 feet
Average annual precipitation: 22 inches
Average annual air temperature: 39 degrees F
Geology: sedimentary

Ecological Unit Composition

60 percent - ABLA/VAGL,PAMY Huckridge Ecological Type
20 percent - PSME/OSCH Paleborolls Ecological Type
20 percent - contrasting inclusions

ABLA/VAGL,PAMY Huckridge (60%)

Setting

Slopes: 4 to 35 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Douglas-fir/pinegrass community
- Douglas-fir/common snowberry community
- lodgepole pine/common snowberry community
- Herbaceous communities dominated by pinegrass, elk sedge or non-native grasses.
- Douglas-fir/blue huckleberry community
- lodgepole pine/blue huckleberry c.t.

Soils

Name: Huckridge series
Taxonomic class: Fine-silty, mixed, superactive Vitrandic Paleboralfs
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 0 to 5 inches - light brownish gray silt loam
- 5 to 27 inches - very pale brown silt loam
- 27 to 48 inches - yellowish brown and very pale brown silt loam
- 48 to 59 inches - light yellowish brown silt loam
- 59 to 70 inches - very pale brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

PSME/OSCH Paleborolls (20%)

Setting

Slopes: 4 to 35 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen-Douglas-fir/pinegrass c.t.
- Douglas-fir/sweetcicely p.a.

Soils

Name: Paleborolls family

Taxonomic class: Fine-silty, mixed, superactive Cryic Paleborolls

Parent material: local alluvium derived from loess and volcanic ash

Typical profile:

- 0 to 14 inches - grayish brown silt loam
- 14 to 20 inches - pale brown silt loam
- 20 to 31 inches - light gray silt loam
- 31 to 70 inches - brown silty clay loam

Depth class: very deep (greater than 60 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 4.0 inches

AWC, surface to 60 inches: 12.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.32

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 35 percent

Landform position: all positions

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a tree canopy of Douglas-fir or quaking aspen over an herbaceous layer dominated by mesic forbs.

Soils: Soils like the Paleborolls that have a silty clay or clay texture in the subsoil or substratum.

Inclusion 2

Slope: 1 to 4 percent

Landform position: drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Loamy soils that are somewhat poorly or poorly drained.

Comment: The riparian communities represented by this inclusion commonly occupy narrow bands and stringers less than 40 feet in width.

Inclusion 3

Slope: 4 to 35 percent

Landform position: spur ridges and south facing shoulders

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Communities that have a shrub layer of common snowberry or whortleleaf snowberry with an herbaceous layer dominated by California brome, thickspike wheatgrass or non-native grasses.

Soils: Loamy soils that have a dark colored surface layer, 4 to 20 inches thick, over a loamy subsoil with 15 to 65 percent rock fragments.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Large slump-earth flows and small slumps have been observed. Pipes broken by soil movement have been reported in the Hoffman Summer Home Area.
- Activities severely limited by slope include: shallow excavations, pond reservoir areas, dwellings without basements, and the use of heavy equipment for woodland harvest.
- Septic tank absorption fields are severely limited because of slope and water percs slowly.
- Off-road vehicle use is severely limited because of slope, the soils erode easily and compact easily.

ABLA/VAGL,PAMY Huckridge

- Blue huckleberry loses vigor and dies when the forest canopy is opened. This response suggests that the ABLA/VAGL,PAMY Huckridge Ecological

Type is at the dry limit of the subalpine fir/blue huckleberry p.a., myrtle pachistima phase.

- A 1 to 2 inch thick compaction pan, beginning at surface level to depths of 12 inches, has been observed in some areas. The greatest potential for soil compaction occurs during periods of high soil moisture in late spring and early autumn.
- Foot and saddlestock trails are severely limited because the soils erode easily.
- The use of heavy equipment for woodland harvest is severely limited because the soils erode easily.
- Dust layers 2 to 8 inches thick have been observed in heavy traffic areas during late summer and early autumn. These dust layers may become saturated with water and erode during snowmelt periods.

Additional Information

- ABLA/VAGL,PAMY Huckridge Ecological Type description on page 298.
- PSME/OSCH Paleborolls Ecological Type description on page 452.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1123—ABLA/CARU,CARU Hopburn - PICO/ARTRP4 Vadnais - Rock Outcrop complex, 1 to 12 percent slopes

Summary

This ecological unit is on plains in a broad transitional area between the cool, moist portion of the shrub steppe zone and the cool portion of the forested zone (fig. 11). The landscape is characterized by undulating to rolling slopes that support communities dominated by conifers, quaking aspen or sagebrush. Surface drainage features are commonly absent.

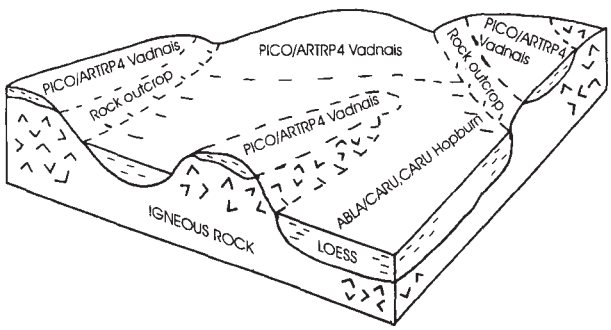


Figure 11. Block diagram for Ecological Unit 1123.

Ecological Unit Setting

Subsection: Island Park
Landform: plains
Elevations: 6300 to 6800 feet
Average annual precipitation: 26 inches
Average annual air temperature: 37 degrees F
Geology: igneous

Ecological Unit Composition

35 percent - ABLA/CARU,CARU Hopburn Ecological Type
35 percent - PICO/ARTRP4 Vadnais Ecotone
15 percent - Rock Outcrop
15 percent - contrasting inclusions

ABLA/CARU,CARU Hopburn (35%)

Setting

Slopes: 1 to 12 percent
Landform position: sideslopes and swales

Vegetation

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- quaking aspen-lodgepole pine/elk sedge c.t.

Soils

Name: Hopburn series
Taxonomic class: Fine-loamy, mixed, superactive Vitrandic Cryoboralfs
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 3 inches - dark grayish brown silt loam
- 3 to 21 inches - pale brown silt loam
- 21 to 45 inches - light yellowish brown loam
- 45 to 70 inches - light yellowish brown loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 10.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32
T factor: 5

PICO/ARTRP4 Vadnais (35%)

Setting

Slopes: 1 to 12 percent
Landform position: ridges and sideslopes

Vegetation

Potential Natural Community

An ecotone of:

- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- Communities that have an open tree canopy of lodgepole pine and quaking aspen over a shrub layer of mountain big sagebrush, antelope bitter-

brush and whortleleaf snowberry. An herbaceous layer is present in these communities. It is dominated by one or more of the following: bluebunch wheatgrass, prairie Junegrass, timber oatgrass, pinegrass, Idaho fescue or Kentucky bluegrass.

Soils

Name: Vadnais series

Taxonomic class: Fine-loamy, mixed, superactive Argic Pachic Cryoborolls

Parent material: local alluvium derived from eolian materials

Typical profile:

- 0 to 12 inches - brown silt loam
- 12 to 30 inches - yellowish brown loam
- 30 inches - hard basalt bedrock

Depth class: moderately deep (20 to 40 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 3.5 inches

AWC, surface to hard basalt bedrock: 5.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.43

T factor: 2

Rock Outcrop (15%)

Setting

Landform position: ridges and sideslopes

Vegetation

Present Vegetation

- lichens

Rock

Name: Rock Outcrop

Features: Rock outcrops consist of exposed pressure ridges and nearly level flows of hard basalt bedrock.

Contrasting Inclusions (15%)

Inclusion 1

Slope: 1 to 12 percent

Landform position: ridges

Potential Natural Community

An ecotone of:

- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- Communities that have a shrub layer of mountain big sagebrush or antelope bitterbrush with an herbaceous layer dominated by one or more of the following: prairie Junegrass, Kentucky bluegrass, Idaho fescue or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium lodgepole pine.

Soils: Soils that are less than 20 inches deep to hard bedrock (Spliten soils).

Inclusion 2

Slope: 1 to 12 percent

Landform position: sideslopes and swales

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- quaking aspen-lodgepole pine/elk sedge c.t.

Soils: Soils like Hopburn that are 20 to 40 inches deep to hard bedrock and have 15 to 40 percent rock fragments in the subsoil.

Management and Limitations

- Unsurfaced roads and parking areas are severely limited because the soils have low strength.
- Off-road vehicle use is severely limited because the soils compact easily. The greatest potential for soil compaction occurs during periods of high soil moisture in late spring and early autumn.
- Mud holes and puddles commonly develop in depressions on unsurfaced roads during snowmelt periods and after large rain events.

PICO/ARTRP4 Vadnais

- The use of heavy equipment for rangeland management is severely limited because of rock outcrops.
- Shallow excavations are severely limited because of depth to rock.

Additional Information

- ABLA/CARU,CARU Hopburn Ecological Type description on page 262.
- PICO/ARTRP4 Vadnais Ecotone description on page 404.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1125—ARNO4/AGSP Simeroi - ARTRP4/FEID Zeale complex, 4 to 20 percent slopes

Summary

This ecological unit is on east facing fan remnants in the shrub steppe zone (fig. 12). It occupies positions that are transitional between the warm, dry and the cool, moist portions of the shrub steppe zone. The landscape is characterized by concave slopes that support communities dominated by sagebrush. Slopes are lightly dissected by shallow draws and inset fans.

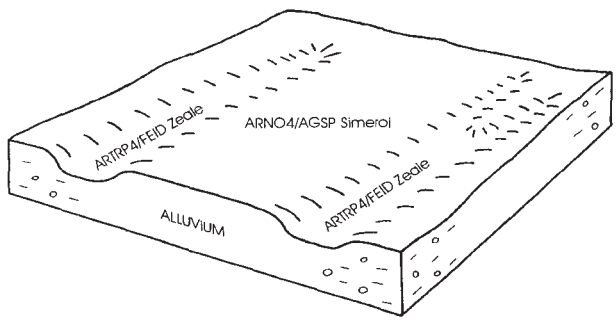


Figure 12. Block diagram of ecological unit 1125.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: fan remnants
Elevations: 5500 to 7000 feet
Average annual precipitation: 11 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

60 percent - ARNO4/AGSP Simeroi Ecological Type
25 percent - ARTRP4/FEID Zeale Ecological Type
15 percent - contrasting inclusions

ARNO4/AGSP Simeroi (60%)

Setting

Slopes: 4 to 20 percent
Landform position: summits

Vegetation

Potential Natural Community

- black sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- black sagebrush/bluebunch wheatgrass p.a.

Soils

Name: Simeroi series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Xeric Haplocalcids
Parent material: colluvium or local alluvium derived from limestone and loess
Typical profile:

- 0 to 3 inches - brown very gravelly silt loam
- 3 to 10 inches - pale brown very gravelly silt loam
- 10 to 60 inches - very pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

ARTRP4/FEID Zeale (25%)

Setting

Slopes: 4 to 20 percent
Landform position: draws

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have a shrub layer of spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils

Name: Zeale series
Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Parent material: alluvium derived from limestone and loess

Typical profile:

- 0 to 15 inches - dark grayish brown gravelly silt loam
- 15 to 60 inches - very pale brown very gravelly loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 6.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.24

T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 20 to 50 percent

Landform position: north facing sideslopes of incised drainageways

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils: Zeale soils

Inclusion 2

Slope: 20 to 50 percent

Landform position: south facing sideslopes of incised drainageways

Potential Natural Community

- mountain big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Soils like Zeale that are slightly more dry.

Inclusion 3

Slope: 4 to 8 percent

Landform position: summits

Potential Natural Community

- black sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- black sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Loamy soils that have carbonates and are 15 to 20 inches deep to a thin cemented pan.

Inclusion 4

Slope: 2 to 8 percent

Landform position: inset fans

Potential Natural Community

- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- basin big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of mountain big sagebrush or spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Soils like Simeroi that have an extremely gravelly loamy coarse sand or coarse sand texture in the subsoil.

Inclusion 5

Slope: 4 to 20 percent

Landform position: summits

Potential Natural Community

- mountain big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of rabbitbrush or gray low sagebrush with an herbaceous layer dominated by needleandthread, Sandberg bluegrass or prairie Junegrass.

Soils: Soils like Zeale that are slightly more dry and have abundant animal burrows.

Comment: This inclusion occurs as very subtle mounds that are 20 feet or less in diameter. These mounds form a polk-a-dot pattern across the ARNO4/AGSP Simeroi dominated summits.

Management and Limitations

- A blue phase of black sagebrush is common on this ecological unit. It is easily misidentified as gray low sagebrush.

ARNO4/AGSP Simeroi

- Pond reservoir areas are severely limited because of seepage.

Additional Information

- ARNO4/AGSP Simeroi Ecological Type description on page 343.
- ARTRP4/FEID Zeale Ecological Type description on page 361.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1126—ARNO4/AGSP Simeroi, 30 to 60 percent slopes

Summary

This ecological unit is on foothills in the warm, dry portion of the shrub steppe zone (fig. 13). The landscape is characterized by south facing sideslopes that support communities dominated by sagebrush. The slopes are lightly dissected by low spur ridges and shallow draws.

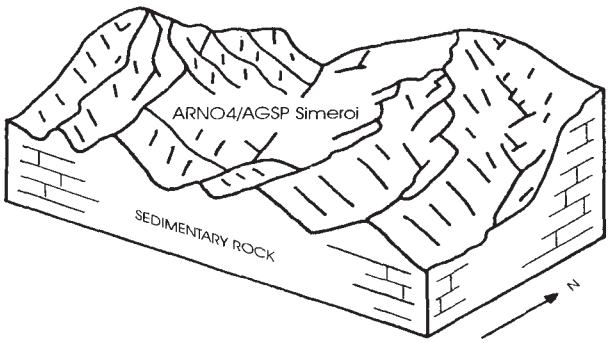


Figure 13. Block diagram of ecological unit 1126.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: foothills
Elevations: 5800 to 8800 feet
Average annual precipitation: 11 inches
Average annual air temperature: 39 degrees F
Geology: sedimentary

Ecological Unit Composition

85 percent - ARNO4/AGSP Simeroi Ecological Type
15 percent - contrasting inclusions

ARNO4/AGSP Simeroi (85%)

Setting

Slopes: 30 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community

- black sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- black sagebrush/bluebunch wheatgrass p.a.
- Communities that have an open, tall shrub layer of curlleaf mountain mahogany over an herbaceous layer dominated by bluebunch wheatgrass.
- Shrub communities dominated by a closed layer of curlleaf mountain mahogany over a depauperate herbaceous layer.

Soils

Name: Simeroi series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Xeric Haplocalcids
Parent material: colluvium or local alluvium derived from limestone and loess
Typical profile:

- 0 to 3 inches - brown very gravelly silt loam
- 3 to 10 inches - pale brown very gravelly silt loam
- 10 to 60 inches - very pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 30 to 50 percent
Landform position: north facing sideslopes of low spur ridges

Potential Natural Community

- Wyoming big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- Wyoming big sagebrush/bluebunch wheatgrass p.a.

Soils: Soils like Simeroi that are more moist.

Inclusion 2

Slope: 30 to 50 percent
Landform position: north facing sideslopes of incised drainageways

Potential Natural Community

- Douglas-fir/Idaho fescue p.a.

Present Vegetation

- Douglas-fir/Idaho fescue p.a.
- mountain big sagebrush/Idaho fescue community

Soils: Soils like Simeroi that are more moist and cool, and have a dark colored surface layer greater than 7 inches thick.

Inclusion 3

Landform position: all positions

Present Vegetation

- lichens and mat rockspirea

Rock: Rock outcrops that consist of surface level exposures to irregular cliffs.

Inclusion 4

Slope: 30 to 50 percent

Landform position: south facing sideslopes and footslopes of incised drainageways

Potential Natural Community

- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- Diverse communities that have a tree canopy or tall shrub layer of Rocky Mountain juniper, basin big sagebrush or curlleaf mountain mahogany with an herbaceous layer dominated by bluebunch wheatgrass or basin wild rye.

Soils: Loamy soils that have greater than 35 percent cobbles, stones or boulders in the surface and subsoil layers.

Comment: This inclusion is commonly associated with areas having remnant volcanic caps or outcrops of quartzite bedrock.

Inclusion 5

Slope: 30 to 50 percent

Landform position: south facing sideslopes

Potential Natural Community

- black sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- black sagebrush/bluebunch wheatgrass p.a.

Soils: Soils like Simeroi that are derived from quartzite and loess, and lack carbonates in the surface layer and upper subsoil.

Comment: The black sagebrush/bluebunch wheatgrass communities supported in this inclusion appear to be more drought tolerant than those of the ARNO4/AGSP Simeroi Ecological Type.

Management and Limitations

- This ecological unit occupies the more warm and dry positions of the Lemhi-Medicine Lodge subsection. The supported communities are characterized by having few species, low cover, and a high percentage of bare ground.
- Pond reservoir areas are severely limited because of seepage.

Additional Information

- ARNO4/AGSP Simeroi Ecological Type description on page 343.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1127—ARTRW8/ARARA Simeroi, 4 to 20 percent slopes

Summary

This ecological unit is on west facing fan remnants in the shrub steppe zone (fig. 14). The unit occupies positions that are transitional between the warm, dry and the cool, moist portions of the shrub steppe zone. The landscape is characterized by concave slopes that support communities dominated by sagebrush. Slopes are lightly dissected by shallow draws and incised drainageways.

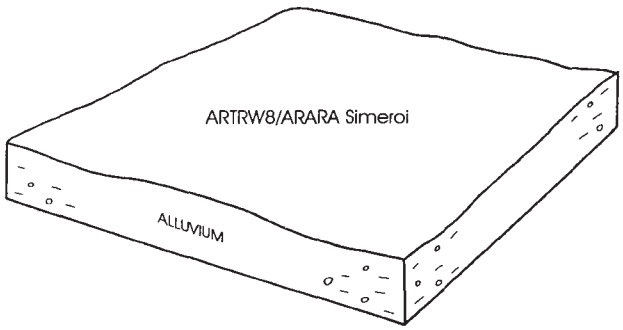


Figure 14. Block diagram of ecological unit 1127.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: fan remnants
Elevations: 6300 to 7400 feet
Average annual precipitation: 11 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

80 percent - ARTRW8/ARARA Simeroi Mosaic
20 percent - contrasting inclusions

ARTRW8/ARARA Simeroi (80%)

Setting

Slopes: 4 to 20 percent
Landform position: summits

Vegetation

Potential Natural Community

A mosaic of:

- Wyoming big sagebrush/bluebunch wheatgrass p.a.
- gray low sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

A mosaic of:

- Wyoming big sagebrush/bluebunch wheatgrass p.a.
- gray low sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush or threetip sagebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils

Name: Simeroi series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Xeric Haplocalcids
Parent material: alluvium derived from limestone and loess
Typical profile:

- 0 to 2 inches - grayish brown gravelly silt loam
- 2 to 8 inches - brown very gravelly loam
- 8 to 60 inches - light gray extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 3.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 20 to 50 percent
Landform position: north facing sideslopes of incised drainageways

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils: Soils like Simeroi that are more moist and have a dark colored surface layer greater than 7 inches thick (Zeale soils).

Inclusion 2

Slope: 20 to 50 percent

Landform position: south facing sideslopes of incised drainageways

Potential Natural Community

- Wyoming big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- Wyoming big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Simeroi soils

Inclusion 3

Slope: 4 to 8 percent

Landform position: summits

Potential Natural Community

- gray low sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- gray low sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Loamy soils that have carbonates and are 15 to 20 inches deep to a thin cemented pan.

Inclusion 4

Slope: 2 to 8 percent

Landform position: inset fans

Potential Natural Community

- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- basin big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of Wyoming big sagebrush or spineless horsebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Soils like Simeroi that have stratified extremely gravelly loamy coarse sand to coarse sand texture in the subsoil.

Management and Limitations

- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- Off-road vehicle use is severely limited because the soils erode easily and compact easily.
- Revegetating cut and fill slopes is severely limited because the soils are droughty.
- The use of heavy equipment for rangeland management is severely limited because of slope.

Additional Information

- ARTRW8/ARARA Simeroi Mosaic description on page 373.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1128—ARTRP4/FEID Monida - ARTRP4/FEID Zeale complex, 4 to 20 percent slopes

Summary

This ecological unit is on fan remnants, foothills and moraines in the cool, moist portion of the shrub steppe zone (fig. 15). The landscape is characterized by rolling to hilly slopes that support communities dominated by sagebrush (Photo 1).

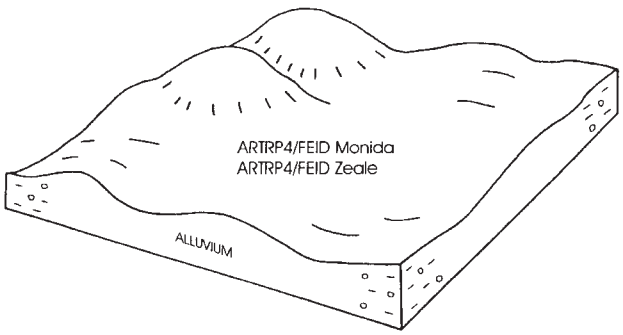


Figure 15. Block diagram of ecological unit 1128.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: fan remnants, foothills and moraines
Elevations: 6800 to 8000 feet
Average annual precipitation: 16 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

40 percent - ARTRP4/FEID Monida Ecological Type
40 percent - ARTRP4/FEID Zeale Ecological Type
20 percent - contrasting inclusions

ARTRP4/FEID Monida (40%)

Setting

Slopes: 4 to 20 percent
Landform position: all positions

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have an open shrub layer of spineless horsebrush with an herbaceous layer dominated by Idaho fescue or bluebunch wheatgrass.

Soils

Name: Monida series
Taxonomic class: Fine-loamy, mixed, superactive Argic Cryoborolls
Parent material: local alluvium or colluvium derived from calcareous siltstone, sandstone and loess
Typical profile:

- 0 to 7 inches - dark grayish brown silt loam
- 7 to 27 inches - grayish brown silty clay loam
- 27 to 38 inches - pale yellow loam
- 38 to 60 inches - pale yellow loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 10.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32
T factor: 5

ARTRP4/FEID Zeale (40%)

Setting

Slopes: 4 to 20 percent
Landform position: all positions

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have an open shrub layer of spineless horsebrush with an herbaceous layer dominated by Idaho fescue or bluebunch wheatgrass.

Soils

Name: Zeale series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Parent material: alluvium derived from limestone and loess

Typical profile:

- 0 to 15 inches - dark grayish brown gravelly silt loam
- 15 to 60 inches - very pale brown very gravelly loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 6.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.24

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 20 percent

Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils: Soils like Monida that have greater than 35 percent rock fragments in the subsoil and substratum (Cryoborolls and Zeebar soils).

Inclusion 2

Slope: 4 to 20 percent

Landform position: all positions

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils that are 20 to 40 inches deep to a clayey substratum.

Inclusion 3

Slope: 2 to 8 percent

Landform position: windswept summits and ridges

Potential Natural Community

- gray low sagebrush/Idaho fescue p.a.

Present Vegetation

- gray low sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of gray low sagebrush or spineless horsebrush with an herbaceous layer dominated by Sandberg bluegrass or prairie Junegrass.

Soils: Soils like Zeale that are slightly more dry.

Inclusion 4

Slope: 4 to 50 percent

Landform position: north facing sideslopes of draws and incised drainageways

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils like Zeale and Monida that are more moist and have a dark colored surface layer greater than 16 inches thick.

Inclusion 5

Slope: 30 to 50 percent

Landform position: south facing sideslopes of draws and incised drainageways

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass communities

Soils: Zeale soils

Management and Limitations

- Off-road vehicle use is severely limited because the soils erode easily.
- The use of heavy equipment for rangeland management is severely limited because of slope.

ARTRP4/FEID Monida

- Unsurfaced roads and parking areas are severely limited because the soils have low strength.

ARTRP4/FEID Zeale

- Fencing is severely limited because the soils are too rocky.

Additional Information

- ARTRP4/FEID Monida Ecological Type description on page 352.
- ARTRP4/FEID Zeale Ecological Type description on page 361.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

Photo 1.This view between Fritz Creek and Divide Creek is a common landscape in the western portion of the inventory area. Ecological unit 1128 ARTRP4/FEID Monida-ARTRP4/FEID Zeale complex, 4 to 20 percent slopes is in the foreground. Ecological unit 1133 PSME/ARTRV Meegero-ARTRP4/FEID Monida complex, 20 to 50 percent slopes is in the middle of the photo. Ecological unit 1129 PIFL2/LEKI2 Fritz-PSME/JUCO6 Gany association, 40 to 70 percent slopes is in the background.

1129—PIFL2/LEKI2 Fritz - PSME/JUCO6 Gany association, 40 to 70 percent slopes

Summary

This ecological unit is on mountains in the dry portion of the forested zone (fig. 16). The landscape is characterized by very steep, high relief mountains that have cold north facing and warm south facing sideslopes. The north facing sideslopes commonly support closed canopy forests of mixed conifers. The south facing sideslopes support open canopy forests of limberpine over a layer of curlleaf mountain mahogany or sagebrush with variable cover. Spur ridges and draws moderately dissect the sideslopes in dendritic and parallel patterns. Rock outcrops are common on south facing slopes.

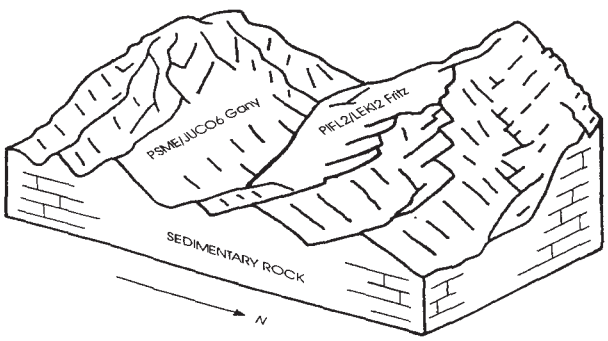


Figure 16. Block diagram of ecological unit 1129.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: mountains
Elevations: 7400 to 9800 feet
Average annual precipitation: 22 inches
Average annual air temperature: 37 degrees F
Geology: sedimentary

Ecological Unit Composition

40 percent - PIFL2/LEKI2 Fritz Ecological Type
40 percent - PSME/JUCO6 Gany Ecological Type
20 percent - contrasting inclusions

PIFL2/LEKI2 Fritz (40%)

Setting

Slopes: 40 to 70 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- limber pine/spike fescue p.a.

Present Vegetation

- limber pine/spike fescue p.a.
- limber pine/curlleaf mountain mahogany community
- mountain big sagebrush/bluebunch wheatgrass community
- Shrub communities dominated by a closed layer of curlleaf mountain mahogany over a depauperate herbaceous layer.

Soils

Name: Fritz series
Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls
Parent material: local alluvium or colluvium derived from limestone and loess
Typical profile:

- 0 to 4 inches - grayish brown very gravelly loam
- 4 to 12 inches - brown very gravelly loam
- 12 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 3.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.05
T factor: 5

PSME/JUCO6 Gany (40%)

Setting

Slopes: 40 to 70 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/common juniper p.a.

Present Vegetation

- Douglas-fir/common juniper p.a.

- Douglas-fir/curlleaf mountain mahogany community

Soils

Name: Gany series

Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Cryoborolls

Parent material: local alluvium or colluvium derived from limestone and loess

Typical profile:

- 2 to 0 inches - forest litter
- 0 to 9 inches - dark grayish brown extremely gravelly silt loam
- 9 to 33 inches - pale brown extremely gravelly loam
- 33 to 60 inches - light brownish gray extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 1.5 inches

AWC, surface to 60 inches: 5.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.05

T factor: 2

Contrasting Inclusions (20%)

Inclusion 1

Slope: 40 to 70 percent

Landform position: north facing footslopes of incised canyons and north facing sideslopes near the upper timberline

Potential Natural Community

- Engelmann's spruce/common juniper p.a.

Present Vegetation

- Engelmann's spruce/common juniper p.a.

Soils: Soils like Gany that are more moist and cool.

Comment: This inclusion progressively increases in extent from south to north.

Inclusion 2

Landform position: all positions

Present Vegetation

- lichens and mat rockspirea

Rock: Rock outcrops that consist of surface level exposures, irregular cliffs and fins or linear cliffs more than 100 feet in height.

Comment: Rock outcrops have the highest occurrence and greatest extent on south facing sideslopes.

Inclusion 3

Landform position: south facing sideslopes

Rock: Rubble land that consists of angular pebbles or cobbles derived from limestone. Scree is commonly represented.

Management and Limitations

- This ecological unit has a high potential for avalanches. Avalanche chutes and runout areas are common in draws.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Revegetating cut and fill slopes is severely limited because of slope.
- Curlleaf mountain mahogany is suggested as a seral species in this ecological unit. Specific characteristics of community composition or landscape position have been difficult to discern. Minimal reproduction was observed in the Birch Creek and Medicine Lodge Creek drainages. Attempts at stimulating mahogany reproduction have had limited success, suggesting the present stands are decadent and likely seral to other communities. Specific conditions needed for establishing seedlings are not clearly understood.
- Limited data collected in Indian Head Canyon and Coal Kiln Canyon suggests curlleaf mountain mahogany age varies from 40 to 100 years. The age of the supporting communities correlates roughly with the beginning of wild fire suppression and disturbance associated with mining and milling activities during the late 1800's.
- Closed, even-aged stands of curlleaf mountain mahogany are somewhat resistant to fire as a result of scattered fuels in the undergrowth.

Additional Information

- PIFL2/LEKI2 Fritz Ecological Type description on page 416.
- PSME/JUCO6 Gany Ecological Type description on page 446.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1130—Alpine Graminoid Fritz, 4 to 30 percent slopes

Summary

This ecological unit is on windswept mountain summits in the alpine zone (fig. 17). The landscape is characterized by convex summits with patterned ground that supports communities dominated by grasses and sedges.

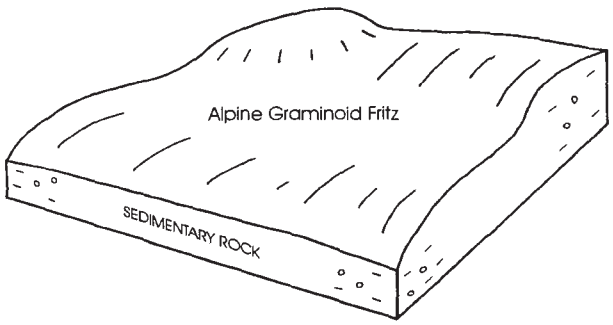


Figure 17. Block diagram of ecological unit 1130.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: mountains
Elevations: 8400 to 11,000 feet
Average annual precipitation: 22 inches
Average annual air temperature: 37 degrees F
Geology: sedimentary

Ecological Unit Composition

85 percent - Alpine Graminoid Fritz Ecological Type
15 percent - contrasting inclusions

Alpine Graminoid Fritz (85%)

Setting

Slopes: 4 to 30 percent
Landform position: all positions

Vegetation

Potential Natural Community
- alpine grass and sedge communities

Present Vegetation
- Herbaceous communities that are dominated by short (less than 5 inches), sod-forming grasses and sedges. Species include: rock sedge, blackroot sedge, timberline bluegrass, Cusick bluegrass or Idaho fescue.

Soils

Name: Fritz series
Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls
Parent material: local alluvium and residuum derived from loess and limestone
Typical profile:
- 0 to 3 inches - dark grayish brown gravelly silt loam
- 3 to 12 inches - brown very gravelly silt loam
- 12 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 5

Contrasting Inclusions

Inclusion 1

Landform position: all positions
Present Vegetation
- lichens and mat rockspirea

Rock: Rock outcrops that consist of surface level exposures.

Inclusion 2

Slope: 4 to 15 percent
Landform position: ridges
Potential Natural Community
- alpine grass and sedge communities

Present Vegetation
- Herbaceous communities dominated by short (less than 5 inches), sod forming grasses and sedges. Species include: rock sedge, blackroot sedge, timberline bluegrass, Cusick bluegrass and Idaho fescue.

Soils: Soils like Fritz that are more droughty and are 10 to 40 inches deep to hard bedrock.

Inclusion 3

Slope: 20 to 40 percent

Landform position: south facing sideslopes in the lower elevation range of the unit

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils: Soils like Fritz that have a dark colored surface layer greater than 16 inches thick (Meegero soils).

Inclusion 4

Slope: 15 to 40 percent

Landform position: north facing sideslopes in the lower elevation range of the unit

Potential Natural Community

- limber pine/Idaho fescue p.a.

Present Vegetation

- limber pine/Idaho fescue p.a.

Soils: Soils like Fritz that are more moist and cool.

Inclusion 5

Slope: 30 to 50 percent

Landform position: short sideslopes in the upper elevation range of the unit

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Communities dominated by an open, low shrub and herbaceous layer. One or more of the following species were observed in these communities: Hayden's clover, smooth larkspur, Nuttall's sandwort, Gordon's ivesia, rock sedge, Sandberg bluegrass, Michaux's sagebrush, common twinpod, Cusick's giant hyssop, gooseberry currant, and green rabbitbrush. South facing slopes support species with more drought tolerance and communities with less total cover than north facing slopes.

Soils: Soils like Fritz that are more droughty and lack a dark colored surface layer (Cryochrepts, loamy-skeletal soils).

Management and Limitations

- Fencing is severely limited because the soils are too rocky.
- Off-road vehicle use is severely limited because the soils erode easily.
- Pond reservoir areas are severely limited because of seepage.
- Revegetating cut and fill slopes is limited because of short growing seasons, episodic reproductive seasons and rocky, droughty soils.

Additional Information

- Alpine Graminoid Fritz Ecological Type description on page 338.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1131—ARARA/FEID Mountainboy, 2 to 8 percent slopes

Summary

This ecological unit is on fan remnants in the cool, moist portion of the shrub steppe zone (fig. 18). The landscape is characterized by planar, windswept slopes that support communities dominated by sagebrush.

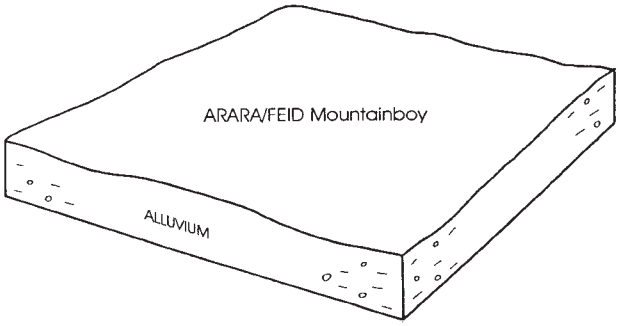


Figure 18. Block diagram of ecological unit 1131.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: fan remnants
Elevations: 7350 to 7700 feet
Average annual precipitation: 14 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

90 percent - ARARA/FEID Mountainboy Ecological Type
10 percent - contrasting inclusions

ARARA/FEID Mountainboy (90%)

Setting

Slopes: 2 to 8 percent
Landform position: all positions

Vegetation

Potential Natural Community

- gray low sagebrush/Idaho fescue p.a.

Present Vegetation

- gray low sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of gray low sagebrush with an herbaceous layer dominated by Sandberg bluegrass, bluebunch wheatgrass or prairie Junegrass.

Soils

Name: Mountainboy series
Taxonomic class: Loamy-skeletal, carbonatic, shallow Duric Cryoborolls
Parent material: alluvium derived from limestone and loess
Typical profile:

- 0 to 6 inches - brown gravelly silt loam
- 6 to 11 inches - brown gravelly loam
- 11 to 16 inches - light gray very gravelly loam
- 16 to 19 inches - light gray weakly cemented extremely gravelly coarse sandy loam
- 19 to 20 inches - light gray strongly cemented duripan
- 20 to 60 inches - variegated extremely gravelly loamy coarse sand

Depth class: shallow (15 to 20 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 2.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 2

Contrasting Inclusions (10%)

Inclusion 1

Slope: 2 to 8 percent
Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- Communities that have a shrub layer of rabbitbrush or gray low sagebrush with an herbaceous layer dominated by needleandthread, Sandberg bluegrass or prairie Junegrass.

Soils: Loamy soils which are greater than 60 inches deep and have carbonates and abundant animal burrows.

Comment: This inclusion occurs as very subtle mounds that are about 20 feet in diameter. These

mounds form a polk-a-dot pattern across the landscape. The early seral stage communities supported on these mounds are associated with persistent rodent activity.

Management and Limitations

- Shallow excavations are severely limited because of a cemented pan and cutbanks cave.
- Pond reservoir areas are severely limited because of seepage.
- Revegetating cut and fill slopes is severely limited because of depth to rock and a cemented pan.
- Off-road vehicle use is severely limited because of depth to rock and the soils compact easily.
- Unsurfaced roads and parking areas are severely limited because of depth to rock.

Additional Information

- ARARA/FEID Mountainboy Ecological Type description on page 340.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1133—PSME/ARTRV Meegero - ARTRP4/FEID Monida complex, 20 to 50 percent slopes

Summary

This ecological unit is on foothills and mountains in a broad transitional area between the cool, moist portion of the shrub steppe zone and the dry portion of the forested zone (fig. 19). The landscape is characterized by steep sideslopes that support communities dominated by sagebrush with widely dispersed conifers. Slopes are lightly to moderately dissected by shallow draws and low spur ridges. North facing sideslopes are commonly represented at the lower elevation range of the unit. Landscape positions shift to south facing sideslopes at the upper elevation range of the unit. Ground, lateral and recessional moraines in mountain valleys are represented in some areas. Mass movements are present in some areas.

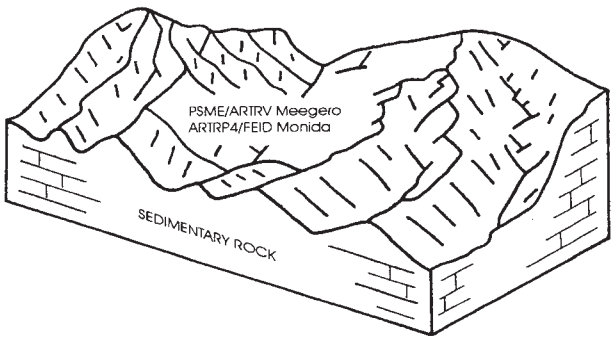


Figure 19. Block diagram of ecological unit 1133.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: foothills, moraines and mountains
Elevations: 6700 to 9600 feet
Average annual precipitation: 18 inches
Average annual air temperature: 37 degrees F
Geology: sedimentary

Ecological Unit Composition

65 percent - PSME/ARTRV Meegero Ecotone
15 percent - ARTRP4/FEID Monida Ecological Type
20 percent - contrasting inclusions

PSME/ARTRV Meegero (65%)

Setting

Slopes: 20 to 50 percent
Landform position: all positions

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.
- Douglas-fir/whortleleaf snowberry p.a.

Soils

Name: Meegero series
Taxonomic class: Loamy-skeletal, carbonatic Calcic Pachic Cryoborolls
Parent material: local alluvium or colluvium derived from limestone and loess
Typical profile:

- 0 to 6 inches - dark grayish brown loam
- 6 to 18 inches - dark grayish brown gravelly loam
- 18 to 24 inches - light brownish gray extremely gravelly loam
- 24 to 60 inches - light gray extremely cobbly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 5.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 2

ARTRP4/FEID Monida (15%)

Setting

Slopes: 20 to 40 percent

Landform position: all positions

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Herbaceous communities dominated by Idaho fescue.

Soils

Name: Monida series

Taxonomic class: Fine-loamy, mixed, superactive Argic Cryoborolls

Parent material: local alluvium or colluvium derived from calcareous siltstone, sandstone and loess

Typical profile:

- 0 to 7 inches - dark grayish brown silt loam
- 7 to 27 inches - grayish brown silty clay loam
- 27 to 38 inches - pale yellow loam
- 38 to 60 inches - pale yellow loam

Depth class: very deep (greater than 60 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 4.0 inches

AWC, surface to 60 inches: 10.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.32

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 30 to 50 percent

Landform position: south facing sideslopes

Potential Natural Community

- mountain big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass p.a.

Soils: Soils like Meegero that are slightly more dry and have a dark colored surface layer less than 16 inches thick (Zeale soils).

Inclusion 2

Landform position: spur ridges and south facing sideslopes

Present Vegetation

- lichens and mat rockspirea

Rock: Rock outcrops that consist of surface level exposures.

Inclusion 3

Slope: 20 to 50 percent

Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Herbaceous communities dominated by Idaho fescue.

Soils: Soils like Monida that have greater than 35 percent rock fragments in the subsoil.

Inclusion 4

Slope: 4 to 30 percent

Landform position: draws and drainageways

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- Herbaceous communities dominated by native or non-native grasses or mesic forbs.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils like Meegero that have less than 35 percent rock fragments in the subsoil.

Management and Limitations

- The slopes of this ecological unit have a moderate potential for mass movement. Small slump-earth flows occur in narrow bands throughout the unit. These failures may be associated with a fault zone or narrow band of fine textured marine sediments. Many management activities are limited in these areas because of slippage.
- The use of heavy equipment for rangeland management is severely limited because of slope.
- Off-road vehicle use is severely limited because the soils erode easily.

PSME/ARTRV Meegero

- The potential natural community of this ecological type may be considered from either a rangeland

or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

- Revegetating cut and fill slopes is severely limited because of slope.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

Additional Information

- PSME/ARTRV Meegero Ecotone description on page 422.
- ARTRP4/FEID Monida Ecological Type description on page 352.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1140—ABLA/THOC Nearl, 8 to 20 percent slopes

Summary

This ecological unit is on unstable mountains in the cool portion of the forested zone (fig. 20). The landscape is characterized by large scale, slump-earth flows with rolling to hilly slopes that support forests of mixed conifers and quaking aspen. The forest canopy cover is variable. Mass movements, scarps, discontinuous ridges, knolls, basins, seeps and springs are common.

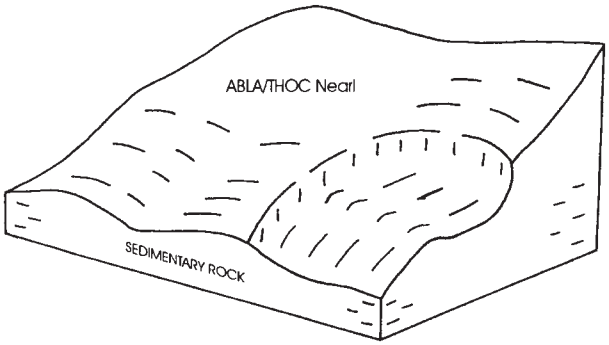


Figure 20. Block diagram of ecological unit 1140.

Ecological Unit Setting

Subsection: Big Hole Mountains, Caribou Range Mountains, Centennial Mountains and Teton Range
Landform: mountains
Elevations: 6600 to 8000 feet
Average annual precipitation: 30 inches
Average annual air temperature: 33 degrees F
Geology: sedimentary

Ecological Unit Composition

80 percent - ABLA/THOC Nearl Ecological Type
20 percent - contrasting inclusions

ABLA/THOC Nearl (80%)

Setting

Slopes: 8 to 20 percent
Landform position: all positions

Vegetation

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a tree canopy of Douglas-fir or quaking aspen with an herbaceous layer dominated by one or more of the following: western meadowrue, western sweetroot, Engelmann's aster, heartleaf arnica, cutleaf balsamroot or sticky geranium.

Soils

Name: Nearl series
Taxonomic class: Fine, smectitic Vertic Cryoborolls
Parent material: local alluvium derived from mixed sources over residuum from shale
Typical profile:

- 2 to 0 inches - forest litter
- 0 to 4 inches - dark grayish brown loam
- 4 to 10 inches - dark grayish brown clay loam
- 10 to 21 inches - light yellowish brown cobbly clay loam
- 21 to 60 inches - yellowish brown clay

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 10.0 inches
Drainage class: moderately well drained
Water table: 12 to 30 inches
Flooding hazard: none
Kw factor: 0.24
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 15 to 40 percent
Landform position: discontinuous ridges and knolls

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- subalpine fir/pinegrass p.a., pinegrass phase
- Douglas-fir/pinegrass community
- Douglas-fir/whortleleaf snowberry community

Soils: Well drained soils that have a gravelly loam to extremely cobbly sandy loam texture to depths of 60 inches or more (Fitzwil and Rhylow soils).

Inclusion 2

Slope: 20 to 40 percent

Landform position: short scarps and sideslopes of drainageways

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a tree canopy of Douglas-fir or quaking aspen with an herbaceous layer dominated by mesic forbs.

Soils: Soils like Nearl that lack a seasonal water table (Jumpstart soils).

Inclusion 3

Slope: 1 to 8 percent

Landform position: basins, bowls, draws and bottoms of drainageways

Potential Natural Community

- Engelmann's spruce/field horsetail c.t.

Present Vegetation

- Herbaceous communities dominated by mesic forbs.
- Engelmann's spruce/field horsetail p.a.

Soils: Clayey soils that are somewhat poorly or poorly drained.

Comment: This inclusion is commonly associated with seeps or springs. Elk wallows are common in these areas.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. The unit commonly occurs on the main body of large slump-earth flows.
- There is a perched water table from June through July. It occurs during and shortly after peak snowmelt periods and after heavy rains of several days duration.
- Shallow excavations are severely limited because of wetness.
- Fencing is severely limited because the soils have a high shrink-swell potential.
- Revegetating cut and fill slopes is severely limited because the soils are too clayey.
- Dwellings without basements, unsurfaced roads and parking areas are severely limited because of wetness and the soils have a high shrink-swell potential.

Additional Information

- ABLA/THOC Nearl Ecological Type description on page 295.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1144—ABLA/SPBE2 Koffgo, unstable, 15 to 60 percent slopes

Summary

This ecological unit is on unstable mountains in the cool portion of the forested zone (fig. 21). The landscape is characterized by large scale slump-earth flows on north facing sideslopes that support closed canopy forests. Slopes are short and complex. They are dissected by scarps, discontinuous ridges, basins and V-shaped drainageways. Mass movements are common.

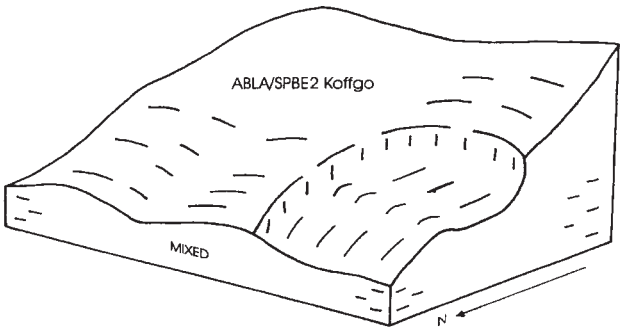


Figure 21. Block diagram of ecological unit 1144.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: mountains
Elevations: 7000 to 8400 feet
Average annual precipitation: 27 inches
Average annual air temperature: 34 degrees F
Geology: mixed

Ecological Unit Composition

80 percent - ABLA/SPBE2 Koffgo Ecological Type
20 percent - contrasting inclusions

ABLA/SPBE2 Koffgo (80%)

Setting

Slopes: 15 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community
- subalpine fir/white spirea p.a.

Present Vegetation
- subalpine fir/white spirea p.a.
- Douglas-fir/white spirea community
- Communities that have a tree canopy of Douglas-fir with a depauperate understory.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:
- 2 to 0 inches - forest litter
- 0 to 8 inches - brown gravelly loam
- 8 to 25 inches - light brownish gray extremely gravelly sandy loam
- 25 to 45 inches - pale brown extremely cobbly sandy loam
- 45 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 2.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 15 to 60 percent
Landform position: south facing sideslopes

Potential Natural Community
- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation
- Douglas-fir/pinegrass community

Soils: Soils like Koffgo that have a dark colored surface layer greater than 10 inches thick (Rhylow soils).

Inclusion 2

Slope: 45 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Soils: Soils like Koffgo that have a neutral reaction (pH) in the surface layer and subsoil.

Inclusion 3

Slope: 35 to 60 percent

Landform position: all positions

Potential Natural Community

- Douglas-fir/white spirea p.a., pinegrass phase

Present Vegetation

- lodgepole pine/white spirea c.t.

Soils: Somewhat excessively drained soils that are derived from tephra (Vitricryand soils).

Inclusion 4

Slope: 15 to 60 percent

Landform position: all positions

Potential Natural Community

- subalpine fir/white spirea p.a.

Present Vegetation

- subalpine fir/white spirea p.a.
- Douglas-fir/white spirea community
- Communities that have a tree canopy of Douglas-fir with a depauperate understory.

Soils: Soils that are less than 20 inches deep to a clayey substratum.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. The unit is on large scale slump-earth flows.
- Shallow excavations are severely limited because of large stones.
- Pond reservoir areas are severely limited because of seepage and slope.
- Unsurfaced roads and parking areas are severely limited because of slope.
- Revegetating cut and fill slopes is severely limited because of slope and the soils are too stony.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/SPBE2 Koffgo Ecological Type description on page 280.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1145—ARTRP4/FEID Monida - ARTRP4/FEID Zeebar complex, 4 to 30 percent slopes

Summary

This ecological unit is on unstable fan remnants in the cool, moist portion of the shrub steppe zone (fig. 22). The landscape is characterized by strongly dissected fan remnants that support communities dominated by sagebrush. Both planar summits and rolling to hilly drainageway sideslopes are represented. Mass movements are common in the drainageways. Seeps, springs and V-shaped stream channels are common.

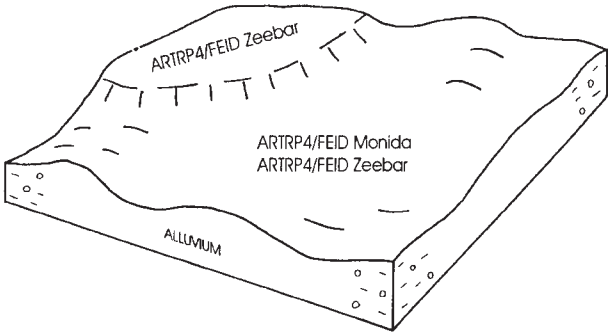


Figure 22. Block diagram of ecological unit 1145.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: fan remnants
Elevations: 6000 to 8000 feet
Average annual precipitation: 18 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

45 percent - ARTRP4/FEID Monida Ecological Type
30 percent - ARTRP4/FEID Zeebar Ecological Type
25 percent - contrasting inclusions

ARTRP4/FEID Monida (45%)

Setting

Slopes: 4 to 30 percent
Landform position: sideslopes

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils

Name: Monida series
Taxonomic class: Fine-loamy, mixed, superactive Argic Cryoborolls
Parent material: local alluvium or colluvium derived from calcareous siltstone, sandstone and loess
Typical profile:

- 0 to 7 inches - dark grayish brown silt loam
- 7 to 27 inches - grayish brown silty clay loam
- 27 to 38 inches - pale yellow loam
- 38 to 60 inches - pale yellow loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 10.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32
T factor: 5

ARTRP4/FEID Zeebar (30%)

Setting

Slopes: 4 to 30 percent
Landform position: summits and sideslopes

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils

Name: Zeebar series

Taxonomic class: Loamy-skeletal, mixed, superactive Argic Cryoborolls
Parent material: local alluvium or colluvium derived from quartzite conglomerate and loess
Typical profile:
- 0 to 3 inches - dark grayish brown gravelly loam
- 3 to 13 inches - dark grayish brown gravelly loam
- 13 to 27 inches - yellowish brown very gravelly sandy clay loam
- 27 to 49 inches - yellowish brown extremely gravelly sandy clay loam
- 49 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

Contrasting Inclusions (25%)

Inclusion 1

Slope: 4 to 8 percent
Landform position: bottom of drainageways

Potential Natural Community
- willow/grass and sedge dominated communities

Present Vegetation
- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Soils that are somewhat poorly or poorly drained.

Comment: This inclusion is commonly associated with small seeps and intermittent streams. The riparian zone is commonly less than 40 feet in width.

Inclusion 2

Slope: 4 to 20 percent
Landform position: bowls, footslopes and north facing sideslopes

Potential Natural Community
An ecotone of:
- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen whortleleaf snowberry/Kentucky bluegrass c.t.
- quaking aspen/pinegrass c.t.
- mountain big sagebrush/Idaho fescue p.a.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils like Zeebar and Monida that are more moist and have a dark colored surface layer greater than 16 inches thick.

Inclusion 3

Slope: 15 to 30 percent
Landform position: ridges and south facing shoulders

Potential Natural Community
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Droughty soils that have an extremely gravelly or cobbly loam texture in the surface layer and subsoil.

Inclusion 4

Slope: 4 to 30 percent
Landform position: spur ridges

Potential Natural Community
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Soils like Monida that are 20 to 40 inches deep to soft bedrock.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Slump-earth flows and small slumps are common in the drainageways.
- Shallow excavations and dwellings without basements are severely limited because of slope.

ARTRP4/FEID Zeebar

- Fencing is severely limited because the soils are too rocky.

Additional Information

- ARTRP4/FEID Monida Ecological Type description on page 352.
- ARTRP4/FEID Zeebar Ecological Type description on page 364.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1146—ARTRP4/FEID Zeebar, 4 to 20 percent slopes

Summary

This ecological unit is on fan remnants in the cool, moist portion of the shrub steppe zone (fig. 23). The landscape is characterized by planar or concave slopes that support communities dominated by sagebrush. Intermittent streams are common in some areas.

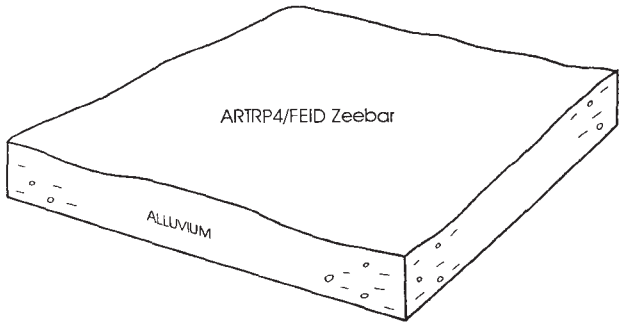


Figure 23. Block diagram of ecological unit 1146.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: fan remnants
Elevations: 6000 to 9000 feet
Average annual precipitation: 17 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

90 percent - ARTRP4/FEID Zeebar Ecological Type
10 percent - contrasting inclusions

ARTRP4/FEID Zeebar (90%)

Setting
Slopes: 4 to 20 percent
Landform position: all positions

Vegetation

Potential Natural Community
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils

Name: Zeebar series
Taxonomic class: Loamy-skeletal, mixed, superactive Argic Cryoborolls
Parent material: local alluvium or colluvium derived from quartzite conglomerate and loess
Typical profile:
- 0 to 3 inches - dark grayish brown gravelly loam
- 3 to 13 inches - dark grayish brown gravelly loam
- 13 to 27 inches - yellowish brown very gravelly sandy clay loam
- 27 to 49 inches - yellowish brown extremely gravelly sandy clay loam
- 49 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

Contrasting Inclusions (10%)

Inclusion 1

Slope: 4 to 20 percent
Landform position: shallow draws

Potential Natural Community
An ecotone of:
- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- quaking aspen/whortleleaf snowberry/Kentucky bluegrass c.t.
- mountain big sagebrush/Idaho fescue p.a.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils like Zeebar that are more moist and have a dark colored surface layer greater than 16 inches thick.

Inclusion 2

Slope: 4 to 20 percent
Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Soils like Zeebar that have carbonates in the lower portion of the subsoil (Cryoboroll soils).

Inclusion 3

Slope: 4 to 8 percent
Landform position: bottom of drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include: Booth's willow, Bebb willow, beaked sedge and starry false Solomon's seal.

Soils: Soils that are somewhat poorly or poorly drained.

Comment: This inclusion is commonly associated with springs, intermittent and small perennial streams. Seedling through medium trees of quaking aspen form a conspicuous band along the outer margin of this inclusion. This band occupies a very narrow (less than 40 feet in width) ecotone between the riparian and upland communities.

Inclusion 4

Slope: 4 to 20 percent
Landform position: all positions

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Soils like Zeebar that have 10 to 20 percent cobbles or stones on the surface.

Comment: This inclusion occurs in the Smelter Gulch and Willow Creek drainages on the northeastern side of Birch Creek.

Management and Limitations

- Fencing is severely limited because the soils are too rocky.
- Unsurfaced roads and parking areas are severely limited because the soils have low strength.
- The use of heavy equipment for rangeland management is severely limited because of slope.
- Revegetation of cut and fill slopes is severely limited because the soils are droughty.
- Off-road vehicle use is severely limited because the soils erode easily and compact easily.

Additional Information

- ARTRP4/FEID Zeebar Ecological Type description on page 364.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1147—ARTRP4/FEID Zeebar, 30 to 50 percent slopes

Summary

This ecological unit is on foothills in a broad transitional area between the cool, moist portion of the shrub steppe zone and the cool portion of the forested zone (fig. 24). The landscape is characterized by steep sideslopes that support communities dominated by sagebrush. The sideslopes are strongly dissected by shallow draws and low spur ridges. Intermittent streams are common in the larger drainageways.

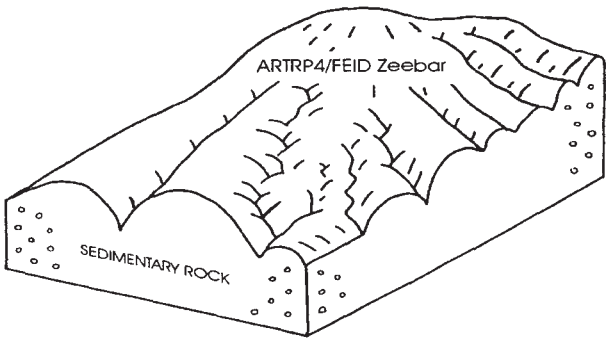


Figure 24. Block diagram of ecological unit 1147.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: foothills
Elevations: 6500 to 9000 feet
Average annual precipitation: 18 inches
Average annual air temperature: 36 degrees F
Geology: sedimentary

Ecological Unit Composition

80 percent - ARTRP4/FEID Zeebar Ecological Type
20 percent - contrasting inclusions

ARTRP4/FEID Zeebar (80%)

Setting

Slopes: 30 to 50 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soil

Name: Zeebar series
Taxonomic class: Loamy-skeletal, mixed, superactive Argic Cryoborolls
Parent material: local alluvium or colluvium derived from quartzite conglomerate and loess
Typical profile:

- 0 to 3 inches - dark grayish brown gravelly loam
- 3 to 13 inches - dark grayish brown gravelly loam
- 13 to 27 inches - yellowish brown very gravelly sandy clay loam
- 27 to 49 inches - yellowish brown extremely gravelly sandy clay loam
- 49 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 30 to 50 percent
Landform position: north facing sideslopes

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of whortleleaf snowberry with an herbaceous layer dominated by basin wildrye.

Soils: Soils like Zeebar that are moist.

Inclusion 2

Slope: 15 to 50 percent

Landform position: south facing spur ridges

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Droughty soils that have an extremely gravelly or cobbly loam texture in the surface layer and subsoil.

Inclusion 3

Slope: 15 to 40 percent

Landform position: bottom of drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include: Booth's willow, Bebb willow, beaked sedge and starry false Solomon's seal.

Soils: Soils that are somewhat poorly or poorly drained.

Comment: This inclusion is commonly associated with springs, intermittent and small perennial streams. Seedling through medium quaking aspen form a conspicuous band along the outer margin of this inclusion. This band occupies a very narrow (less than 40 feet) ecotone between the riparian and upland communities.

Management and Limitations

- The use of heavy equipment for rangeland management is severely limited because of slope.
- Off-road vehicle use is severely limited because of slope and the soils erode easily.
- Fencing is severely limited because the soils are too rocky.

Additional Information

- ARTRP4/FEID Zeebar Ecological Type description on page 364.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1149—PSME/CARU,CARU Edgway, 15 to 40 percent slopes

Summary

This ecological unit is on unstable foothills and mountains in the cool portion of the forested zone (fig. 25). The landscape is characterized by concave sideslopes that support forests of mixed conifers and quaking aspen. Forest canopy cover is variable. The sideslopes are lightly dissected by low spur ridges, shallow draws, subtle benches and short, steep escarpments. Mass movements are common in some areas. Seeps and intermittent streams are common in draws on lower slope positions.

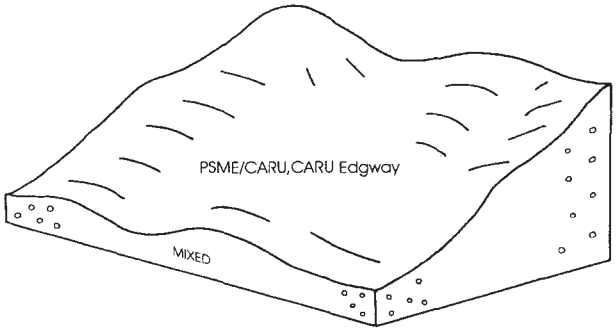


Figure 25. Block diagram of ecological unit 1149.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: foothills and mountains
Elevations: 6500 to 7100 feet
Average annual precipitation: 22 inches
Average annual air temperature: 37 degrees F
Geology: mixed

Ecological Unit Composition

85 percent - PSME/CARU,CARU Edgway Ecological Type
15 percent - contrasting inclusions

PSME/CARU,CARU Edgway (85%)

Setting

Slopes: 15 to 40 percent
Landform position: all positions

Vegetation

Potential Natural Community

- Douglas-fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass p.a., pinegrass phase
- Douglas-fir/whortleleaf snowberry community
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- Communities that have a tree canopy of Douglas-fir over an herbaceous layer dominated by non-native grasses.
- Communities that have a shrub layer of snowbrush ceanothus with an herbaceous layer dominated by elk sedge or non-native grasses.

Soils

Name: Edgway series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 10 inches - grayish brown very gravelly loam
- 10 to 15 inches - light brownish gray very gravelly loam
- 15 to 42 inches - yellowish brown very gravelly clay loam
- 42 to 60 inches - light yellowish brown very cobbly loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 8 to 20 percent

Landform position: ridges, knolls and summits

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- subalpine fir/pinegrass p.a., pinegrass phase
- Douglas-fir/pinegrass community
- Douglas-fir/whortleleaf snowberry community

Soils: Soils like Edgway that have a surface layer greater than 24 inches thick (Fitzwil soils).

Inclusion 2

Slope: 35 to 60 percent

Landform position: south facing sideslopes

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- subalpine big sagebrush/California brome p.a.
- Douglas-fir/whortleleaf snowberry p.a.
- Diverse shrub or herbaceous communities dominated by one or more of the following: whortleleaf snowberry, white spirea, oneflower helianthella, other mesic forbs, or non-native grasses.
- Shrub dominated communities that have widely dispersed seedling through pole Douglas-fir.

Soils: Soils like Edgway that are slightly more warm and dry and have a very or extremely gravelly sandy loam texture in the subsoil (Povey soils).

Inclusion 3

Slope: 15 to 35 percent

Landform position: short north facing sideslopes

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., blue huckleberry phase
- Douglas-fir/blue huckleberry community

Soils: Cool, moist, light colored soils that have a very gravelly or cobbly loam texture in the surface layer and subsoil (Koffgo soils).

Inclusion 4

Slope: 15 to 35 percent

Landform position: short north facing sideslopes

Potential Natural Community

- subalpine fir/white spirea p.a.

Present Vegetation

- Douglas-fir/white spirea community
- Communities that have a tree canopy of Douglas-fir with a depauperate understory.

Soils: Cool, moist, light colored soils that have a very gravelly or cobbly loam texture in the surface layer and subsoil (Koffgo soils).

Inclusion 5

Slope: 4 to 20 percent

Landform position: bottom of draws

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Soils that are somewhat poorly or poorly drained.

Comment: This inclusion is commonly associated with small seeps and intermittent springs. The riparian zone is less than 40 feet in width.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Slump-earth flows and small slumps are common in some areas.
- Pond reservoir areas, shallow excavations and the use of heavy equipment for woodland harvest and mechanical site preparation are severely limited because of slope.
- Camp and picnic areas are severely limited because of slope and small stones.
- Most natural regeneration of Douglas-fir occurs under shelterwood cuts without site preparation. However, residual forest litter layers are a very inefficient seedbed and moss mats are a very effective seedbed for Douglas-fir.
- The following shrubs and trees provide an effective shade cover for natural regeneration of Douglas-fir during early and mid seral conditions: subalpine big sagebrush, snowbrush ceanothus, Scouler's willow, Saskatoon serviceberry, white spirea, quaking aspen or Douglas-fir. Inefficient covers include whortleleaf snowberry, currants and lodgepole pine.
- Survival of planted Douglas-fir appears greatest on sites that have been broadcast burned.

Broadcast burning tends to provide more site protection for tree seedlings than other treatments.

- Most natural regeneration of lodgepole pine occurs under shelterwood cuts that have been lightly scarified. Shelterwood cuts that have been broadcast burned have slightly less natural regeneration by lodgepole pine. Natural regeneration by lodgepole pine in shelterwood cuts without site preparation is about half that of lightly scarified treatments.
- Douglas-fir in shelterwood cuts provide an effective shade cover for the natural regeneration of lodgepole pine. Timber harvest slash, currants, whortleleaf snowberry and Scouler's willow provide inefficient shade cover for the natural regeneration of lodgepole pine.
- Pinegrass, elk sedge and smooth brome can create severe competition for tree and shrub seedlings because of abundant root and rhizome development. The sod forming grasses effectively restrict tree and shrub regeneration from seed by depleting soil moisture prior to seedling establishment.
- In early and mid seral conditions, machine scarification decreases pinegrass and elk sedge cover and increases sticky geranium cover. Sticky geranium is a preferred gopher forage species. Gophers may forage on pine during the winter when sticky geranium and other forbs are unavailable.

Additional Information

- PSME/CARU,CARU Edgway Ecological Type description on page 437.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1150—ABLA/CARU,CARU Rhylow - ABLA/CARU,CARU Fitzwil association, 4 to 40 percent slopes

Summary

This ecological unit is on foothills and mountains in the cool portion of the forested zone (fig. 26). The topography is characterized by south facing dipslopes that are moderately or strongly dissected by parallel drainageways. The summits between drainageways have planar to convex slopes. Sideslopes of drainageways have complex slopes. Closed canopy forests and reforesting clearcuts are common.

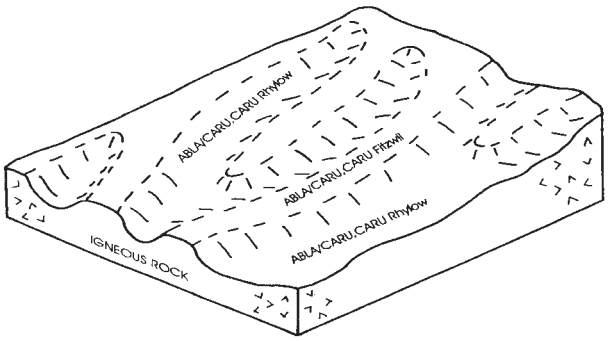


Figure 26. Block diagram of ecological unit 1150.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: foothills and mountains
Elevations: 6500 to 8000 feet
Average annual precipitation: 27 inches
Average annual air temperature: 36 degrees F
Geology: igneous

Ecological Unit Composition

50 percent - ABLA/CARU,CARU Rhylow Ecological Type
30 percent - ABLA/CARU,CARU Fitzwil Ecological Type
20 percent - contrasting inclusions

ABLA/CARU,CARU Rhylow (50%)

Setting

Slopes: 15 to 40 percent
Landform position: south, west and east facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass community
- Douglas-fir/whortleleaf snowberry community
- Communities that have a tree canopy of Douglas-fir over an herbaceous layer dominated by non-native grasses.
- Communities that have a shrub layer of snowbrush ceanothus or white spirea with an herbaceous layer dominated by elk sedge.
- subalpine fir/pinegrass p.a., pinegrass phase

Soils

Name: Rhylow series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 12 inches - dark brown gravelly loam
- 12 to 31 inches - dark yellowish brown gravelly loam
- 31 to 44 inches - yellowish brown extremely cobbly sandy loam
- 44 to 60 inches - grayish brown extremely stony sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 4.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

ABLA/CARU,CARU Fitzwil (30%)

Setting

Slopes: 4 to 20 percent

Landform position: summits

Vegetation

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- subalpine fir/pinegrass p.a., pinegrass phase
- Douglas-fir/pinegrass community
- Douglas-fir/whortleleaf snowberry community
- Communities that have a tree canopy of Douglas-fir over an herbaceous layer of non-native grasses.
- Communities that have a shrub layer of snowbrush ceanothus with an herbaceous layer dominated by elk sedge.

Soils

Name: Fitzwil series

Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Parent material: local alluvium or colluvium derived from loess, volcanic ash and rhyolitic tuff

Typical profile:

- 0 to 7 inches - dark grayish brown gravelly silt loam
- 7 to 14 inches - brown gravelly loam
- 14 to 27 inches - pale brown very gravelly loam
- 27 to 36 inches - very pale brown and light yellowish brown extremely gravelly loam
- 36 to 60 inches - light yellowish brown and very pale brown extremely cobbly loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 6.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.15

T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 20 to 50 percent

Landform position: short north facing sideslopes of drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., blue huckleberry phase
- Douglas-fir/blue huckleberry community

Soils: Cool, light colored soils that have a very gravelly or cobbly loam texture in the surface layer and subsoil (Koffgo soils).

Inclusion 2

Slope: 20 to 50 percent

Landform position: short north facing slideslopes of drainageways

Potential Natural Community

- subalpine fir/white spirea p.a.

Present Vegetation

- Douglas-fir/white spirea community
- Communities that have a tree canopy of Douglas-fir with a depauperate understory.

Soils: Cool, light colored soils that have a very gravelly or cobbly loam texture in the surface layer and subsoil (Koffgo soils).

Inclusion 3

Slope: 20 to 50 percent

Landform position: south facing sideslopes

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- subalpine big sagebrush/California brome p.a.
- Douglas-fir/whortleleaf snowberry p.a.
- Diverse shrub or herbaceous communities that are dominated by one or more of the following: whortleleaf snowberry, white spirea, oneflower helianthella, other mesic forbs, or non-native grasses.
- Shrub dominated communities that have widely dispersed seedling through pole Douglas-fir.

Soils: Soils like Rhylow that are slightly more warm and dry (Povey soils).

Inclusion 4

Slope: 4 to 20 percent

Landform position: summits and shoulders

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass community
- Douglas-fir/whortleleaf snowberry community

Soils: Soils like Fitzwil that are 20 to 40 inches deep to fragmental material.

Inclusion 5

Landform position: sideslopes

Rock: Rubble Land that consists of angular cobbles, stones or boulders derived from rhyolite. Scree is commonly represented.

Management and Limitations

- Off-road vehicle use is severely limited because the soils erode easily and compact easily.

ABLA/CARU,CARU Rhylow

- Unsurfaced roads and parking areas are severely limited because of slope.
- Shallow excavations and dwellings without basements are severely limited because of slope.
- The use of heavy equipment for mechanical site preparation is severely limited because the soils are too bouldery.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

ABLA/CARU,CARU Fitzwil

- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/CARU,CARU Rhylow Ecological Type description on page 268.
- ABLA/CARU,CARU Fitzwil Ecological Type description on page 258.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1154—PSME/JUCO6 Pikaden - PSME/FEID Pikaden - Rubble Land association, 40 to 65 percent slopes

Summary

This ecological unit is on mountains in the dry portion of the forested zone (fig. 27). The landscape is characterized by very steep, high relief mountains that have cold north facing and warm south facing sideslopes. Conifers are supported in closed canopy forests on north facing sideslopes and in open canopy forests on south facing sideslopes. The sideslopes are convex. They are lightly dissected by low spur ridges and shallow draws.

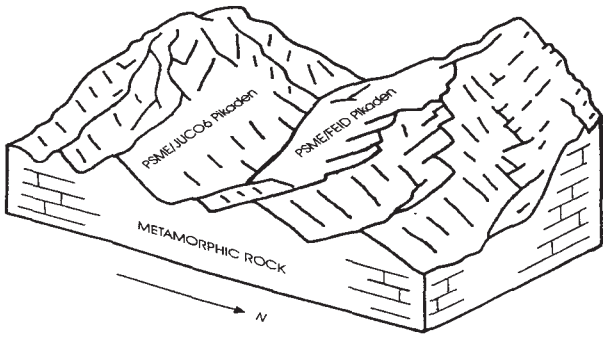


Figure 27. Block diagram of ecological unit 1154.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: mountains
Elevations: 7500 to 9800 feet
Average annual precipitation: 22 inches
Average annual air temperature: 36 degrees F
Geology: metamorphic

Ecological Unit Composition

40 percent - PSME/JUCO6 Pikaden Ecological Type
25 percent - PSME/FEID Pikaden Ecological Type
15 percent - Rubble Land
20 percent - contrasting inclusions

PSME/JUCO6 Pikaden (40%)

Setting

Slopes: 40 to 65 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/common juniper p.a.

Present Vegetation

- Douglas-fir/common juniper p.a.

Soils

Name: Pikaden series
Taxonomic class: Sandy-skeletal, mixed Typic Cryochrepts
Parent material: colluvium derived from quartzite and loess
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 5 inches - brown extremely gravelly silt loam
- 5 to 12 inches - light brownish gray extremely gravelly loam
- 12 to 27 inches - light brownish gray extremely gravelly loamy sand
- 27 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 0.5 inches
AWC, surface to 60 inches: 1.0 inches
Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.05
T factor: 3

PSME/FEID Pikaden (25%)

Setting

Slopes: 40 to 65 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/Idaho fescue p.a.

Present Vegetation

- Douglas-fir/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush with an herbaceous layer dominated by bluebunch wheatgrass or Idaho fescue.

- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir, limber pine or Rocky Mountain juniper.

Soils

Name: Pikaden series

Taxonomic class: Sandy-skeletal, mixed Typic Cryochrepts

Parent material: colluvium derived from quartzite and loess

Typical profile:

- 0 to 7 inches - dark grayish brown extremely gravelly sandy loam
- 7 to 17 inches - light brownish gray extremely gravelly sandy loam
- 17 to 30 inches - light gray extremely cobbly loamy sand
- 30 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 0.5 inches

AWC, surface to 60 inches: 1.0 inches

Drainage class: somewhat excessively drained

Water table: none

Flooding hazard: none

Kw factor: 0.02

T factor: 3

Rubble Land (15%)

Setting

Landform position: all positions

Rock

Name: Rubble Land

Features: Rubble Land consists of angular cobbles, stones or boulders derived from quartzite. Scree is commonly represented.

Contrasting Inclusions (20%)

Inclusion 1

Slope: 30 to 50 percent

Landform position: sideslopes at the upper elevation range of the unit

Potential Natural Community

- limber pine/Idaho fescue p.a.

Present Vegetation

- limber pine/Idaho fescue p.a.

Soils: Pikaden soils

Inclusion 2

Slope: 40 to 65 percent

Landform position: south facing sideslopes

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.

Soils: Loamy soils that have a dark colored surface layer greater than 16 inches thick and are greater than 60 inches deep to fragmental material (Povey soils).

Inclusion 3

Landform position: south facing sideslopes

Present Vegetation

- lichens

Rock: Rock outcrops that consist of irregular cliffs.

Comment: Rock outcrops are commonly associated with areas of rubble land.

Management and Limitations

- Shallow excavations are severely limited because cutbanks cave.
- Revegetating cut and fill slopes is severely limited because of slope and the soils are droughty.
- Fencing is severely limited because the soils are too rocky.
- The use of heavy equipment for woodland harvest is severely limited because of slope and the soils are too rocky.
- The use of heavy equipment for woodland mechanical site preparation is severely limited because of slope.
- Foot and saddlestock trails are severely limited because of small stones.

Additional Information

- PSME/JUCO6 Pikaden Ecological Type description on page 449.
- PSME/FEID Pikaden Ecological Type description on page 443.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1170—ABLA/Tall Forb Yodal, 4 to 35 percent slopes

Summary

This ecological unit is on unstable mountain sideslopes, summits and basins in a broad transitional area between the forested and alpine zones (fig. 28). The landscape is characterized by rolling to hilly slopes that support subalpine forb communities with dispersed islands and ribbons of conifers. Low spur ridges and shallow draws lightly dissect the slopes in a dendritic pattern. Mass movements and V-shaped gullies are common.

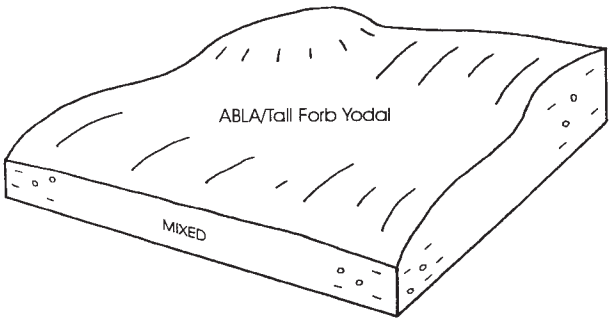


Figure 28. Block diagram of ecological unit 1170.

Ecological Unit Setting

Subsection: Big Hole Mountains, Teton Range, Centennial Mountains and Caribou Range Mountains
Landform: mountains
Elevations: 7600 to 9800 feet
Average annual precipitation: 45 inches
Average annual air temperature: 30 degrees F
Geology: mixed

Ecological Unit Composition

80 percent - ABLA/Tall Forb Yodal Mosaic
20 percent - contrasting inclusions

ABLA/Tall Forb Yodal (80%)

Setting

Slopes: 4 to 35 percent
Landform position: sideslopes, summits and basins

Vegetation

Potential Natural Community
A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.
- islands and ribbons of the subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils

Name: Yodal series
Taxonomic class: Fine-loamy, mixed, active Abruptic Paleboralfs
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:

- 0 to 3 inches - brown gravelly loam
- 3 to 17 inches - brown gravelly loam
- 17 to 38 inches - light yellowish brown gravelly loam
- 38 to 55 inches - reddish yellow very gravelly very fine sandy loam
- 55 to 70 inches - red silty clay

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 7.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 35 percent
Landform position: ridges
Potential Natural Community
A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.

- arrowleaf balsamroot-oneflower helianthella c.t.
- islands and stringers of the subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils: Soils like Yodal that have dark colored surface layer, 40 inches or more thick, with a very or extremely gravelly loam or sandy loam texture (Rhylow soils).

Inclusion 2

Slope: 4 to 35 percent

Landform position: ridges

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Herbaceous communities dominated by an open layer of one or more of the following: Gordon's ivesia, fernleaf licoriceroot, showy frasera, Lemmon's rockcress, thickleaf groundsel or edible valeriana.

Soils: Droughty soils that have greater than 60 percent rock fragments on the surface and are 10 to 20 inches deep to fragmental material (Oorang soils).

Inclusion 3

Slope: 4 to 35 percent

Landform position: south facing ridges

Potential Natural Community

- tall forb communities

Present Vegetation

- arrowleaf balsamroot-oneflower helianthella c.t.

Soils: Soils that have a loamy surface layer, 15 to 30 inches thick, over a subsoil that has carbonates and 35 to 70 percent rock fragments.

Inclusion 4

Slope: 8 to 20 percent

Landform position: sideslopes and footslopes

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.

Soils: Soils that have a loamy surface layer, 15 to 30 inches thick, over a clayey subsoil with a high shrink-swell potential (Nearl soils).

Comment: This inclusion is commonly associated with sheltered positions in the lower elevation range of the ecological unit.

Inclusion 5

Landform position: sideslopes and draws

Potential Natural Community:

A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- herbaceous communities of dispersed forbs

Badlands: Badlands occurring as barren land on head scarps and V-shaped gullies. Local relief is commonly 30 to 150 feet.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Some areas occupy head and crown positions of large slump-earth flows. Main scarps, minor scarps, small slump-earth flows, badlands and V-shaped gullies occur in these areas.
- This ecological unit has a high potential for avalanches. Avalanche runout areas are common in basins that occur below alpine mountain sideslopes, peaks and ridges.
- Off-road vehicle use is severely limited because the soils erode easily.
- Shallow excavations and dwellings without basements are severely limited because of slope.
- Camp and picnic areas are severely limited because of slope and small stones.
- The use of heavy equipment for woodland harvest is severely limited because of slope.
- The use of heavy equipment for woodland mechanical site preparation is severely limited because the soils are too bouldery.

Additional Information

- ABLA/Tall Forb Yodal Mosaic description on page 283.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1172—ABLA/ACGL Gany - ABLA/THOC Katpa - PSME/BERE,SYOR2 Fritz complex, 40 to 70 percent slopes

Summary

This ecological unit is on mountains in the mid portion of the forested zone (fig. 29). The landscape is characterized by very steep, high relief mountains with moist, north facing and dry, south facing sideslopes. Closed canopy forests occur on the north facing sideslopes and open canopy forests occur on the south facing sideslopes. Mixed conifers are supported in both positions. The sideslopes are moderately dissected by spur ridges, shallow draws, avalanche chutes and rock outcrops. Large rockfalls are present in some areas.

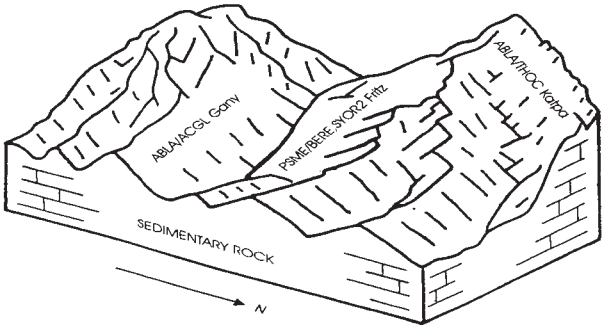


Figure 29. Block diagram of ecological unit 1172.

Ecological Unit Setting

Subsection: Teton Range, Big Hole Mountains and Centennial Mountains
Landform: mountains
Elevations: 6700 to 9700 feet
Average annual precipitation: 24 inches
Average annual air temperature: 37 degrees F
Geology: sedimentary

Ecological Unit Composition

40 percent - ABLA/ACGL Gany Ecological Type
25 percent - ABLA/THOC Katpa Ecological Type
15 percent - PSME/BERE,SYOR2 Fritz Ecological Type
20 percent - contrasting inclusions

ABLA/ACGL Gany (40%)

Setting

Slopes: 40 to 70 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation
- subalpine fir/Rocky Mountain maple p.a.
- Douglas-fir/Rocky Mountain maple community
- Shrub communities dominated by Rocky Mountain maple, Greene mountainash or Saskatoon serviceberry are common in avalanche chutes.

Soils

Name: Gany series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Cryoborolls
Parent material: local alluvium or colluvium derived from limestone and loess
Typical profile:
- 2 to 0 inches - forest litter
- 0 to 12 inches - brown extremely gravelly silt loam
- 12 to 48 inches - yellowish brown extremely gravelly loam
- 48 to 60 inches - light brownish gray extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 4.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.05
T factor: 2

ABLA/THOC Katpa (25%)

Setting

Slopes: 40 to 70 percent
Landform position: south facing draws

Vegetation

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

A mosaic of:

- subalpine fir/western meadowrue p.a.
- nettleleaf giant hyssop-showy goldeneye c.t.
- arrowleaf balsamroot-oneflower helianthella c.t.

Soils

Name: Katpa series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Pachic Cryoborolls

Parent material: local alluvium or colluvium derived from limestone and loess

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - brown gravelly silt loam
- 7 to 16 inches - brown very gravelly silt loam
- 16 to 32 inches - brown extremely gravelly silt loam
- 32 to 60 inches - brown extremely cobbly loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 5.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.15

T factor: 3

PSME/BERE,SYOR2 Fritz (15%)

Setting

Slopes: 40 to 70 percent

Landform position: south facing ridges

Vegetation

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase
- Communities that have a dispersed to open tree canopy dominated by Douglas-fir with an open to closed shrub layer dominated by curlleaf mountain mahogany. Other trees and shrubs include: limber pine, Rocky Mountain juniper, bigtooth maple, whortleleaf snowberry and mountain big sagebrush.

Soils

Name: Fritz series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Parent material: local alluvium or colluvium derived from limestone and loess

Typical profile:

- 0 to 5 inches - brown gravelly silt loam
- 5 to 11 inches - brown gravelly silt loam
- 11 to 39 inches - light gray very gravelly loam
- 39 to 45 inches - white very cobbly sandy loam
- 45 inches - hard limestone bedrock

Depth class: deep (40 to 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.0 inches

AWC, surface to hard limestone bedrock: 4.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Landform position: all positions

Present Vegetation

- Diverse communities of dispersed trees, shrubs, forbs or grasses are common along fractures of the bedrock.
- mosses and lichens

Rock: Rock outcrops that consist of surface level exposures, irregular cliffs and fins, or linear cliffs more than 100 feet in height.

Comment: Rock outcrops have the highest occurrence and greatest extent on south facing sideslopes.

Inclusion 2

Landform position: south facing draws

Rock: Rubble Land that consists of angular pebbles or cobbles derived from limestone. Scree is commonly represented.

Inclusion 3

Slope: 35 to 60 percent

Landform position: south facing footslopes

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation

- subalpine fir/Rocky Mountain maple p.a.
- Douglas-fir/Rocky Mountain maple community
- Shrub communities dominated by Rocky Mountain maple or Greene mountainash.

Soils: Soils that have 10 to 50 percent cobbles, stones or boulders in the surface layer and are 10 to 20 inches deep to fragmental material.

Inclusion 4

Slope: 40 to 70 percent

Landform position: south facing sideslopes in the upper elevation range of the unit.

Potential Natural Community

An ecotone of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.
- islands of subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils: Soils like Fritz and Katpa that are more moist.

Inclusion 5

Slope: 40 to 70 percent

Landform position: south facing ridges

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Communities that have a dispersed to open layer of curlleaf mountain mahogany over a low shrub and herbaceous layer dominated by one or more of the following: whortleleaf snowberry, Oregon-grape, bluebunch wheatgrass, arrowleaf balsamroot or annual forbs.

Soils: Loamy soils that have carbonates and are less than 20 inches deep to hard bedrock.

Management and Limitations

- This ecological unit has a high potential for avalanches. Avalanche chutes are common.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Revegetating cut and fill slopes is severely limited because of slope.

Additional Information

- ABLA/ACGL Gany Ecological Type description on page 240.
- ABLA/THOC Katpa Ecological Type description on page 289.
- PSME/BERE,SYOR2 Fritz Ecological Type description on page 434.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1175—ABLA/Tall Forb Yodal, 35 to 60 percent slopes

Summary

This ecological unit is on unstable mountains in a broad transitional area between the forested and alpine zones (Fig. 30). The landscape is characterized by steep sideslopes that support subalpine forb communities with dispersed islands and ribbons of conifers. Low spur ridges and shallow draws slightly dissect the slopes in a dendritic pattern. Mass movements and V-shaped gullies are common.

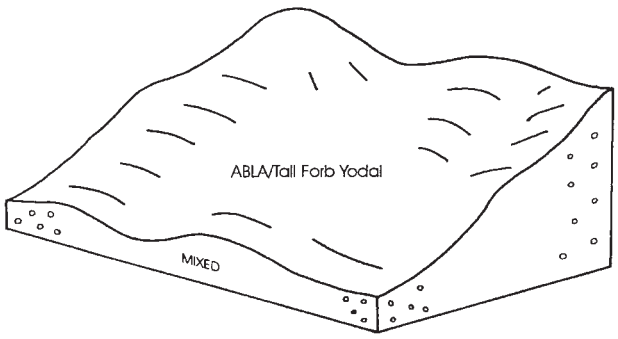


Figure 30. Block diagram of ecological unit 1175.

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains, Caribou Range Mountains and Teton Range
Landform: mountains
Elevations: 7600 to 9800 feet
Average annual precipitation: 45 inches
Average annual air temperature: 30 degrees F
Geology: mixed

Ecological Unit Composition

80 percent - ABLA/Tall Forb Yodal Mosaic
20 percent - contrasting inclusions

ABLA/Tall Forb Yodal (80%)

Setting

Slopes: 35 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community
A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.
- islands and ribbons of the subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils

Name: Yodal series
Taxonomic class: Fine-loamy, mixed, active Abruptic Paleboralfs
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:

- 0 to 3 inches - brown gravelly loam
- 3 to 17 inches - brown gravelly loam
- 17 to 38 inches - light yellowish brown gravelly loam
- 38 to 55 inches - reddish yellow very gravelly very fine sandy loam
- 55 to 70 inches - red silty clay

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 7.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 35 to 60 percent
Landform position: ridges
Potential Natural Community
A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.

- arrowleaf balsamroot-oneflower helianthella c.t.
- islands and ribbons of the subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils: Soils like Yodal that have dark colored surface layer, 40 inches or more thick, with a very or extremely gravelly loam or sandy loam texture (Rhylow soils).

Inclusion 2

Slope: 4 to 60 percent

Landform position: ridges

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Herbaceous communities dominated by an open layer of one or more of the following were observed: Gordon's ivesia, fernleaf licoriceroot, showy frasera, Lemmon's rockcress, thickleaf groundsel, or edible valeriana.

Soils: Droughty soils that have carbonates and greater than 60 percent rock fragments (Cryochrepts, loamy-skeletal).

Inclusion 3

Slope: 35 to 60 percent

Landform position: south facing ridges

Potential Natural Community

- tall forb communities

Present Vegetation

- arrowleaf balsamroot-oneflower helianthella c.t.

Soils: Soils that have a loamy surface layer, 15 to 30 inches thick, over a subsoil which has carbonates and 35 to 70 percent rock fragments.

Inclusion 4

Slope: 35 to 60 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.

Soils: Light colored, loamy soils that lack carbonates and have 35 to 90 percent rock fragments to depths of 40 inches or more. (Koffgo soils)

Inclusion 5

Landform position: sideslopes and draws

Potential Natural Community

A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- herbaceous communities of dispersed forbs

Badlands: Badlands occurring as barren land on head scarps and V-shaped gullies. Local relief is commonly 30 to 150 feet.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Some areas occupy scarp positions of large slump-earth flows. Small slump-earth flows and V-shaped gullies are common.
- The avalanche hazard is high because of slope, exposed landscape positions and snow accumulation.
- Off-road vehicle use is severely limited because the soils erode easily.
- Shallow excavations and dwellings without basements are severely limited because of slope.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

Additional Information

- ABLA/Tall Forb Yodal Mosaic description on page 283.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1204—PSME/ARTRV Povey, 30 to 60 percent slopes

Summary

This ecological unit is on canyon, foothill and mountain sideslopes in a broad transitional area between the shrub steppe and forested zones (Fig. 31). The landscape is characterized by convex, south facing sideslopes that support communities dominated by sagebrush. Widely dispersed conifers are common in some areas.

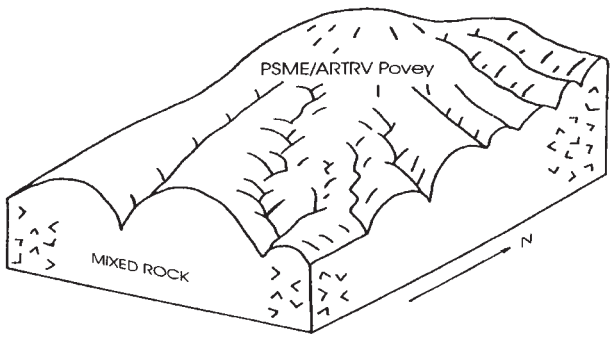


Figure 31. Block diagram of ecological unit 1204.

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains and Caribou Range Mountains
Landform: canyons, foothills and mountains
Elevations: 6400 to 9600 feet
Average annual precipitation: 19 inches
Average annual air temperature: 39 degrees F
Geology: mixed

Ecological Unit Composition

80 percent - PSME/ARTRV Povey Ecotone
20 percent - contrasting inclusions

PSME/ARTRV Povey (80%)

Setting

Slopes: 30 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a shrub layer of subalpine big sagebrush, snowbrush ceanothus or whortleleaf snowberry with an herbaceous layer dominated by one or more of the following: bluebunch wheatgrass, California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through pole Douglas-fir and Rocky Mountain juniper.

Soils

Name: Povey series
Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks and loess
Typical profile:

- 0 to 27 inches - dark grayish brown gravelly loam
- 27 to 39 inches - dark grayish brown very gravelly sandy loam
- 39 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 60 percent
Landform position: ridges and spur ridges

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.

- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Diverse communities that have a layer of mountain big sagebrush, subalpine big sagebrush, whortleleaf snowberry, sapling quaking aspen, black chokecherry or snowbrush ceanothus with an herbaceous layer dominated by bluebunch wheatgrass, slender wheatgrass or California brome.

Soils: Soils like Povey that are less than 60 inches deep to hard bedrock.

Inclusion 2

Landform position: all positions

Rock: Rock outcrops that consist of irregular cliffs.

Inclusion 3

Slope: 35 to 60 percent
Landform position: all positions

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Douglas-fir/whortleleaf snowberry p.a.
- Diverse communities that have a layer of mountain big sagebrush, subalpine big sagebrush, whortleleaf snowberry, sapling quaking aspen, black chokecherry or snowbrush ceanothus with an herbaceous layer dominated by bluebunch wheatgrass, slender wheatgrass or California brome.
- Shrub dominated communities that have widely dispersed seedling through pole Douglas-fir.

Soils: Soils like Povey that have a very gravelly sandy clay loam or clay loam texture in the subsoil.

Inclusion 4

Slope: 15 to 35 percent
Landform position: benches

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Douglas-fir/whortleleaf snowberry p.a.
- Diverse communities that have a layer of mountain big sagebrush, subalpine big sagebrush, whortleleaf snowberry, sapling quaking aspen, black chokecherry or snowbrush ceanothus with an herbaceous layer dominated by bluebunch wheatgrass, slender wheatgrass or California brome.
- Shrub dominated communities that have widely dispersed seedling through pole Douglas-fir.

Soils: Soils like Povey that have less than 35 percent rock fragments in the subsoil.

Inclusion 5

Landform position: south facing sideslopes

Rock: Rubble land that consists of angular pebbles, cobbles or flagstones derived from igneous or sedimentary rocks.

Management and Limitations

- Off-road vehicle use is severely limited because of slope and the soils erode easily.
- The potential natural community of this ecological unit may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

Additional Information

- PSME/ARTRV Povey Ecotone description on page 425.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1209—Tall Forb Etnass - ABLA/THOC Nearl - PSME/ARTRV Tophat complex, 4 to 30 percent slopes

Summary

This ecological unit is on unstable foothills in a broad transitional area between the cool, moist portion of the shrub steppe zone and the warm portion of the forested zone (Fig. 32). The landscape is characterized by large-scale, slump-earth flows with rolling to hilly slopes that support a mosaic of communities dominated by mesic forbs, sagebrush, quaking aspen and mixed conifers. Mass movements, scarps, discontinuous ridges, knolls, basins, seeps and springs are common.

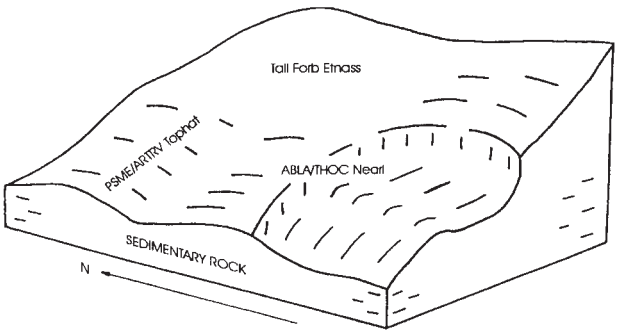


Figure 32. Block diagram of ecological unit 1209.

Ecological Unit Setting

Subsection: Caribou Range Mountains
Landform: foothills
Elevations: 5700 to 6700 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: sedimentary

Ecological Unit Composition

35 percent - Tall Forb Etnass Ecological Type
30 percent - ABLA/THOC Nearl Ecological Type
15 percent - PSME/ARTRV Tophat Ecotone
20 percent - contrasting inclusions

Tall Forb Etnass (35%)

Setting

Slopes: 4 to 20 percent
Landform position: sideslopes and ridges

Vegetation

Potential Natural Community
- tall forb communities

Present Vegetation
- mulesears wyethia c.t.
- Herbaceous communities dominated by cutleaf balsamroot.

Soils

Name: Etnass series
Taxonomic class: Fine, smectitic Typic Humicryerts
Parent material: residuum derived from shale
Typical profile:
- 0 to 5 inches - grayish brown clay loam
- 5 to 11 inches - grayish brown silty clay
- 11 to 45 inches - light brownish gray silty clay
- 45 to 60 inches - light olive gray clay

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 9.0 inches
Drainage class: moderately well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

ABLA/THOC Nearl (30%)

Setting

Slopes: 4 to 20 percent
Landform position: basins, footslopes and sideslopes

Vegetation

Potential Natural Community
- subalpine fir/western meadowrue p.a.

Present Vegetation
- subalpine fir/western meadowrue p.a.
- quaking aspen/mulesears wyethia c.t.
- quaking aspen-subalpine fir/tall forb c.t.

- Communities dominated by quaking aspen that have widely dispersed seedling through medium Douglas-fir, lodgepole pine or subalpine fir.

Soils

Name: Nearl series

Taxonomic class: Fine, smectitic Vertic Cryoborolls

Parent material: local alluvium derived from mixed sources over residuum from shale

Typical profile:

- 2 to 0 inches - forest litter
- 0 to 4 inches - dark grayish brown loam
- 4 to 10 inches - dark grayish brown clay loam
- 10 to 21 inches - light yellowish brown cobbly clay loam
- 21 to 60 inches - yellowish brown clay

Depth class: very deep (greater than 60 inches)

Permeability: slow

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 10.0 inches

Drainage class: moderately well drained

Water table: 12 to 30 inches

Flooding hazard: none

Kw factor: 0.24

T factor: 5

PSME/ARTRV Tophat (15%)

Setting

Slopes: 15 to 30 percent

Landform position: south facing sideslopes

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Communities that have a shrub layer of spiked big sagebrush or subalpine big sagebrush with an herbaceous layer dominated by California brome, slender wheatgrass or bluebunch wheatgrass.
- Shrub communities dominated by whortleleaf snowberry or antelope bitterbrush.
- Communities that have widely dispersed seedling through medium Douglas-fir or Rocky Mountain juniper.

Soils

Name: Tophat series

Taxonomic class: Fine, mixed, superactive Argic Pachic Cryoborolls

Parent material: local alluvium, colluvium or residuum derived from mixed sources

Typical profile:

- 0 to 7 inches - very dark grayish brown cobbly loam
- 7 to 17 inches - reddish gray cobbly clay loam
- 17 to 34 inches - reddish brown cobbly clay loam
- 34 to 60 inches - reddish brown cobbly silty clay loam

Depth class: very deep (greater than 60 inches)

Permeability: slow

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 8.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.17

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 15 to 30 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- lodgepole pine/pinegrass c.t.

Soils: Light colored, loamy soils that lack carbonates, are well drained and greater than 60 inches deep (Huckridge soils).

Inclusion 2

Slope: 4 to 30 percent

Landform position: ridges, sideslopes and summits

Potential Natural Community

- subalpine fir/sweetcicely p.a., myrtle pachistima phase

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf
- snowberry/pinegrass c.t.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.

Soils: Well drained, loamy soils that have a dark colored surface layer and are greater than 40 inches deep to a clayey substratum (Edgway soils).

Inclusion 3

Slope: 2 to 8 percent

Landform position: basins and drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Herbaceous communities dominated by beaked sedge or fowl bluegrass.

Soils: Loamy or clayey soils that are somewhat poorly or poorly drained.

Inclusion 4

Slope: 4 to 20 percent

Landform position: ridges

Potential Natural Community

- tall forb communities

Present Vegetation

- Herbaceous communities dominated by mulesears wyethia or cutleaf balsamroot.

Soils: Soils like Etnass that have carbonates and 10 to 35 percent pebbles or cobbles in the surface layer.

Inclusion 5

Slope: 15 to 30 percent

Landform position: south facing sideslopes

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- threetip sagebrush/Kentucky bluegrass community
- mountain big sagebrush/Idaho fescue p.a.

Soils: Soils like Tophat that are slightly more dry and are calcareous in the subsoil (Quirt soils).

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Large slump-earth flows and small slumps are common.
- Unsurfaced roads and parking areas are severely limited because the soils have low strength and a high shrink-swell potential.
- Fencing is severely limited because the soils have a high shrink-swell potential.
- Dwellings without basements are severely limited because the soils have a high shrink-swell potential.

Tall Forb Etnass

- Revegetating cut and fill slopes is severely limited because the soils are too clayey.

ABLA/THOC Nearl

- Revegetating cut and fill slopes is severely limited because the soils are too clayey.
- There is a perched water table from June through July. It occurs during and shortly after peak snowmelt periods and after heavy rains of several days duration.
- Shallow excavations are severely limited because of wetness.

PSME/ARTRV Tophat

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.
- Shallow excavations are severely limited because of slope.

Additional Information

- Tall Forb Etnass Ecological Type description on page 479.
- ABLA/THOC Nearl Ecological Type description on page 295.
- PSME/ARTRV Tophat Ecotone description on page 428.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1216—ABLA/ACGL Koffgo - ABLA/ACGL Rhylow - PSME/ARTRV Povey complex, 35 to 60 percent slopes

Summary

This ecological unit is on unstable mountains in the mid portion of the forested zone (Fig. 33). The topography is characterized by steep to very steep sideslopes that are weakly to strongly dissected by spur ridges and draws in dendritic and trellis patterns. A mosaic of cool north facing and warm south facing sideslopes is common. The north facing sideslopes support closed canopy forests of mixed conifers. South facing sideslopes support open canopy forests of mixed conifers and quaking aspen over a diverse layer of mountain shrubs with variable cover. Mass movements and avalanche chutes are common in some areas.

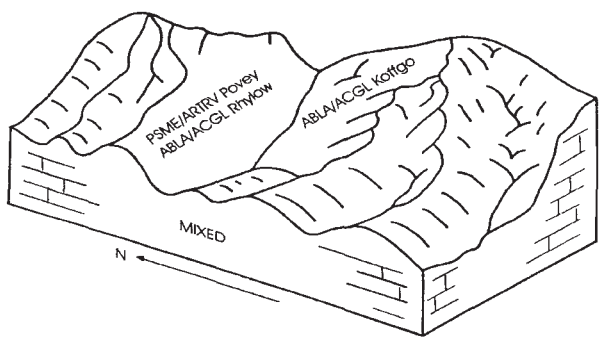


Figure 33. Block diagram of ecological unit 1216.

Ecological Unit Setting

Subsection: Big Hole Mountains, Caribou Range Mountains and Teton Range
Landform: mountains
Elevations: 5600 to 8500 feet
Average annual precipitation: 26 inches
Average annual air temperature: 37 degrees F
Geology: mixed

Ecological Unit Composition

40 percent - ABLA/ACGL Koffgo Ecological Type
20 percent - ABLA/ACGL Rhylow Ecological Type
20 percent - PSME/ARTRV Povey Ecotone
20 percent - contrasting inclusions

ABLA/ACGL Koffgo (40%)

Setting

Slopes: 35 to 60 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation
- subalpine fir/Rocky Mountain maple p.a.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Typical profile:
- 2 to 0 inches - forest litter
- 0 to 9 inches - dark grayish brown gravelly loam
- 9 to 16 inches - light brownish gray extremely gravelly sandy loam
- 16 to 54 inches - light brownish gray extremely stony sandy loam
- 54 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 2.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 4

ABLA/ACGL Rhylow (20%)

Setting

Slopes: 35 to 60 percent
Landform position: south facing draws and footslopes and southeast facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation

- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- Douglas-fir/Rocky Mountain maple community
- Douglas-fir/white spirea community
- Tall shrub communities dominated by Greene mountainash or Rocky Mountain maple.

Soils

Name: Rhylow series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 14 inches - brown very gravelly loam
- 14 to 30 inches - pale brown very gravelly sandy loam
- 30 to 50 inches - light brownish gray extremely cobbly sandy loam
- 50 to 60 inches - light gray extremely cobbly sandy loam

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 2.0 inches

AWC, surface to 60 inches: 4.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.10

T factor: 5

PSME/ARTRV Povey (20%)

Setting

Slopes: 35 to 60 percent

Landform position: south facing shoulders and sideslopes

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Communities that have a shrub layer of whortleleaf snowberry, snowbrush ceanothus, or subalpine big sagebrush with an herbaceous layer dominated by California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through large Douglas-fir, lodgepole pine or Rocky Mountain juniper.
- Douglas-fir/whortleleaf snowberry p.a.

Soils

Name: Povey series

Classification: Loamy-skeletal, mixed, superactive Pachic Cryoborolls

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks and loess

Typical profile:

- 0 to 27 inches - dark grayish brown gravelly loam
- 27 to 39 inches - dark grayish brown very gravelly sandy loam
- 39 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 6.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 60 percent

Landform position: south facing windswept ridges

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Herbaceous communities dominated by Idaho fescue, bluebunch wheatgrass or other native grasses and sedges.

Soils: Dark colored, loamy soils that are less than 20 inches deep to hard bedrock.

Inclusion 2

Slope: 30 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Communities that have a dispersed to closed layer of curlleaf mountain mahogany or Rocky Mountain juniper over a low shrub layer of mountain big sagebrush, whortleleaf snowberry, antelope bitterbrush or Oregongrape. Arrowleaf balsamroot and bluebunch wheatgrass are common in the herbaceous layer of these communities.

Soils: Loamy soils that have a dark colored surface layer 8 to 15 inches thick, over a subsoil that has carbonates and greater than 35 percent rock fragments (Fritz soils).

Comment: This inclusion is commonly associated with limestone geologic materials.

Inclusion 3

Slope: 30 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation

- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- Shrub communities dominated by Greene mountainash or Rocky Mountain maple.

Soils: Soils like Rhylow that are less than 40 inches deep to soft bedrock or a clayey substratum.

Comment: This inclusion has a high potential for mass movement. Earth flows are common.

Inclusion 4

Slope: 30 to 70 percent

Landform position: north facing shoulders of dominant ridges

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- nettleleaf giant hyssop-showy goldeneye c.t.

Soils: Soils like Koffgo that are more moist and have less than 35 percent rock fragments in the surface layer and subsoil.

Comment: This inclusion has a high potential for avalanches. Avalanche chutes are common.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Small slump-earth flows and slumps are common on south facing sideslopes. Block and rock falls are present on north facing sideslopes.
- This ecological unit has a high potential for avalanches. Avalanche chutes and runout areas are common in some areas.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Revegetating cut and fill slopes is severely limited because of slope.

ABLA/ACGL Koffgo

- Fencing is severely limited because the soils are too rocky.

ABLA/ACGL Rhylow

- Fencing is severely limited because the soils are too rocky.

PSME/ARTRV Povey

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

Additional Information

- ABLA/ACGL Koffgo Ecological Type description on page 243.
- ABLA/ACGL Rhylow Ecological Type description on page 246.
- PSME/ARTRV Povey Ecotone description on page 425.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1219—ABLA/PHMA5 Lagall - PSME/ARTRV Povey - PSME/BERE,SYOR2 Fritz complex, 35 to 70 percent slopes

Summary

This ecological unit is on unstable foothills and mountains in the warm portion of the forested zone (Fig. 34). The topography is characterized by steep and very steep sideslopes that are weakly to strongly dissected by spur ridges and draws in dendritic and trellis patterns. A mosaic of cool north facing and warm south facing sideslopes is common. The north facing sideslopes support closed canopy forests of mixed conifers. South facing sideslopes support an open canopy forest of mixed conifers and quaking aspen over a diverse layer of mountain shrubs with variable cover. Mass movements and avalanche chutes are common in some areas.

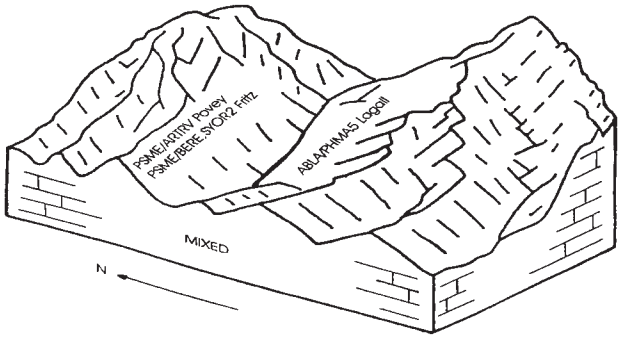


Figure 34. Block diagram of ecological unit 1219.

Ecological Unit Setting

Subsection: Big Hole Mountains and Caribou Range Mountains
Landform: foothills and mountains
Elevations: 5600 to 8500 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: mixed

Ecological Unit Composition

40 percent - ABLA/PHMA5 Lagall Ecological Type
25 percent - PSME/ARTRV Povey Ecotone
15 percent - PSME/BERE,SYOR2 Fritz Ecological Type
20 percent - contrasting inclusions

ABLA/PHMA5 Lagall (40%)

Setting

Slopes: 35 to 70 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/mallow ninebark p.a.

Present Vegetation
- subalpine fir/mallow ninebark p.a.
- Douglas-fir/mallow ninebark community
- lodgepole pine/mallow ninebark community
- Shrub communities dominated by mallow ninebark.

Soils

Name: Lagall series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:
- 1 to 0 inches - forest litter
- 0 to 10 inches - brown very gravelly loam
- 10 to 30 inches - pale brown very gravelly loam
- 30 to 60 inches - light yellowish brown extremely cobbly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

PSME/ARTRV Povey (25%)

Setting

Slopes: 35 to 60 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have a dispersed to open tree canopy of Douglas-fir, Rocky Mountain juniper or quaking aspen over a shrub layer dominated by one or more of the following: Saskatoon serviceberry, snowbrush ceanothus, whortleleaf snowberry, antelope bitterbrush or subalpine big sagebrush.

Soils

Name: Povey series

Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks and loess

Typical profile:

- 0 to 27 inches - dark grayish brown gravelly loam
- 27 to 39 inches - dark grayish brown very gravelly sandy loam
- 39 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 6.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 5

PSME/BERE,SYOR2 Fritz (15%)

Setting

Slopes: 35 to 70 percent

Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Communities that have a dispersed to closed layer of curlleaf mountain mahogany or Rocky Mountain juniper over a low shrub layer of mountain big sagebrush, whortleleaf snowberry, antelope bitterbrush or Oregongrape. Arrowleaf balsamroot and bluebunch wheatgrass are common in the herb layer.

Soils

Name: Fritz series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Parent material: local alluvium or colluvium derived from limestone and loess

Typical profile:

- 0 to 5 inches - brown gravelly silt loam
- 5 to 11 inches - brown gravelly silt loam
- 11 to 39 inches - light gray very gravelly loam
- 39 to 45 inches - white very cobbly sandy loam
- 45 inches - hard limestone bedrock

Depth class: deep (40 to 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.0 inches

AWC, surface to hard limestone bedrock: 4.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 35 to 70 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/mallow ninebark p.a.

Present Vegetation

- Douglas-fir/mallow ninebark community
- subalpine fir/mallow ninebark p.a.

Soils: Soils like Fritz that are more moist and cool (Gany soils).

Inclusion 2

Slope: 35 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- curlleaf mountain mahogany/bluebunch wheatgrass p.a.

Present Vegetation

- Communities that have a dispersed to closed layer of curlleaf mountain mahogany or Rocky Mountain juniper over a low shrub layer of mountain big sagebrush, whortleleaf snowberry, antelope bitterbrush or Oregongrape. Arrowleaf balsamroot and bluebunch wheatgrass are common in the herbaceous layer of these communities.

Soils: Loamy soils that have carbonates and are less than 20 inches deep to hard or soft bedrock.

Inclusion 3

Slope: 35 to 60 percent

Landform position: south facing sideslopes

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have a shrub layer of spiked big sagebrush or subalpine big sagebrush with an herbaceous layer dominated by California brome or slender wheatgrass.
- Whortleleaf snowberry or antelope bitterbrush are present in some communities.
- Shrub dominated communities that have widely dispersed seedling through medium trees of Douglas-fir or Rocky Mountain juniper.

Soils: Clayey soils which lack carbonates and have a dark colored surface layer 16 to 30 inches thick (Tophat soils).

Inclusion 4

Landform position: south facing sideslopes

Rock: Rubble Land that consists of angular pebbles or cobbles derived from limestone or quartzite. Scree is commonly represented.

Inclusion 5

Slope: 20 to 50 percent

Landform position: south facing sideslopes

Potential Natural Community

- mountain brush communities

Present Vegetation

- Tall shrub communities dominated by bigtooth maple, black chokecherry or Saskatoon serviceberry.

Soils: Soils like Povey that are 20 to 60 inches deep to fragmental material.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Small slump-earth flows and slumps are common. Block and rock falls are present.
- This ecological unit has a high potential for avalanches. Avalanche chutes and runout areas occur below dominant ridges in some areas.
- Curlleaf mountain mahogany and juniper are suggested as seral species in this ecological unit.
- The use of heavy equipment for woodland management is severely limited because of slope.

ABLA/PHMA5 Lagall

- Fencing is severely limited because the soils are too rocky.

PSME/ARTRV Povey

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

PSME/BERE,SYOR2 Fritz

- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/PHMA5 Lagall Ecological Type description on page 277.
- PSME/ARTRV Povey Ecotone description on page 425.
- PSME/BERE,SYOR2 Fritz Ecological Type description on page 434.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1222—ABLA/ACGL Koffgo - PSME/SYAL Lagall - ABLA/ACGL Rhylow complex, 50 to 70 percent slopes

Summary

This ecological unit is on incised canyons in the mid portion of the forested zone (Fig. 35). The landscape is characterized by deeply incised canyons with moist north facing and warm south facing sideslopes. Slopes are convex. Relief is 200 to 500 feet. The north facing sideslopes are lightly to moderately dissected by low spur ridges and shallow draws. They support closed canopy forests of mixed conifers. The south facing sideslopes are moderately or strongly dissected by parallel bands of cliffs, shelves and narrow benches. They support open canopy forests of mixed conifers over a diverse layer of mountain shrubs with variable cover. Rock outcrops are common.

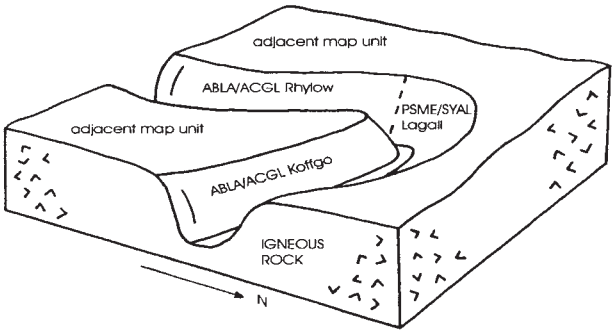


Figure 35. Block diagram of ecological unit 1222.

Ecological Unit Setting

Subsection: Island Park
Landform: canyons
Elevations: 5300 to 6600 feet
Average annual precipitation: 24 inches
Average annual air temperature: 37 degrees F
Geology: igneous

Ecological Unit Composition

40 percent - ABLA/ACGL Koffgo Ecological Type
25 percent - PSME/SYAL Lagall Ecological Type
15 percent - ABLA/ACGL Rhylow Ecological Type
20 percent - contrasting inclusions

ABLA/ACGL Koffgo (40%)

Setting

Slopes: 50 to 70 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation
- subalpine fir/Rocky Mountain maple p.a.
- Douglas-fir/Rocky Mountain maple community
- quaking aspen/Scouler's willow c.t.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:
- 2 to 0 inches - forest litter
- 0 to 9 inches - dark grayish brown gravelly loam
- 9 to 16 inches - light brownish gray extremely gravelly sandy loam
- 16 to 54 inches - light brownish gray extremely stony sandy loam
- 54 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 2.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 4

PSME/SYAL Lagall (25%)

Setting

Slopes: 50 to 70 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- Douglas-fir/white spirea community

Soils

Name: Lagall series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - very dark gray very gravelly loam
- 7 to 15 inches - very dark grayish brown extremely cobbly sandy loam
- 15 to 23 inches - pale brown extremely cobbly loam
- 23 to 60 inches - pale brown extremely cobbly loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.0 inches

AWC, surface to 60 inches: 3.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.15

T factor: 5

ABLA/ACGL Rhylow (15%)

Setting

Slopes: 50 to 70 percent

Landform position: east and west facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation

- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- Douglas-fir/Rocky Mountain maple community
- Douglas-fir/white spirea community
- Tall shrub communities dominated by Greene mountainash or Rocky Mountain maple.

Soils

Name: Rhylow series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 14 inches - brown very gravelly loam
- 14 to 30 inches - pale brown very gravelly sandy loam
- 30 to 50 inches - light brownish gray extremely cobbly sandy loam
- 50 to 60 inches - light gray extremely cobbly sandy loam

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 2.0 inches

AWC, surface to 60 inches: 4.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.10

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 35 to 75 percent

Landform position: south facing sideslopes

Potential Natural Community

- Douglas-fir/white spirea p.a., pinegrass phase

Present Vegetation

- Douglas-fir/white spirea p.a., pinegrass phase

Soils: Soils like Koffgo that are less than 40 inches deep to hard bedrock.

Inclusion 2

Landform position: all positions

Present Vegetation

- Diverse communities of dispersed trees, shrubs, forbs or grasses are common along fractures in the bedrock.

Rock: Rock outcrops that consist of surface level exposures to parallel bands of cliffs 100 feet or more in height.

Comment: The rock outcrops commonly occur as surface level exposures on north facing spur ridges. On south facing sideslopes the rock outcrops occur in long, linear bands that run across the slope. Both surface level exposures and cliffs are represented on the south facing sideslopes.

Inclusion 3

Slope: 15 to 50 percent

Landform position: north and east facing shoulders

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.

Soils: Soils that have a silt loam or gravelly silt loam texture to depths of 40 inches or more.

Inclusion 4

Slope: 40 to 60 percent

Landform position: north and east facing footslopes

Potential Natural Community

- subalpine fir/red baneberry p.a.

Present Vegetation

- subalpine fir/red baneberry p.a.

Soils: Soils like Koffgo that are more moist and cool.

Management and Limitations

- Revegetating cut and fill slopes is severely limited because of slope and the soils are droughty.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Unsurfaced roads and foot and saddlestock trails are severely limited because of slope.
- Shallow excavations are severely limited because of large stones or slope.

ABLA/ACGL Koffgo

- Fencing is severely limited because the soils are too rocky.

PSME/SYAL Lagall

- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/ACGL Koffgo Ecological Type description on page 243.
- PSME/SYAL Lagall Ecological Type description on page 460.
- ABLA/ACGL Rhylow Ecological Type description on page 246.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1224—ABLA/VAGL,PAMY Huckridge - ABLA/VAGL, PAMY Koffgo - PSME/ARTRV Povey complex, 4 to 50 percent slopes

Summary

This ecological unit is on dissected tablelands in the warm portion of the forested zone (Fig. 36). The topography is characterized by a parallel pattern of summits, with rolling to hilly slopes, and incised drainageways with short, steep sideslopes. Relief is commonly 50 to 300 feet. The summits and north facing sideslopes support reforesting clearcuts and closed canopy forests. Diverse communities dominated by shrubs and grasses with widely dispersed conifers are supported on south facing sideslopes.

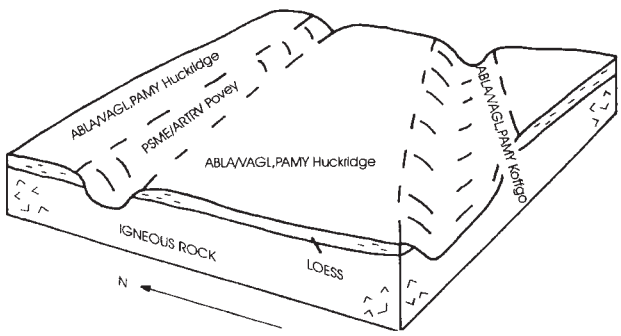


Figure 36. Block diagram of ecological unit 1224.

Ecological Unit Setting

Subsection: Big Hole Mountains, Island Park and Teton Range
Landform: dissected tablelands
Elevations: 5300 to 7300 feet
Average annual precipitation: 24 inches
Average annual air temperature: 36 degrees F
Geology: igneous

Ecological Unit Composition

30 percent - ABLA/VAGL,PAMY Huckridge Ecological Type
30 percent - ABLA/VAGL,PAMY Koffgo Ecological Type
15 percent - PSME/ARTRV Povey Ecotone
25 percent - contrasting inclusions

ABLA/VAGL,PAMY Huckridge (30%)

Setting

Slopes: 4 to 30 percent
Landform position: summits and footslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community
- Douglas-fir/white spirea community
- Douglas-fir/pinegrass community
- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Communities that have a shrub layer of whortleleaf snowberry or white spirea with an herbaceous layer dominated by elk sedge, pinegrass or non-native grasses.
- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Soils

Name: Huckridge series
Taxonomic class: Fine-silty, mixed, superactive Vitrandic Paleboralfs
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 0 to 5 inches - light brownish gray silt loam
- 5 to 27 inches - very pale brown silt loam
- 27 to 48 inches - yellowish brown and very pale brown silt loam
- 48 to 59 inches - light yellowish brown silt loam
- 59 to 70 inches - very pale brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none

Kw factor: 0.43
T factor: 5

ABLA/VAGL,PAMY Koffgo (30%)

Setting

Slopes: 15 to 50 percent
Landform position: north facing sideslopes and summits

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community
- Douglas-fir/white spirea community
- Douglas-fir/pinegrass community
- lodgepole pine/elk sedge c.t.
- lodgepole pine/pinegrass c.t.
- Herbaceous communities dominated by elk sedge or pinegrass.

Soils

Name: Koffgo series
Classification: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - grayish brown gravelly silt loam
- 7 to 16 inches - pale brown very gravelly silt loam
- 16 to 55 inches - light gray very cobbly sandy loam
- 55 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

PSME/ARTRV Povey (15%)

Setting

Slopes: 20 to 50 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community
An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Communities that have a shrub layer of whortleleaf snowberry, snowbrush ceanothus, or subalpine big sagebrush with an herbaceous layer dominated by California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through large Douglas-fir, lodgepole pine or Rocky Mountain juniper.
- Douglas-fir/whortleleaf snowberry p.a.

Soils

Name: Povey series
Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls
Parent material: local alluvium or colluvium derived from igneous rocks and loess
Typical profile:

- 0 to 27 inches - dark grayish brown gravelly loam
- 27 to 39 inches - dark grayish brown very gravelly sandy loam
- 39 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 5

Contrasting Inclusions (25%)

Inclusion 1

Slope: 15 to 50 percent
Landform position: south facing sideslopes and shoulders

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Diverse communities that have a dispersed to open tree canopy of Douglas-fir or Rocky Mountain juniper over a shrub and herbaceous layer dominated by whortleleaf snowberry, snowbrush ceanothus, arrowleaf balsamroot or annual forbs.

Soils: Loamy soils that are less than 20 inches deep to hard bedrock.

Inclusion 2

Slope: 4 to 20 percent

Landform position: summits and south facing shoulders

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.

Soils: Soils like Huckridge that are slightly more warm and have a dark colored surface layer greater than 10 inches thick (Paleboroll soils).

Inclusion 3

Slope: 25 to 50 percent

Landform position: south facing sideslopes in the mid and upper elevation range of the unit

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen-Douglas-fir/pinegrass c.t.
- quaking aspen-lodgepole pine/whortleleaf snowberry c.t.
- quaking aspen-lodgepole pine/elk sedge c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.

Soils: Soils like Povey that are more moist (Lagall soils).

Inclusion 4

Slope: 15 to 35 percent

Landform position: south facing shoulders in the lower elevation range of the unit

Potential Natural Community

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.
- mountain big sagebrush/whortleleaf snowberry/bluebunch wheatgrass community
- Shrub dominated communities that have widely dispersed seedling through medium Rocky Mountain juniper or Douglas-fir.

Soils: Loamy soils that have a dark colored surface layer, 16 to 27 inches thick, over a subsoil which has carbonates (Tetonia soils).

Inclusion 5

Slope: 4 to 25 percent

Landform position: footslopes and bottoms of incised drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase
- Douglas-fir/blue huckleberry community
- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Huckridge or Koffgo that are colder.

Management and Limitations

- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited on the sideslopes of incised drainageways because of slope or the soils erode easily.
- Shallow excavations are severely limited because of slope.
- Pond reservoir areas are severely limited because of slope.
- Off-road vehicle use is severely limited because of slope and the soils erode easily and compact easily.

ABLA/VAGL,PAMY Huckridge

- Blue huckleberry loses vigor and dies when the forest canopy is opened. This response suggests that the ABLA/VAGL,PAMY Huckridge Ecological Type is at the dry limit of the subalpine fir/blue huckleberry p.a., myrtle pachistima phase.
- The greatest potential for soil compaction occurs during periods of high soil moisture in late spring and early autumn. A 1 to 2 inch thick compaction pan beginning at surface level to depths of 12 inches has been observed in some areas.
- Foot and saddlestock trails are severely limited because the soils erode easily.
- Dust layers 2 to 8 inches thick have been observed in heavy traffic areas during late summer and early autumn. These dust layers may become saturated with water and erode during snowmelt periods.

ABLA/VAGL,PAMY Koffgo

- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- Revegetating cut and fill slopes is severely limited because of slope.
- Foot and saddlestock trails are severely limited because of slope.

PSME/ARTRV Povey

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.
- Activities severely limited because of slope include: the use of heavy equipment for rangeland management, foot and saddlestock trails, and revegetating cut and fill slopes.

Additional Information

- ABLA/VAGL,PAMY Huckridge Ecological Type description on page 298.
- ABLA/VAGL,PAMY Koffgo Ecological Type description on page 302.
- PSME/ARTRV Povey Ecotone description on page 425.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1225—PIAL Lasac - ABLA/VASC,VASC Castan complex, 30 to 60 percent slopes

Summary

This ecological unit is on escarpments of plateaus in the cold, moist portion of the forested zone (Fig. 37). The landscape is characterized by steep and very steep sideslopes that support closed canopy forests. Relief is commonly 200 to 600 feet. Low spur ridges and shallow draws strongly dissect the sideslopes in a parallel pattern. The upper sideslopes of the escarpments are convex and the lower sideslopes are concave.

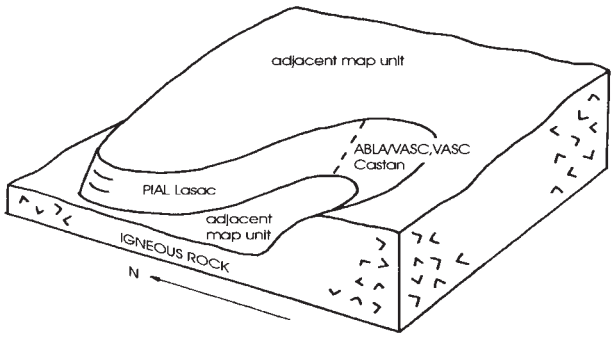


Figure 37. Block diagram of ecological unit 1225.

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: escarpments of plateaus
Elevations: 6500 to 8000 feet
Average annual precipitation: 40 inches
Average annual air temperature: 34 degrees F
Geology: igneous

Ecological Unit Composition

60 percent - PIAL Lasac Mosaic
20 percent - ABLA/VASC,VASC Castan Ecological Type
20 percent - contrasting inclusions

PIAL Lasac (60%)

Setting

Slopes: 35 to 60 percent
Landform position: spur ridges and south and west facing sideslopes

Vegetation

Potential Natural Community

A mosaic of:
- whitebark pine/elk sedge p.a.
- whitebark pine/grouse whortleberry p.a.

Comment: The whitebark pine/elk sedge p.a. is commonly on south aspects and the whitebark pine/grouse whortleberry p.a. is commonly on west aspects.

Present Vegetation

A mosaic of:
- whitebark pine/elk sedge p.a.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils

Name: Lasac series
Taxonomic class: Ashy-skeletal, glassy Vitrandic Cryochrepts
Parent material: local alluvium, colluvium or residuum derived from tephra and loess
Typical profile:
- 1 to 0 inches - forest litter
- 0 to 6 inches - brown gravelly silt loam
- 6 to 10 inches - pale brown gravelly silt loam
- 10 to 17 inches - pale brown extremely gravelly loamy sand
- 17 to 60 inches - variegated very gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.0 inches
Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 5

ABLA/VASC,VASC Castan (20%)

Setting

Slopes: 30 to 50 percent
Landform position: north facing sideslopes and footslopes with all aspects

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- Lodgepole pine dominated communities that have widely dispersed subalpine fir.

Soils

Name: Castan series

Taxonomic class: Ashy-skeletal, glassy Humic Vitricryands

Parent material: colluvium or residuum derived from tephra and loess

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 11 inches - brown cobbly silt loam
- 11 to 16 inches - brown cobbly loam
- 16 to 49 inches - pale brown and very pale brown extremely gravelly sandy loam
- 49 to 60 inches - pale brown extremely gravelly loamy sand

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 6.0 inches

AWC, surface to 60 inches: 10.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.15

T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 20 to 50 percent

Landform position: south facing swales

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- subalpine fir/pinegrass p.a., pinegrass phase
- lodgepole pine/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- quaking aspen-subalpine fir/elk sedge c.t.

Soils: Soils like Castan that are more dry and warm.

Inclusion 2

Landform position: spur ridges

Rock: Rock outcrops that consist of surface level exposures to irregular cliffs 20 feet in height.

Management and Limitations

- Severe rill or gully erosion on exposed soil has been observed following a single rain event.
- Severe hydrophobic conditions in the soil surface layers have been observed after fires. These hydrophobic conditions increase surface runoff and increase the potential for erosion.
- Revegetating with grasses or forbs after fire is limited because of hydrophobic soil conditions and slope.
- Revegetating cut and fill slopes is severely limited because of slope and the soils are too stony.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Shallow excavations are severely limited because cutbanks cave.
- Fencing is severely limited because the soils are too rocky.

Additional Information

- PIAL Lasac Mosaic description on page 389.
- ABLA/VASC,VASC Castan Ecological Type description on page 332.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1228—PSME/CARU,CARU Nopla, 2 to 15 percent slopes

Summary

This ecological unit is on plains and dissected shield volcanos in the cool portion of the forested zone (Fig. 38). The landscape is characterized by undulating to rolling slopes that support forests of mixed conifers and quaking aspen or reforesting clearcuts.

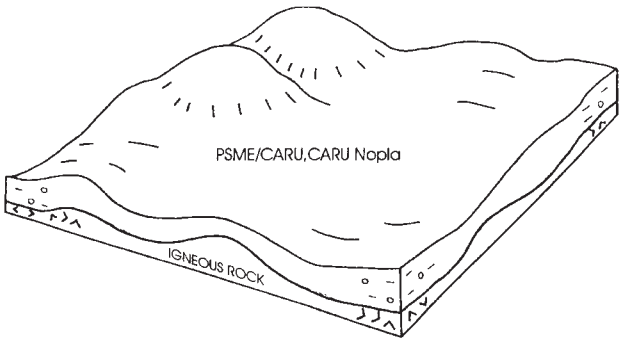


Figure 38. Block diagram of ecological unit 1228.

Ecological Unit Setting

Subsection: Island Park
Landform: plains and shield volcanos
Elevations: 6000 to 7000 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

80 percent - PSME/CARU,CARU Nopla Ecological Type
20 percent - contrasting inclusions

PSME/CARU,CARU Nopla (80%)

Setting

Slopes: 2 to 15 percent
Landform position: all positions

Vegetation

Potential Natural Community

- Douglas-fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass p.a., pinegrass phase
- lodgepole pine/pinegrass c.t.
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- Douglas-fir/whortleleaf snowberry community
- Herbaceous communities dominated by elk sedge or pinegrass with lesser amounts of fireweed, sticky cinquefoil or sticky geranium.

Soils

Name: Nopla series
Taxonomic class: Fine-loamy, mixed, superactive Cryic Paleborolls
Parent material: local alluvium derived from loess, volcanic ash and igneous rocks
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 14 inches - brown silt loam
- 14 to 24 inches - pale brown silt loam
- 24 to 39 inches - yellowish brown and pale brown gravelly silt loam
- 39 to 54 inches - brown very cobbly loam
- 54 to 75 inches - brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 9.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 8 to 20 percent
Landform position: north facing sideslopes of low ridges

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Nopla that are more moist and cool.

Inclusion 2

Slope: 2 to 12 percent

Landform position: north facing footslopes of low ridges

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils: Soils that have a light colored surface layer, 40 inches or more thick, with a silt loam texture (Islandpark soils).

Inclusion 3

Slope: 8 to 20 percent

Landform position: south facing shoulders and sideslopes of low ridges

Potential Natural Community

- Douglas-fir/whortleleaf snowberry p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a shrub layer of whortleleaf snowberry with an herbaceous layer of California brome.

Soils: Dark colored, loamy soils that have 5 to 20 percent stones or boulders in the surface layer and greater than 35 percent stones or boulders in the subsoil.

Inclusion 4

Slope: 0 to 2 percent

Landform position: sloughs and drainageways

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- quaking aspen/tall forb c.t.

Soils: Soils like Nopla that are somewhat poorly drained.

Comment: This inclusion occurs in the Icehouse, Bunkhouse, Willow and Meyers Creek areas. Many of the sloughs and drainageways in these areas have an induced water table resulting from beaver activity in adjacent stream channels.

Inclusion 5

Landform position: all positions

Potential Natural Community

- Douglas-fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass p.a., pinegrass phase
- lodgepole pine/pinegrass c.t.
- Douglas-fir/whortleleaf snowberry community
- Herbaceous communities dominated by elk sedge or pinegrass with lesser amounts of fireweed, sticky cinquefoil or sticky geranium.

Soils: Dark colored, loamy soils that are 20 to 40 inches deep to hard bedrock.

Management and Limitations

- Unsurfaced roads and parking areas are severely limited because of low strength.
- The slopes of this ecological unit have a high potential for mass movement. Slump-earth flows and small slumps are common in some areas.
- Pond reservoir areas are severely limited because of slope.
- Most natural regeneration of Douglas-fir occurs under shelterwood cuts without site preparation. However, residual forest litter layers are a very inefficient seedbed and moss mats are a very effective seedbed for Douglas-fir.
- The following shrubs and trees provide an effective shade cover for natural regeneration of Douglas-fir during early and mid seral conditions: subalpine big sagebrush, snowbrush ceanothus, Scouler's willow, Saskatoon serviceberry, white spirea, quaking aspen or Douglas-fir. Inefficient covers include whortleleaf snowberry, currants and lodgepole pine.
- Survival of planted Douglas-fir appears greatest on sites that have been broadcast burned. Broadcast burning tends to provide more site protection for tree seedlings than other treatments.
- Most natural regeneration of lodgepole pine occurs under shelterwood cuts that have been lightly scarified. Shelterwood cuts that have been broadcast burned have slightly less natural regeneration by lodgepole pine. Natural regeneration of lodgepole pine in shelterwood cuts without site preparation is about half that of lightly scarified treatments.
- Douglas-fir in shelterwood cuts provide an effective shade cover for the natural regeneration of lodgepole pine. Timber harvest slash, currants, whortleleaf snowberry and Scouler's willow provide inefficient shade cover for the natural regeneration of lodgepole pine.
- Pinegrass, elk sedge and smooth brome can create severe competition for tree and shrub seedlings, mainly through extreme root and rhizome development. The sod forming grasses

effectively restrict tree and shrub regeneration from seed by depleting soil moisture prior to seedling establishment.

- In early and mid seral conditions, machine scarification decreases pinegrass and elk sedge cover and increases sticky geranium cover. Sticky geranium is a preferred gopher forage species. Gophers may forage on pine during the winter when sticky geranium and other forbs are unavailable.

Additional Information

- PSME/CARU,CARU Nopla Ecological Type description on page 440.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1230—PSME/SPBE2,CARU Vitricryands, 35 to 60 percent slopes

Summary

This ecological unit is on mountains in the cool portion of the forested zone (Fig. 39). The landscape is characterized by droughty, south facing sideslopes that support closed canopy forests. The sideslopes are lightly to moderately dissected by shallow draws and low spur ridges in a dendritic pattern.

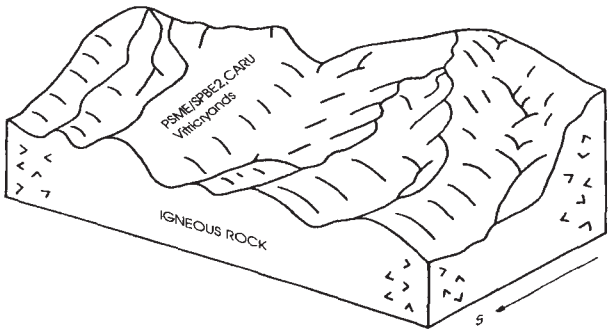


Figure 39. Block diagram of ecological unit 1230.

Ecological Unit Setting

Subsection: Island Park
Landform: mountains
Elevations: 6800 to 8000 feet
Average annual precipitation: 30 inches
Average annual air temperature: 34 degrees F
Geology: igneous

Ecological Unit Composition

80 percent - PSME/SPBE2,CARU Vitricryands Ecological Type
20 percent - contrasting inclusions

PSME/SPBE2,CARU Vitricryands (80%)

Setting

Slopes: 35 to 60 percent
Landform position: sideslopes and ridges

Vegetation

Potential Natural Community

- Douglas-fir/white spirea p.a., pinegrass phase

Present Vegetation

- Douglas-fir/white spirea p.a., pinegrass phase
- lodgepole pine/white spirea c.t.
- Douglas-fir/pinegrass community
- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.

Soils

Name: Vitricryands family
Taxonomic class: Ashy-skeletal, glassy Typic Vitricryands
Parent material: local alluvium, colluvium or residuum derived from tephra and loess
Typical profile:

- 0 to 8 inches - grayish brown gravelly sandy loam
- 8 to 19 inches - very pale brown very gravelly sandy loam
- 19 to 30 inches - very pale brown extremely gravelly loamy sand
- 30 to 60 inches - very pale brown extremely cobbly loamy sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 4.5 inches
Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 35 to 60 percent
Landform position: sideslopes and draws

Potential Natural Community

- Douglas-fir/whortleleaf snowberry p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a shrub layer of whortleleaf snowberry or white spirea with an herbaceous layer dominated by native or non-native grasses or mesic forbs.

Soils: Well drained, loamy soils that have a dark colored surface layer greater than 16 inches thick

and are greater than 60 inches deep to the substratum (Povey soils).

Inclusion 2

Slope: 15 to 45 percent

Landform position: footslopes and bottom of drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- Douglas-fir/blue huckleberry community
- lodgepole pine/blue huckleberry c.t.

Soils: Soils like the Vitricryands that are more moist and have a dark colored surface layer greater than 10 inches thick (Castan soils).

Management and Limitations

- Revegetating cut and fill slopes is severely limited because of slope and the soils are too sandy.
- Shallow excavations are severely limited because cutbanks cave.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

Additional Information

- PSME/SPBE2,CARU Vitricryands Ecological Type description on page 457.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1250—PSME/ARTRV Povey, 4 to 30 percent slopes

Summary

This ecological unit is on canyons and foothills in a broad transitional area between the shrub steppe and forested zones (Fig. 40). The landscape is characterized by south facing sideslopes that support diverse communities dominated by shrubs and grasses. Widely dispersed conifers are common in some areas. Complex slopes are common in the foothills and convex slopes are common in the canyons.

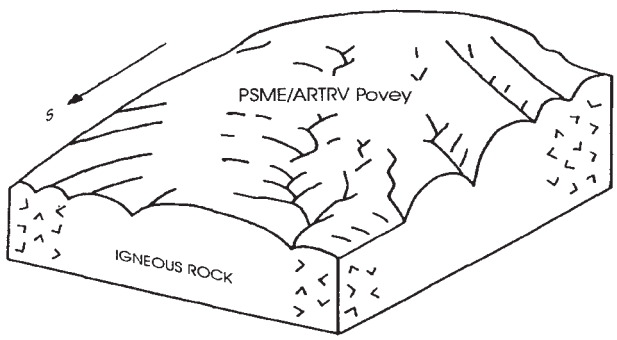


Figure 40. Block diagram of ecological unit 1250.

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains and Island Park
Landform: canyons and foothills
Elevations: 5300 to 7500 feet
Average annual precipitation: 19 inches
Average annual air temperature: 39 degrees F
Geology: igneous

Ecological Unit Composition

85 percent - PSME/ARTRV Povey Ecotone
15 percent - contrasting inclusions

PSME/ARTRV Povey (85%)

Setting

Slopes: 4 to 30 percent
Landform position: sideslopes

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome pa.

Present Vegetation

- Communities that have a shrub layer of mountain big sagebrush, subalpine big sagebrush, snowbrush ceanothus or whortleleaf snowberry with an herbaceous layer dominated by needleandthread, California brome, slender wheatgrass or bluebunch wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through pole Douglas-fir.
- Douglas-fir/whortleleaf snowberry p.a.

Soils

Name: Povey series
Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls
Parent material: local alluvium or colluvium derived from igneous rocks and loess
Typical profile:

- 0 to 27 inches - dark grayish brown gravelly loam
- 27 to 39 inches - dark grayish brown very gravelly sandy loam
- 39 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 2 to 15 percent
Landform position: toes of scarp slopes (commonly associated with scoured positions)

Potential Natural Community

An ecotone of:

- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/needleandthread community
- Herbaceous communities dominated by annual forbs.

Soils: Loamy soils that have less than 35 percent rock fragments and are less than 20 inches deep to hard bedrock (Spliten soils).

Inclusion 2

Slope: 2 to 8 percent

Landform position: summits and shoulders

Potential Natural Community

An ecotone of:
- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome pa.

Present Vegetation
- Communities that have a shrub layer of mountain big sagebrush, subalpine big sagebrush, whortleleaf snowberry or snowbrush ceanothus with an herbaceous layer dominated by bluebunch wheatgrass, needleandthread, California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils: Soils like Povey that are 20 to 40 inches deep to hard bedrock.

Inclusion 3

Slope: 2 to 20 percent

Landform position: toes of scarp slopes (commonly associated with depositional positions) and sideslopes

Potential Natural Community
- Douglas-fir/whortleleaf snowberry p.a.

Present Vegetation
- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a layer of sapling quaking aspen or whortleleaf snowberry with an herbaceous layer of native or non-native grasses.

Soils: Soils like Povey that have 1 to 5 percent boulders in the surface layer.

Inclusion 4

Slope: 4 to 20 percent

Landform position: sideslopes, benches and draws

Potential Natural Community

An ecotone of:
- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome pa.

Present Vegetation
- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Communities that have a shrub layer of mountain big sagebrush, subalpine big sagebrush, whortleleaf snowberry or snowbrush ceanothus with an herbaceous layer dominated by bluebunch wheatgrass, needleandthread, California brome or slender wheatgrass.
- Seedling through medium Douglas-fir are common in some shrub dominated communities.

Soils: Soils like Povey that have a very gravelly sandy clay loam or clay loam texture in the subsoil.

Inclusion 5

Slope: 30 to 50 percent

Landform position: sideslopes

Potential Natural Community

An ecotone of:
- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome pa.

Present Vegetation
- mountain big sagebrush/Idaho fescue p.a.
- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a shrub layer of mountain big sagebrush, subalpine big sagebrush, whortleleaf snowberry or snowbrush ceanothus with an herbaceous layer dominated by bluebunch wheatgrass, needleandthread, California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils: Povey soils.

Management and Limitations

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining

factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

- Off-road vehicle use is severely limited because the soils erode easily and compact easily.
- The use of heavy equipment for rangeland management is severely limited because of slope.

Additional Information

- PSME/ARTRV Povey Ecotone description on page 425.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1270—ABLA/ARTRS2 Cryumbrepts - Rock Outcrop complex, 25 to 60 percent slopes

Summary

This ecological unit is on mountains in a transitional area between the forested and alpine zones. The landscape is characterized by steep, droughty, south facing sideslopes that support open canopy forests (Fig. 41). This ecological unit has a scruffy appearance when compared to adjacent units. Slopes are complex. They are lightly to strongly dissected by low spur ridges, shallow draws and irregular bedrock controlled benches.

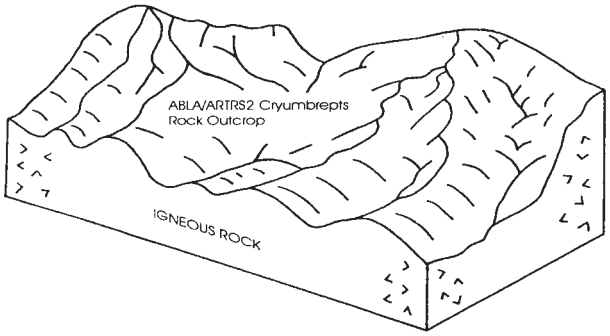


Figure 41. Block diagram of ecological unit 1270.

Ecological Unit Setting

Subsection: Centennial Mountains, Big Hole Mountains and Teton Range
Landform: mountains
Elevations: 7600 to 10,000 feet
Average annual precipitation: 33 inches
Average annual air temperature: 32 degrees F
Geology: igneous

Ecological Unit Composition

65 percent - ABLA/ARTRS2 Cryumbrepts Mosaic
15 percent - Rock Outcrop
20 percent - contrasting inclusions

ABLA/ARTRS2 Cryumbrepts (65%)

Setting

Slopes: 25 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community

A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- spiked big sagebrush/elk sedge p.a.

Present Vegetation

A mosaic of:

- subalpine fir/gooseberry currant p.a.
- Douglas-fir/whortleleaf snowberry community
- Douglas-fir/white spirea community
- spiked big sagebrush/elk sedge p.a.
- Communities that have an open shrub layer of spiked big sagebrush with an herbaceous layer dominated by one or more of the following: Ross' sedge, California brome, thickleaf groundsel, fireweed or common yarrow.

Soils

Name: Cryumbrepts family
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 0 to 5 inches - brown loam
- 5 to 20 inches - brown cobbly loam
- 20 to 31 inches - brown extremely cobbly loam
- 31 to 35 inches - weathered bedrock
- 35 inches - unweathered bedrock

Depth class: moderately deep (20 to 40 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to unweathered bedrock: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 2

Rock Outcrop (15%)

Setting

Landform position: all positions

Vegetation

Present Vegetation

- lichens

Rock

Name: Rock Outcrop

Features: Rock outcrops of hard igneous bedrock that consist of surface level exposures to broken escarpments more than 20 feet in height.

Contrasting Inclusions (20%)

Inclusion 1

Slope: 15 to 70 percent

Landform position: all positions

Potential Natural Community

A mosaic of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- spiked big sagebrush/elk sedge p.a.

Present Vegetation

- Diverse communities of dispersed trees, shrubs, forbs and grasses.

Soils: Loamy soils that are less than 10 inches deep to hard bedrock.

Inclusion 2

Slope: 35 to 65 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/gooseberry currant p.a., whitebark pine phase

Present Vegetation

- subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils: Loamy soils that are greater than 40 inches deep to hard bedrock.

Inclusion 3

Landform position: avalanche chutes and north facing sideslopes

Rock: Rubble Land that consists of angular pebbles, cobbles, stones or boulders derived from mixed volcanic materials. Scree is commonly represented.

Inclusion 4

Slope: 25 to 60 percent

Landform position: sideslopes above 9000 feet elevation

Potential Natural Community

- whitebark pine/Ross' sedge p.a., Ross' sedge phase

Present Vegetation

- whitebark pine/Ross' sedge p.a., Ross' sedge phase

Soils: Somewhat excessively drained soils that are derived from tephra (Lasac soils).

Comment: This inclusion was observed only on Baldy and Slide Mountains.

Management and Limitations

- Off-road vehicle use is severely limited because of slope and the soils erode easily.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Revegetating cut and fill slopes is severely limited because of depth to rock.

Additional Information

- ABLA/ARTRS2 Cryumbrepts Mosaic description on page 252.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1280—Rubble Land - Low Alpine Forb Cryochrepts, loamy-skeletal - Rock Outcrop complex, 40 to 70 percent slopes

Summary

This ecological unit is on high relief cirque headwalls and mountain peaks in the alpine zone (Fig. 42). The landscape is characterized by very steep sideslopes that support depauperate communities of alpine forbs in a mosaic with rock outcrops and rubble land. When viewed from a distance this ecological unit has the appearance of bare rock. Both active and stable slopes are represented.

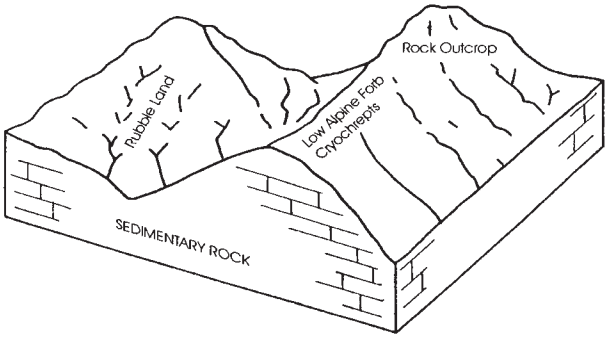


Figure 42. Block diagram of ecological unit 1280.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge and Centennial Mountains

Landform: mountains

Elevations: 8800 to 12,200 feet

Average annual precipitation: 30 inches

Average annual air temperature: 35 degrees F

Geology: sedimentary

Ecological Unit Composition

50 percent - Rubble Land

20 percent - Low Alpine Forb Cryochrepts, loamy-skeletal Ecological Type

15 percent - Rock Outcrop

15 percent - contrasting inclusions

Rubble Land (50%)

Setting

Landform position: draws

Rock

Name: Rubble Land

Features: Rubble Land that consists of angular pebbles, cobbles, stones or boulders derived from limestone. Scree, talus and moraines are commonly represented. Active creep is common on concave slopes dominated by pebbles.

Low Alpine Forb Cryochrepts, loamy-skeletal (20%)

Setting

Slopes: 40 to 70 percent

Landform position: spur ridges

Vegetation

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Communities that have an open, low shrub and herbaceous layer dominated by one or more of the following: Hayden's clover, smooth larkspur, Nuttall's sandwort, Gordon's ivesia, rock sedge, Sandberg bluegrass, Michaux's sagebrush, common twinpod, Cusick's giant hyssop, gooseberry currant or green rabbitbrush.

Soils

Name: Cryochrepts, loamy-skeletal subgroup

Taxonomic class: Typic Cryochrepts

Parent material: local alluvium or colluvium derived from limestone

Typical profile:

- 0 to 2 inches - pale brown extremely gravelly sandy loam
- 2 to 8 inches - brown very gravelly fine sandy loam
- 8 to 36 inches - pale brown extremely cobbly sandy loam
- 36 inches - fractured limestone bedrock

Depth class: moderately deep through very deep

Permeability: moderately rapid

AWC, surface to 20 inches: 1.0 inches

AWC, surface to fractured limestone bedrock: 1.5 inches

Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.05
T factor: 2

Rock Outcrop (15%)

Setting

Landform position: all positions

Vegetation

Present Vegetation

- lichens

Rock

Name: Rock Outcrop

Features: Rock outcrops of hard limestone bedrock that consist of surface level exposures to irregular cliffs. The cliffs range up to 200 or more feet in height. Rock outcrops are most abundant on spur ridges, north facing slopes and peaks rising above mountain saddles.

Contrasting Inclusions (15%)

Inclusion 1

Slope: 4 to 35 percent
Landform position: summits and saddles

Potential Natural Community

- alpine grass and sedge communities

Present Vegetation

- Herbaceous communities dominated by short (less than 5 inches), sod-forming grasses and sedges. One or more of the following were observed in these communities: rock sedge, blackroot sedge, timberline bluegrass, Cusick bluegrass or Idaho fescue.

Soils: Soils like the Cryochrepts, loamy-skeletal that have a dark colored surface layer greater than 7 inches thick (Fritz soils).

Inclusion 2

Slope: 40 to 70 percent
Landform position: spur ridges in the lower elevation range of the unit

Potential Natural Community

- krummholz communities

Present Vegetation

- Krummholz communities dominated by Engelmann's spruce, subalpine fir, whitebark pine or limberpine. Species dominance varies with geographic area and aspect.

Soils: Soils like the Cryochrepts, loamy-skeletal that are well drained and greater than 40 inches deep to the substratum.

Management and Limitations

- The avalanche hazard is high because of slope, exposed landscape positions and snow accumulation.
- Pebble dominated Rubble Land, occurring in concave positions, has active creep and scree flows. Unstable slopes limit foot and saddlestock trails, shallow excavations, and revegetating cut and fill slopes.
- Shallow excavations are severely limited because of the depth to rock, large stones and slope.

Additional Information

- Low Alpine Forb Cryochrepts, loamy-skeletal Ecological Type description on page 384.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1294—ARTRP4/SYOR2/FEID Tetonia - PSME/OSCH Rin complex, 15 to 35 percent slopes

Summary

This ecological unit is on dissected tablelands and foothills in a narrow transitional area between the cool, moist portion of the shrub steppe zone and the warm portion of the forested zone (Fig. 43). The landscape is characterized by hilly slopes that support a mosaic of communities dominated by quaking aspen or sagebrush.

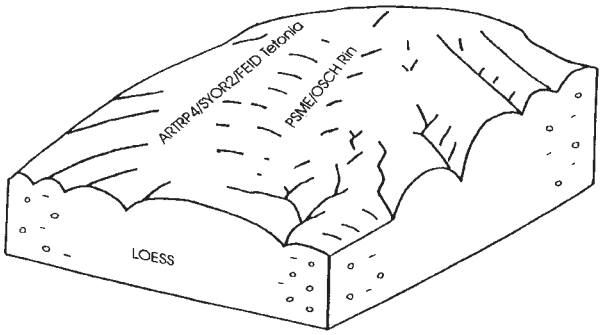


Figure 43. Block diagram of ecological unit 1294.

Ecological Unit Setting

Subsection: Big Hole Mountains and Caribou Range Mountains
Landform: dissected tablelands and foothills
Elevations: 5300 to 6500 feet
Average annual precipitation: 18 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

40 percent - ARTRP4/SYOR2/FEID Tetonia Ecological Type
40 percent - PSME/OSCH Rin Ecological Type
20 percent - contrasting inclusions

ARTRP4/SYOR2/FEID Tetonia (40%)

Setting

Slopes: 15 to 35 percent
Landform position: ridges and south facing sideslopes

Vegetation

Potential Natural Community

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.
- Communities that have a shrub layer of threetip sagebrush with an herbaceous layer dominated by Idaho fescue, Kentucky bluegrass or cheatgrass.

Soils

Name: Tetonia series
Taxonomic class: Coarse-silty, mixed, superactive Calcic Pachic Cryoborolls
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 7 inches - dark grayish brown silt loam
- 7 to 22 inches - brown silt loam
- 22 to 60 inches - light gray silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 11.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.37
T factor: 5

PSME/OSCH Rin (40%)

Setting

Slopes: 15 to 35 percent
Landform position: draws and north facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium lodgepole pine and Douglas-fir.

Soils

Name: Rin series

Taxonomic class: Coarse-silty, mixed, superactive Pachic Cryoborolls

Parent material: local alluvium derived from loess

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 29 inches - dark grayish brown silt loam
- 29 to 60 inches - light brownish gray silt loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 4.0 inches

AWC, surface to 60 inches: 12.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.43

T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 35 percent

Landform position: north facing sideslopes and draws

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.

Soils: Soils like Rin that have a silty clay loam texture or 5 to 65 percent rock fragments, or both, in the subsoil.

Inclusion 2

Slope: 15 to 50 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Douglas-fir/pinegrass community
- quaking aspen-lodgepole pine/elk sedge c.t.
- quaking aspen-Douglas-fir/pinegrass c.t.

Soils: Soils that have a light colored surface layer, 24 to 40 inches thick, with a silt loam texture (Huckridge soils).

Inclusion 3

Slope: 35 to 60 percent

Landform position: south facing sideslopes and shoulders

Potential Natural Community

- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- basin big sagebrush/bluebunch wheatgrass p.a.
- An open canopy of Rocky Mountain juniper is present in some communities.

Soils: Soils like Tetonia that have a dark colored surface layer less than 16 inches thick and 35 to 65 percent rock fragments in the subsoil and substratum.

Management and Limitations

- Off-road vehicle use is severely limited because the soils erode easily.
- Foot and saddlestock trails are severely limited because the soils erode easily.

Additional Information

- ARTRP4/SYOR2/FEID Tetonia Ecological Type description on page 367.
- PSME/OSCH Rin Ecological Type description on page 455.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1303—ABLA/OSCH,PAMY Edgway - ABLA/THOC Jumpstart - PSME/ARTRV Tophat complex, 15 to 50 percent slopes

Summary

This ecological unit is on unstable foothills and mountains in a broad transitional area between the cool, moist portion of the shrub steppe zone and the warm portion of the forested zone (Fig. 44). The landscape is characterized by complex slopes with moderate relief that support a mosaic of communities dominated by sagebrush, mountain shrubs, quaking aspen and mixed conifers. A blending of distinct communities and of species is represented in the mosaic. Slopes are short. They are frequently broken by small benches and low scarps. Spur ridges and draws moderately dissect the slopes in dendritic and trellis patterns. Mass movements are common.

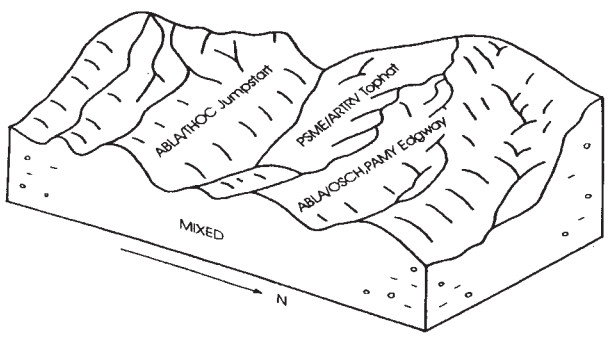


Figure 44. Block diagram of ecological unit 1303.

Ecological Unit Setting

Subsection: Big Hole Mountains, Caribou Range Mountains, Centennial Mountains, Teton Range and Lemhi-Medicine Lodge

Landform: foothills and mountains

Elevations: 5600 to 8000 feet

Average annual precipitation: 25 inches

Average annual air temperature: 37 degrees F

Geology: mixed

Ecological Unit Composition

30 percent - ABLA/OSCH,PAMY Edgway Ecological Type

25 percent - ABLA/THOC Jumpstart Ecological Type

25 percent - PSME/ARTRV Tophat Ecotone

20 percent - contrasting inclusions

ABLA/OSCH,PAMY Edgway (30%)

Setting

Slopes: 15 to 50 percent

Landform position: sideslopes, ridges and summits

Vegetation

Potential Natural Community

- subalpine fir/sweetcicely p.a., myrtle pachistima phase

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- subalpine fir/sweetcicely p.a., myrtle pachistima phase
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen-subalpine fir/Saskatoon service-berry c.t.
- Douglas-fir/whortleleaf snowberry community

Soils

Name: Edgway series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Parent material: local alluvium or colluvium derived from mixed sources

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 11 inches - dark grayish brown silt loam
- 11 to 19 inches - pale brown silt loam
- 19 to 60 inches - light yellowish brown very cobbly silt loam

Depth class: very deep (greater than 60 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 3.5 inches

AWC, surface to 60 inches: 7.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.32
T factor: 5

ABLA/THOC Jumpstart (25%)

Setting

Slopes: 30 to 50 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a mixed tree canopy of subalpine fir, Douglas-fir, Engelmann's spruce, lodgepole pine and quaking aspen over an herbaceous layer dominated by Columbian brome.
- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.

Soils

Name: Jumpstart series
Taxonomic class: Fine, mixed, active Mollic Cryoboralfs
Parent material: local alluvium, colluvium or residuum derived from shale
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 9 inches - reddish brown silt loam
- 9 to 15 inches - light reddish brown silt loam
- 15 to 43 inches - reddish brown silty clay loam
- 43 to 60 inches - red silty clay loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 10.5 inches
Drainage class: moderately well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 5

PSME/ARTRV Tophat (25%)

Setting

Slopes: 15 to 50 percent
Landform position: south facing shoulders and sideslopes

Vegetation

Potential Natural Community
An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have a shrub layer of spiked big sagebrush or subalpine big sagebrush, with an herbaceous layer dominated by California brome, slender wheatgrass or bluebunch wheatgrass.
- Shrub communities dominated by whortleleaf snowberry or antelope bitterbrush.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir or Rocky Mountain juniper.

Soils

Name: Tophat series
Taxonomic class: Fine, mixed, superactive Argic Pachic Cryoborolls
Parent material: local alluvium, colluvium or residuum derived from mixed sources
Typical profile:

- 0 to 7 inches - very dark grayish brown cobbly loam
- 7 to 17 inches - reddish gray cobbly clay loam
- 17 to 34 inches - reddish brown cobbly clay loam
- 34 to 60 inches - reddish brown cobbly silty clay loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 8.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 8 to 30 percent
Landform position: basins, draws and footslopes

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a mixed tree canopy of subalpine fir, Douglas-fir, Engelmann's spruce, lodgepole pine and quaking aspen over an herbaceous layer dominated by Columbian brome.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/tall forb c.t.
- quaking aspen-subalpine fir/tall forb c.t.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium Douglas-fir, lodgepole pine or subalpine fir.

Soils: Soils that have a loamy surface layer, 15 to 30 inches thick, over a clayey subsoil with a high shrink-swell potential (Nearl soils).

Inclusion 2

Slope: 4 to 30 percent

Landform position: ridges and summits

Potential Natural Community

- tall forb communities

Present Vegetation

- Herbaceous communities dominated by mulesears wyethia and cutleaf balsamroot.

Soils: Clayey soils that form 1/8 to 5/8 inch wide cracks from the soil surface to depths of 30 to 50 inches (Etnass soils).

Inclusion 3

Slope: 15 to 50 percent

Landform position: south facing sideslopes

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Soils like Tophat that are slightly more dry and have carbonates in the subsoil (Quirt soils).

Inclusion 4

Slope: 4 to 60 percent

Landform position: windswept ridges

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Herbaceous communities that are dominated by Idaho fescue, bluebunch wheatgrass or other native grasses and sedges.

Soils: Loamy soils that lack carbonates, have 15 to 70 percent rock fragments, and are less than 20 inches deep to hard bedrock.

Inclusion 5

Slope: 15 to 70 percent

Landform position: ridges and south facing sideslopes

Potential Natural Community

- curlleaf mountain mahogany/bluebunch wheatgrass p.a.

Present Vegetation

- Communities that have a dispersed to closed layer of curlleaf mountain mahogany or Rocky Mountain juniper over a low shrub layer of mountain big sagebrush, whortleleaf snowberry, antelope bitterbrush or Oregongrape. Arrowleaf balsamroot and bluebunch wheatgrass are common in the herbaceous layer of these communities.

Soils: Loamy soils that have carbonates, have 15 to 70 percent rock fragments, and are less than 20 inches deep to hard or soft bedrock.

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Large slump-earth flows and small slumps are common.
- Activities severely limited because of slope include: use of heavy equipment for woodland harvest, shallow excavations, dwellings without basements and pond reservoir areas.
- Unsurfaced roads and parking areas are severely limited because of slope and low strength.
- Off-road vehicle use is severely limited because the soils erode easily.

ABLA/THOC Jumpstart

- Dwellings without basements are severely limited because the soils have a high shrink-swell potential.
- Fencing is severely limited because the soils have a high shrink-swell potential.

PSME/ARTRV Tophat

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big

sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

- Dwellings without basements are severely limited because the soils have a high shrink-swell potential.
- Fencing is severely limited because the soils have a high shrink-swell potential.

Additional Information

- ABLA/OSCH,PAMY Edgway Ecological Type description on page 271.
- ABLA/THOC Jumpstart Ecological Type description on page 286.
- PSME/ARTRV Tophat Ecotone description on page 428.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1307—ABLA/VAGL,PAMY Huckridge, 4 to 20 percent slopes

Summary

This ecological unit is on summits of dissected tablelands in the warm portion of the forested zone (Fig. 45). The landscape is characterized by rolling to hilly slopes that support reforesting clearcuts and closed canopy forests. Barchan dunes are common in some areas. Relief is less than 100 feet.

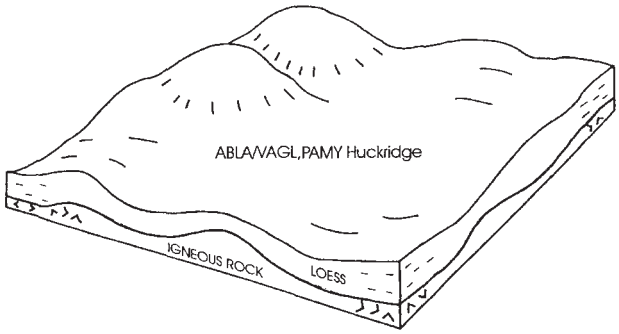


Figure 45. Block diagram of ecological unit 1307.

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5600 to 6700 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

90 percent - ABLA/VAGL,PAMY Huckridge Ecological Type
10 percent - contrasting inclusions

ABLA/VAGL,PAMY Huckridge (90%)

Setting

Slopes: 4 to 20 percent
Landform position: all positions

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by pinegrass, elk sedge or non-native grasses.
- Douglas-fir/blue huckleberry community
- Douglas-fir/common snowberry community
- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/common snowberry community
- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Soils

Name: Huckridge series
Taxonomic class: Fine-silty, mixed, superactive Vitrandic Paleboralfs
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 0 to 5 inches - light brownish gray silt loam
- 5 to 27 inches - very pale brown silt loam
- 27 to 48 inches - yellowish brown and very pale brown silt loam
- 48 to 59 inches - light yellowish brown silt loam
- 59 to 70 inches - very pale brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

Contrasting Inclusions(10%)

Inclusion 1

Slope: 20 to 35 percent
Landform position: short sideslopes of bowls and incised drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation
- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils: Huckridge soils

Inclusion 2

Slope: 1 to 4 percent

Landform position: drainageways

Potential Natural Community
- willow/grass and sedge dominated communities

Present Vegetation
- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Soils like Huckridge that are somewhat poorly or poorly drained.

Comment: The riparian communities represented by this inclusion commonly occupy narrow bands and stringers that are less than 40 feet in width.

Inclusion 3

Slope: 4 to 20 percent

Landform position: south facing shoulders and spur ridges

Potential Natural Community
- Douglas-fir/sweetcicely p.a.

Present Vegetation
- quaking aspen-lodgepole pine/whortleleaf snowberry c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen/whortleleaf snowberry/pinegrass c.t.

Soils: Soils that have a loamy, dark colored surface layer, 4 to 20 inches thick, over a loamy subsoil that has 15 to 60 percent rock fragments.

Management and Limitations

- Blue huckleberry loses vigor and dies when the forest canopy is opened. This response suggests that the ABLA/VAGL,PAMY Huckridge Ecological Type is at the dry limit of the subalpine fir/blue huckleberry p.a., myrtle pachistima phase.
- The greatest potential for soil compaction occurs during periods of high soil moisture in late spring and early autumn. A 1 to 2 inch thick compaction pan beginning at surface level to depths of 12 inches has been observed in some areas.
- Foot and saddlestock trails are severely limited because the soils erode easily.
- Off-road vehicle use is severely limited because the soils erode easily and compact easily.
- Dust layers 2 to 8 inches thick have been observed in heavy traffic areas during late summer and early autumn. These dust layers may become saturated with water and erode during snowmelt periods.

Additional Information

- ABLA/VAGL,PAMY Huckridge Ecological Type description on page 298.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1313—ARTRP4/FEID Cryoborolls, 8 to 35 percent slopes

Summary

This ecological unit is on fan remnants and foothills in the cool, moist portion of the shrub steppe zone (Fig. 46). The landscape is characterized by planar to hilly slopes that support communities dominated by sagebrush or grass. Slopes are lightly dissected by shallow draws and incised drainageways.

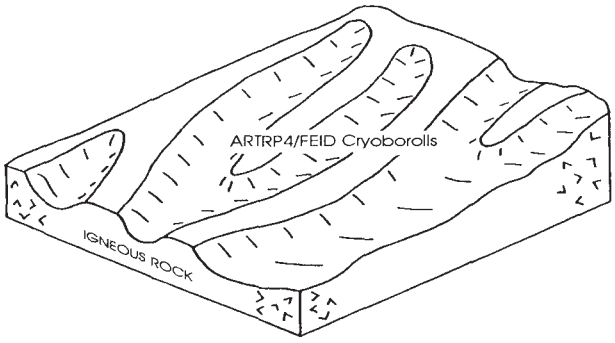


Figure 46. Block diagram of ecological unit 1313.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: fan remnants and foothills
Elevations: 6200 to 7600 feet
Average annual precipitation: 16 inches
Average annual air temperature: 36 degrees F
Geology: igneous

Ecological Unit Composition

85 percent - ARTRP4/FEID Cryoborolls Ecological Type
15 percent - contrasting inclusions

ARTRP4/FEID Cryoborolls (85%)

Setting

Slopes: 8 to 35 percent
Landform position: all positions

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Communities that have an open shrub layer of spineless horsebrush with an herbaceous layer of bluebunch wheatgrass.

Comment: Wyoming big sagebrush is present in most areas.

Soils

Name: Cryoborolls family
Taxonomic class: Loamy-skeletal, mixed, superactive Typic Cryoborolls
Parent material: colluvium or local alluvium derived from igneous rocks and loess
Typical profile:

- 0 to 15 inches - dark grayish brown gravelly silt loam
- 15 to 38 inches - pale brown very flaggy silt loam
- 38 to 53 inches - white extremely flaggy loam
- 53 to 60 inches - pale yellow very gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 3

Contrasting Inclusions (15%)

Inclusion 1

Slope: 20 to 40 percent
Landform position: south facing sideslopes of drainageways and foothills

Potential Natural Community

- Wyoming big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- Wyoming big sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush with an herbaceous layer of bluebunch wheatgrass.

Soils: Soils like the Cryoborolls that are slightly more warm and dry and have carbonates in the subsoil.

Inclusion 2

Slope: 30 to 50 percent

Landform position: north facing sideslopes of incised drainageways

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- Diverse communities that are dominated by sapling quaking aspen, Saskatoon serviceberry or black chokecherry.

Soils: Soils like the Cryoborolls that are more moist and lack carbonates in the subsoil.

Inclusion 3

Landform position: south facing draws and north facing sideslopes of incised drainageways

Present Vegetation

- lichens

Rock: Rubble land that consists of pebbles or flagstones and is derived from igneous rock. Scree is commonly represented.

Inclusion 4

Slope: 4 to 20 percent

Landform position: ridges

Potential Natural Community

A mosaic of:

- Wyoming big sagebrush/bluebunch wheatgrass p.a
- gray low sagebrush/ bluebunch wheatgrass p.a.

Present Vegetation

- Wyoming big sagebrush/bluebunch wheatgrass p.a
- gray low sagebrush/bluebunch wheatgrass p.a.
- Communities that have a shrub layer of spineless horsebrush or threetip sagebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Soils like the Cryoborolls that are less than 40 inches deep to hard bedrock.

Comment: This inclusion is commonly associated with windswept positions.

Management and Limitations

- Off-road vehicle use is severely limited because the soils erode easily.
- Fencing is severely limited because the soils are too rocky.
- Pond reservoir areas are severely limited because of seepage and slope.

Additional Information

- ARTRP4/FEID Cryoborolls Ecological Type description on page 349.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1315—ABLA/OSCH,PAMY Edgway - ABLA/VAGL,PAMY Koffgo - PSME/ARTRV Povey association, 15 to 50 percent slopes

Summary

This ecological unit is on foothills and mountains in the warm portion of the forested zone (Fig. 47). The topography is characterized by hilly slopes that are lightly to moderately dissected by incised drainageways. The drainageways have dry, south facing and moist, north facing sideslopes. Summits between drainageways support forests with variable canopy cover of mixed conifers and quaking aspen. Diverse communities dominated by shrubs and grasses with widely dispersed conifers are supported on the south facing drainageway sideslopes. Closed canopy forests are supported on the north facing drainageway sideslopes. Mass movements are present in some areas.

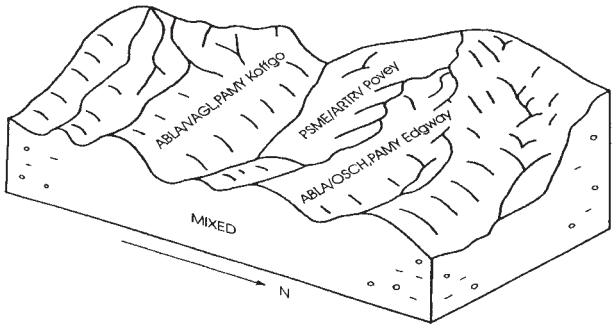


Figure 47. Block diagram of ecological unit 1315.

Ecological Unit Setting

Subsection: Big Hole Mountains and Teton Range
Landform: foothills and mountains
Elevations: 6000 to 7800 feet
Average annual precipitation: 26 inches
Average annual air temperature: 38 degrees F
Geology: mixed

Ecological Unit Composition

50 percent - ABLA/OSCH,PAMY Edgway Ecological Type
15 percent - ABLA/VAGL,PAMY Koffgo Ecological Type
15 percent - PSME/ARTRV Povey Ecotone
20 percent - contrasting inclusions

ABLA/OSCH,PAMY Edgway (50%)

Setting

Slopes: 15 to 40 percent
Landform position: summits and sideslopes

Vegetation

Potential Natural Community

- subalpine fir/sweetcicely p.a., myrtle pachistima phase

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- subalpine fir/sweetcicely p.a., myrtle pachistima phase
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen-subalpine fir/Saskatoon service-berry c.t.
- Douglas-fir/whortleleaf snowberry community

Soils

Name: Edgway series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 11 inches - dark grayish brown silt loam
- 11 to 19 inches - pale brown silt loam
- 19 to 60 inches - light yellowish brown very cobbly silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 7.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32

T factor: 5

ABLA/VAGL,PAMY Koffgo (15%)

Setting

Slopes: 30 to 50 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community
- Douglas-fir/common snowberry community

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - grayish brown gravelly silt loam
- 7 to 16 inches - pale brown very gravelly silt loam
- 16 to 55 inches - light gray very cobbly sandy loam
- 55 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

PSME/ARTRV Povey (15%)

Setting

Slopes: 30 to 50 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community
An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Communities that have a shrub layer of whortleleaf snowberry, snowbrush ceanothus, or subalpine big sagebrush with an herbaceous layer dominated by California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through large Douglas-fir, lodgepole pine or Rocky Mountain juniper.
- Douglas-fir/whortleleaf snowberry p.a.

Soils

Name: Povey series
Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks and loess
Typical profile:

- 0 to 27 inches - dark grayish brown gravelly loam
- 27 to 39 inches - dark grayish brown very gravelly sandy loam
- 39 to 60 inches - pale brown extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 25 to 50 percent
Landform position: south facing sideslopes

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.

- quaking aspen-Douglas-fir/Saskatoon serviceberry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/Fendler's meadowrue c.t.
- quaking aspen/Saskatoon serviceberry/brackenfern c.t.
- Shrub communities dominated by snowbrush ceanothus.

Soils: Soils like Povey that are more moist (Lagall soils).

Inclusion 2

Slope: 4 to 60 percent

Landform position: summits and south facing sideslopes

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community

Soils: Soils like Povey that are more dry.

Inclusion 3

Slope: 8 to 20 percent

Landform position: summits

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a tree canopy of Douglas-fir or quaking aspen with an herbaceous layer dominated by mesic forbs.

Soils: Soils that have a loamy surface layer, 15 to 30 inches thick, over a clayey subsoil with a high shrink-swell potential (Nearl soils).

Inclusion 4

Slope: 4 to 30 percent

Landform position: summits

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/pinegrass community
- Douglas-fir/blue huckleberry community
- Herbaceous communities that are dominated by elk sedge or pinegrass.

Soils: Light colored soils that have a silt loam texture to depths of 60 inches or more (Huckridge soils).

Inclusion 5

Slope: 4 to 20 percent

Landform position: bottom of draws

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Booth's willow/fowl bluegrass c.t.
- Booth's willow/beaked sedge c.t.
- Geyer's willow/fowl bluegrass c.t.

Soils: Loamy soils that are somewhat poorly or poorly drained (Cryaquoll soils).

Management and Limitations

- The slopes of this ecological unit have a moderate potential for mass movement. Slump-earth flows and small slumps are present in some areas.
- Shallow excavations are severely limited because of slope.
- Pond reservoir areas are severely limited because of slope.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

ABLA/VAGL,PAMY Koffgo

- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- Revegetating cut and fill slopes is severely limited because of slope.
- Shallow excavations are severely limited because of large stones.

PSME/ARTRV Povey

- The potential natural community of this ecological type may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland

philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.

Revegetating cut and fill slopes is severely limited because of slope.

Additional Information

- ABLA/OSCH,PAMY Edgway Ecological Type description on page 271.
- ABLA/VAGL,PAMY Koffgo Ecological Type description on page 302.
- PSME/ARTRV Povey Ecotone description on page 425.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1316—ABLA/VAGL,PAMY Koffgo - ABLA/THOC Koffgo - Rock Outcrop complex, 40 to 70 percent slopes

Summary

This ecological unit is on mountains in the mid portion of the forested zone (Fig. 48). The unit occurs in glacial troughs, cirques and on the north side of topographically dominant peaks and ridges. Very steep slopes supporting open canopy forests that are frequently dissected by avalanche chutes, rock outcrops and rubble land characterize the landscape. Mixed conifers are represented in the forest canopy. Communities dominated by tall shrubs or subalpine forbs are supported in the avalanche chutes. Mass movements are present in some areas.

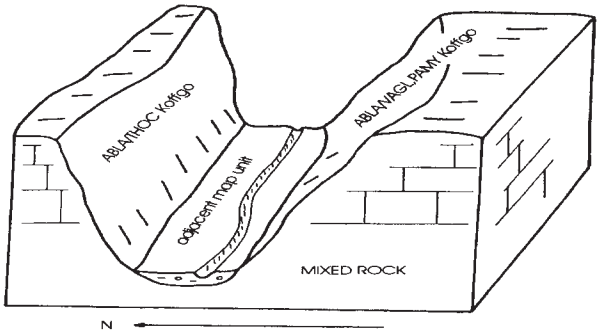


Figure 48. Block diagram of ecological unit 1316.

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains, Caribou Range Mountains and Teton Range

Landform: mountains

Elevations: 7200 to 9800 feet

Average annual precipitation: 32 inches

Average annual air temperature: 35 degrees F

Geology: mixed

Ecological Unit Composition

35 percent - ABLA/VAGL,PAMY Koffgo Ecological Type

30 percent - ABLA/THOC Koffgo Ecological Type

15 percent - Rock Outcrop

20 percent - contrasting inclusions

ABLA/VAGL,PAMY Koffgo (35%)

Setting

Slopes: 40 to 70 percent

Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- Shrub communities dominated by Greene mountainash or blue huckleberry are common in avalanche chutes.

Soils

Name: Koffgo series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - grayish brown gravelly silt loam
- 7 to 16 inches - pale brown very gravelly silt loam
- 16 to 55 inches - light gray very cobbly sandy loam
- 55 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 6.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.28

T factor: 4

ABLA/THOC Koffgo (30%)

Setting

Slopes: 40 to 70 percent

Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- The fernleaf licoriceroot-duncecap larkspur c.t. and the nettleleaf giant hyssop-showy goldeneye c.t. are common in avalanche chutes.

Soils

Name: Koffgo series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Parent material: local alluvium or colluvium derived from igneous or sedimentry rocks, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 2 inches - dark grayish brown gravelly loam
- 2 to 24 inches - yellowish brown very gravelly loam
- 24 to 45 inches - light yellowish brown extremely cobbly sandy loam
- 45 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 1.5 inches

AWC, surface to 60 inches: 2.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.10

T factor: 4

Rock Outcrop (15%)

Setting

Landform position: all positions

Vegetation

Present Vegetation

- lichens
- Diverse communities of dispersed trees, shrubs, forbs and grass associated with the subalpine fir/blue huckleberry p.a., myrtle pachistima phase and the subalpine fir/western meadowrue p.a. are common along fractures in the bedrock.

Rock

Name: Rock Outcrop

Features: Rock outcrops that consist of surface level exposures and broken or linear cliffs more than 100 feet in height. The rock outcrops are of mixed origin.

Contrasting Inclusions (20%)

Inclusion 1

Slope: 40 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present Vegetation

- subalpine fir/Rocky Mountain maple p.a.
- Communities that have a tall shrub layer of Greene mountainash with an herbaceous layer of mesic forbs.

Soils: Soils like Koffgo that have a dark colored surface layer 10 to 20 inches thick (Rhylow soils).

Inclusion 2

Slope: 40 to 70 percent

Landform position: south facing spur ridges

Potential Natural Community

- tall forb communities

Present Vegetation

- arrowleaf balsamroot-oneflower helianthella c.t.
- Mountain big sagebrush or spiked big sagebrush is common in these communities.

Soils: Loamy soils that are less than 40 inches deep to hard bedrock.

Inclusion 3

Landform position: north facing draws

Rock: Rubble Land that consists of angular cobbles, stones or boulders derived from mixed sources. Scree or rock falls are commonly represented.

Inclusion 4

Slope: 40 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

An ecotone of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.

- ribbons or islands of the subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils: Soils that have a loamy surface layer, greater than 40 inches thick, over a clayey subsoil (Yodal soils).

Management and Limitations

- The slopes of this ecological unit have a potential for mass movement. Small block falls or slump-earth flows occur on the north facing mountain sideslopes and cirques dominated by sedimentary bedrock.
- This ecological unit has a high potential for avalanches. Avalanche chutes are common.
- V-shaped gullies are common in the south facing draws of this ecological unit. The gullies form on shoulder positions near upper treeline. They commonly extend down slope into adjacent ecological units on footslope or valley floor positions.
- Foot and saddlestock trails are severely limited because of slope and rock outcrops.
- Shallow excavations are severely limited because of large stones and slope.
- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- Revegetating cut and fill slopes is severely limited because of slope.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

Additional Information

- ABLA/VAGL,PAMY Koffgo Ecological Type description on page 302.
- ABLA/THOC Koffgo Ecological Type description on page 292.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1331—Low Alpine Forb Oorang - Rubble Land complex, 4 to 35 percent slopes

Summary

This ecological unit is on mountain summits and cirque floors in the alpine zone (Fig. 49). The topography is karst. The landscape is characterized by rolling to hilly slopes with a pavement of etched, pitted, grooved and fluted rock fragments. Alpine communities of dispersed forbs are commonly supported. Joints, weathered into the bedrock, strongly dissect the slopes. Low escarpments, ridges and knolls are common in some areas.

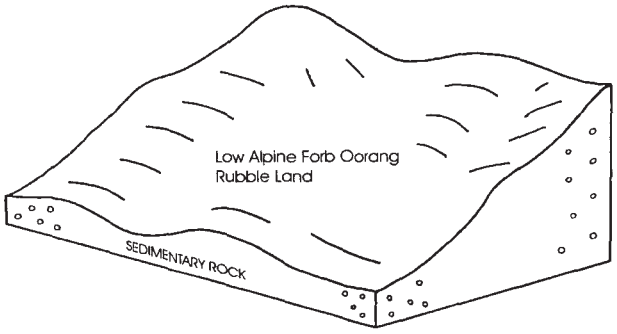


Figure 49. Block diagram of ecological unit 1331.

Ecological Unit Setting

Subsection: Teton Range and Big Hole Mountains
Landform: mountains and cirques
Elevations: 8900 to 9800 feet
Average annual precipitation: 45 inches
Average annual air temperature: 30 degrees F
Geology: sedimentary

Ecological Unit Composition

65 percent - Low Alpine Forb Oorang Ecological Type
15 percent -Rubble Land
20 percent - contrasting inclusions

Low Alpine Forb Oorang (65%)

Setting

Slopes: 4 to 35 percent
Landform position: all positions

Vegetation

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Herbaceous communities dominated by an open layer of one or more of the following were observed: Gordon's ivesia, fernleaf licoriceroot, showy frasera, Lemmon's rockcress, thickleaf groundsel or edible valeriana.

Soils

Name: Oorang series
Taxonomic class: Fragmental, carbonatic Typic Cryochrepts
Parent material: residuum derived from limestone
Typical profile:

- 0 to 4 inches - brown extremely gravelly silt loam
- 4 to 12 inches - yellowish brown extremely flaggy silt loam
- 12 to 41 inches - fragmental material
- 41 inches - fractured, thinly bedded limestone bedrock

Depth class: deep (greater than 40 inches)
Permeability: moderate
AWC, surface to 20 inches: 0.5 inches
AWC, surface to fractured, thinly bedded limestone bedrock: 0.5 inches
Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 2

Rubble Land (15%)

Setting

Landform position: all positions

Rock

Name: Rubble Land
Features: Rubble Land that consists of flagstones, stones and boulders derived from limestone. These rock fragments are commonly flat in shape and are interlocked.

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 15 percent
Landform position: joints and sinkholes

Potential Natural Community

An ecotone of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.
- arrowleaf balsamroot-oneflower helianthella c.t.

Soils: Loamy soils with less than 35 percent rock fragments that are greater than 20 inches deep to fragmental material.

Inclusion 2

Landform position: all positions

Rock: Rock outcrops of fractured, thinly bedded limestone and shale that consist of surface level exposures to low escarpments.

Inclusion 3

Slope: 15 to 60 percent
Landform position: shoulders of north facing escarpments and ridges

Potential Natural Community

- subalpine fir/gooseberry currant p.a., whitebark pine phase

Present Vegetation

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- Krummholz communities dominated by subalpine fir.

Soils: Soils like Oorang that are more moist.

Comment: This inclusion forms conspicuous patches and ribbons of trees in an otherwise stark landscape.

Management and Limitations

- Revegetating cut and fill slopes or other disturbed areas is limited because of short growing seasons, episodic (not annual) reproductive seasons and rocky, droughty soil.
- Fencing is severely limited because the soils are too rocky.
- Camp and picnic areas are severely limited because of slope and small stones.
- Shallow excavations are severely limited because of large stones and slope.
- Foot and saddlestock trails are severely limited because of large and small stones.

Additional Information

- Low Alpine Forb Oorang Ecological Type description on page 387.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1332—ARTRP4/FEID Quirt, 15 to 35 percent slopes

Summary

This ecological unit is on foothills in the cool, moist portion of the shrub steppe zone (Fig. 50). The landscape is characterized by hilly slopes that support communities dominated by sagebrush. Slopes are lightly dissected by shallow draws in a trellis pattern. Sideslopes of incised drainageways are represented in some areas. Seeps, springs and V-shaped gullies are common.

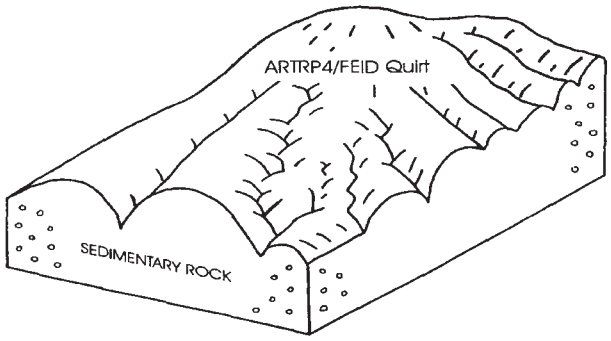


Figure 50. Block diagram of ecological unit 1332.

Ecological Unit Setting

Subsection: Caribou Range Mountains
Landform: foothills
Elevations: 5700 to 7600 feet
Average annual precipitation: 16 inches
Average annual air temperature: 38 degrees F
Geology: sedimentary

Ecological Unit Composition

80 percent - ARTRP4/FEID Quirt Ecological Type
20 percent - contrasting inclusions

ARTRP4/FEID Quirt (80%)

Setting

Slopes: 15 to 35 percent
Landform position: all positions

Vegetation

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils

Name: Quirt series
Taxonomic class: Fine, mixed, superactive Argic Cryoborolls
Parent material: residuum derived from shale
Typical profile:

- 0 to 7 inches - dark grayish brown silt loam
- 7 to 18 inches - reddish brown silty clay loam
- 18 to 28 inches - weak red silty clay loam
- 28 to 50 inches - reddish brown silty clay loam
- 50 to 60 inches - reddish gray clay loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 10.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 15 to 35 percent
Landform position: north facing bowls

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/tall forb c.t.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium Douglas-fir or subalpine fir.

Soils: Soils that have a loamy, dark colored surface layer, 24 to 40 inches thick, over a clayey subsoil.

Comment: The quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/tall forb c.t. could be considered a potential natural community under a recurring fire regime. When fires are suppressed the potential natural community is expected to be the subalpine fir/western meadowrue p.a.

Inclusion 2

Slope: 15 to 35 percent
Landform position: ridges and shoulders

Potential Natural Community:

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils: Soils like Quirt that are less than 40 inches deep to soft bedrock.

Inclusion 3

Slope: 15 to 35 percent
Landform position: ridges

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Herbaceous communities dominated by Idaho fescue, bluebunch wheatgrass or Sandberg bluegrass.

Soils: Loamy or clayey soils that have 35 to 75 percent rock fragments and are less than 20 inches deep to hard bedrock.

Inclusion 4

Slope: 15 to 35 percent
Landform position: north facing bowls

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.

Soils: Light colored, loamy soils that are well drained, lack carbonates and are greater than 60 inches deep (Huckridge soils).

Inclusion 5

Slope: 4 to 15 percent
Landform position: drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- beaked sedge c.t.

Soils: Loamy or clayey soils that are somewhat poorly or poorly drained.

Management and Limitations

- Off-road vehicle use is severely limited because of slope and the soils erode easily.
- Unsurfaced roads and parking areas are severely limited because the soils have low strength and a high shrink-swell potential.
- Fencing is severely limited because the soils have a high shrink-swell potential.

Additional Information

- ARTRP4/FEID Quirt Ecological Type description on page 355.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1333—ARTRP4/FEID Quirt - ARTRP4/SYOR2/FEID Tetonia complex, 4 to 15 percent slopes

Summary

This ecological unit is on foothills in the cool, moist portion of the shrub steppe zone (fig. 51). The landscape is characterized by rolling slopes that support communities dominated by sagebrush. Slopes are lightly dissected in a trellis pattern by shallow, incised drainageways.

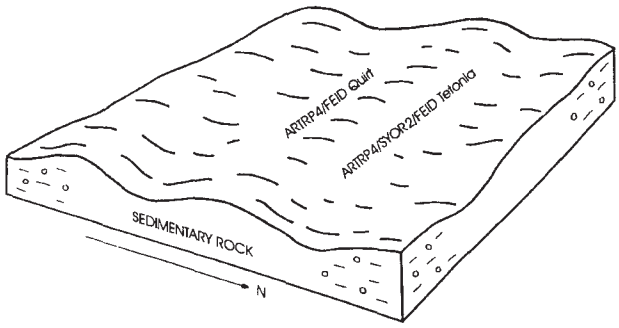


Figure 51. Block diagram of ecological unit 1333.

Ecological Unit Setting

Subsection: Caribou Range Mountains
Landform: foothills
Elevations: 5650 to 6700 feet
Average annual precipitation: 16 inches
Average annual air temperature: 38 degrees F
Geology: sedimentary

Ecological Unit Composition

50 percent - ARTRP4/FEID Quirt Ecological type
30 percent - ARTRP4/SYOR2/FEID Tetonia Ecological Type
20 percent - contrasting inclusions

ARTRP4/FEID Quirt (50%)

Setting

Slopes: 4 to 15 percent
Landform position: ridges and smooth southwest facing sideslopes

Vegetation

Potential Natural Community
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/Idaho fescue p.a.

Soils

Name: Quirt series
Taxonomic class: Fine, mixed, superactive Argic Cryoborolls
Parent material: residuum derived from shale
Typical profile:
- 0 to 7 inches - dark grayish brown silt loam
- 7 to 18 inches - reddish brown silty clay loam
- 18 to 28 inches - weak red silty clay loam
- 28 to 50 inches - reddish brown silty clay loam
- 50 to 60 inches - reddish gray clay loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 10.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

ARTRP4/SYOR2/FEID Tetonia (30%)

Setting

Slopes: 4 to 15 percent
Landform position: hummocky northeast facing sideslopes

Vegetation

Potential Natural Community
- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.
- threetip sagebrush/Idaho fescue community

Soils

Name: Tetonia series
Taxonomic class: Coarse-silty, mixed, superactive Calcic Pachic Cryoborolls
Parent material: local alluvium derived from loess
Typical profile:
- 0 to 7 inches - dark grayish brown silt loam

- 7 to 22 inches - brown silt loam
- 22 to 60 inches - light gray silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 11.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.37
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 20 percent
Landform position: north facing bowls

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium lodgepole pine or Douglas-fir.

Soils: Dark colored, loamy soils that are well drained, lack carbonates and are greater than 60 inches deep (Rin soils).

Inclusion 2

Slope: 4 to 20 percent
Landform position: north facing bowls

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.

Soils: Light colored, loamy soils that are well drained, lack carbonates and are greater than 60 inches deep (Huckridge soils).

Inclusion 3

Slope: 2 to 8 percent
Landform position: drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- beaked sedge c.t.

Soils: Loamy or clayey soils that are somewhat poorly or poorly drained.

Inclusion 4

Slope: 4 to 15 percent
Landform position: ridges

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- mountain big sagebrush/bluebunch wheatgrass community
- Herbaceous communities dominated by Idaho fescue, bluebunch wheatgrass or Sandberg bluegrass.

Soils: Loamy or clayey soils that have 35 to 75 percent rock fragments and are less than 20 inches deep to hard bedrock.

Inclusion 5

Slope: 15 to 35 percent
Landform position: sideslopes of incised drainageways

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.

Soils: Quirt soils.

Management and Limitations

- Foot and saddlestock trails are severely limited because the soils erode easily.

ARTRP4/FEID Quirt

- Unsurfaced roads and parking areas are severely limited because the soils have low strength and a high shrink-swell potential.
- Fencing is severely limited because the soils have a high shrink-swell potential.

ARTRP4/SYOR2/FEID Tetonia

- Rodent burrows are abundant in some areas.

Additional Information

- ARTRP4/FEID Quirt Ecological Type description on page 355.
- ARTRP4/SYOR2/FEID Tetonia Ecological Type description on page 367.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1400—ARTRP4/ARART Trude, 0 to 4 percent slopes

Summary

This ecological unit is on droughty sand and gravel bars on outwash plains in the cool portion of the forested zone (fig. 52). The landscape is characterized by nearly level to undulating slopes that support communities dominated by sagebrush. A seasonal water table is at depths greater than 6 feet.

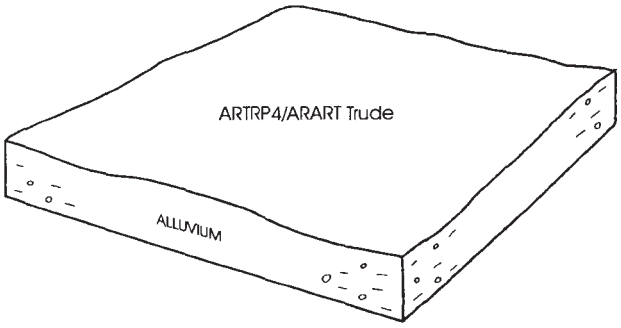


Figure 52. Block diagram of Ecological Unit 1400.

Ecological Unit Setting

Subsection: Island Park
Landform: outwash plains
Elevations: 6200 to 6400 feet
Average annual precipitation: 28 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

95 percent - ARTRP4/ARART Trude Mosaic
5 percent - contrasting inclusions

ARTRP4/ARART Trude (95%)

Setting

Slopes: 0 to 4 percent
Landform position: all positions

Vegetation

Potential Natural Community
A mosaic of:
- mountain big sagebrush/Idaho fescue p.a.
- hotsprings sagebrush/Idaho fescue p.a.

Present Vegetation
A mosaic of:
- mountain big sagebrush/Idaho fescue p.a.
- hotsprings sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush or hotsprings sagebrush with an herbaceous layer dominated by native or non-native grasses, parsnipflower buckwheat or pussytoes.

Soils

Name: Trude series
Taxonomic class: Sandy-skeletal, mixed Dystric Cryochrepts
Parent material: mixed alluvium
Typical profile:
- 0 to 8 inches - brown gravelly sandy loam
- 8 to 21 inches - light yellowish brown gravelly coarse sandy loam
- 21 to 60 inches - variegated stratified coarse sand to extremely gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 3

Contrasting Inclusions (5%)

Inclusion 1

Slope: 0 to 4 percent
Landform position: slightly lower terraces

Potential Natural Community
A mosaic of:
- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Present Vegetation
- lodgepole pine/pinegrass c.t.

Soils: Soils like Trude that are moderately well drained and have a seasonal high water table at a depth of 6 to 30 inches (Perfa soils).

Management and Limitations

- Shallow excavations are severely limited because cutbanks cave.
- Pond reservoir areas are severely limited because of seepage.
- Septic tank absorption fields are severely limited because the soils are a poor filter.
- Fencing is severely limited because the soils are too sandy.
- Revegetating cut and fill slopes is severely limited because the soils are droughty.

Additional Information

- ARTRP4/ARART Trude Mosaic description on page 346.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1401—ARTRP4/ARART Trude - ABLA/CACA4,CACA4 Bootjack association, 0 to 2 percent slopes

Summary

This ecological unit is on outwash plains in the cool portion of the forested zone (fig. 53). The topography is characterized by nearly level to undulating stream terraces that are moderately dissected by overflow channels. The stream terraces are droughty, greater than 6 feet deep to a seasonal water table and support communities dominated by sagebrush. The overflow channels have frequent, low intensity floods, a seasonal water table and support riparian communities dominated by grasses and sedges.

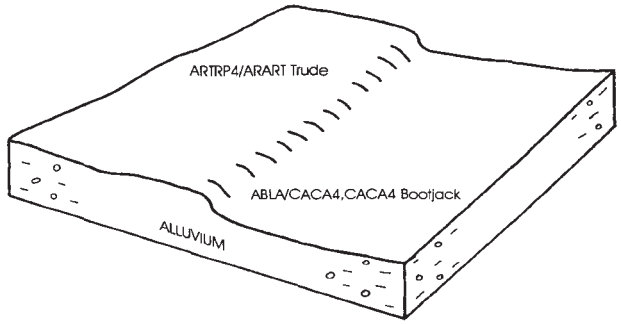


Figure 53. Block diagram of ecological unit 1401.

Ecological Unit Setting

Subsection: Island Park
Landform: outwash plains
Elevations: 6100 to 6200 feet
Average annual precipitation: 25 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

45 percent - ARTRP4/ARART Trude Mosaic
40 percent - ABLA/CACA4,CACA4 Bootjack Ecological Type
15 percent - contrasting inclusions

ARTRP4/ARART Trude (45%)

Setting

Slopes: 0 to 2 percent
Landform position: higher stream terraces

Vegetation

Potential Natural Community
A mosaic of:
- mountain big sagebrush/Idaho fescue p.a.
- hotsprings sagebrush/Idaho fescue p.a.

Present Vegetation
A mosaic of:
- mountain big sagebrush/Idaho fescue p.a.
- hotsprings sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush or hotsprings sagebrush with an herbaceous layer dominated by native and non-native grasses, parsnipflower buckwheat or pussytoes.

Soils

Name: Trude series
Taxonomic class: Sandy-skeletal, mixed Dystric Cryochrepts
Parent material: mixed alluvium
Typical profile:
- 0 to 8 inches - brown gravelly sandy loam
- 8 to 21 inches - light yellowish brown gravelly coarse sandy loam
- 21 to 60 inches - variegated stratified coarse sand to extremely gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 3

ABLA/CACA4,CACA4 Bootjack (40%)

Setting

Slopes: 0 to 2 percent
Landform position: lower stream terraces and sloughs

Vegetation

Potential Natural Community
- subalpine fir/bluejoint p.a., bluejoint phase

Present Vegetation

- Herbaceous communities dominated by sedges or non-native grasses.

Soils

Name: Bootjack series

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aeric Cryaquepts

Parent material: alluvium derived from diatomaceous earth and obsidian sands

Typical profile:

- 2 to 0 inches - forest litter
- 0 to 3 inches - light gray silt loam
- 3 to 15 inches - white loam
- 15 to 60 inches - variegated stratified coarse sand and fine sand

Depth class: very deep (greater than 60 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 5.0 inches

Drainage class: poorly drained

Water table: 0 to 18 inches

Flooding hazard: frequent

Kw factor: 0.49

T factor: 2

Contrasting Inclusions (15%)

Inclusion 1

Slope: 0 to 1 percent

Landform position: lowest sloughs

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- beaked sedge c.t.

Soils: Very poorly drained soils that have a thick layer of peat on the surface (Tepete soils).

Inclusion 2

Slope: 0 to 2 percent

Landform position: lower stream terraces and sloughs

Potential Natural Community

- subalpine fir/bluejoint p.a., bluejoint phase

Present Vegetation

- Herbaceous communities dominated by native or non-native grasses or sedges.

Soils: Soils like Bootjack that have a very or extremely cobbly coarse sand texture in the substratum.

Inclusion 3

Slope: 0 to 2 percent

Landform position: higher stream terraces

Potential Natural Community

- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- Communities that have a shrub layer of mountain big sagebrush with an herbaceous layer of native or non-native grasses.

Soils: Soils like Trude that have a very or extremely cobbly coarse sand texture in the substratum.

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation, depth to seasonal high water table, flooding potential and perennial stream flows interrelate with each other. The stream flows are governed in part by releases from Island Park Dam.
- Pond reservoir areas are severely limited because of seepage.
- Septic tank absorption fields are severely limited because the soils are a poor filter.
- Shallow excavations are severely limited because cutbanks cave.

ABLA/CACA4,CACA4 Bootjack

- This ecological type has the potential for frequent flooding of long durations during the peak snowmelt period, April through June.
- Activities severely limited because of flooding or wetness include: camp and picnic areas, dwellings without basements, unsurfaced roads and parking areas, off-road vehicle use and the use of heavy equipment for woodland harvest.
- Establishing tree seedlings is limited because plant competition and wetness result in seedling mortality.
- Tree windthrow hazard is severe because of wetness.

Additional Information

- ARTRP4/ARART Trude Mosaic description on page 346.
- ABLA/CACA4,CACA4 Bootjack Ecological Type description on page 255.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1414—ABLA/VASC,PIAL Winegar - CALE4 Oxyaquic Cryochrepts - Rock Outcrop complex, 4 to 15 percent slopes

Summary

This ecological unit is on cirque floors in the cold, moist portion of the forested zone (fig. 54). The landscape is characterized by rolling slopes that support a mosaic of open canopy forests and riparian communities dominated by subalpine forbs. Scoured rock outcrops and intermittent or perennial streams and ponds are common.

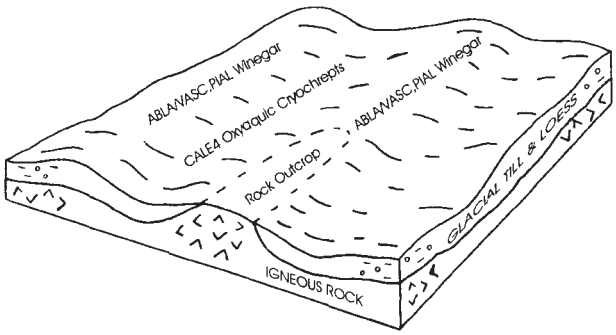


Figure 54. Block diagram of ecological unit 1414.

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains and Teton Range
Landform: cirques
Elevations: 9000 to 9900 feet
Average annual precipitation: 45 inches
Average annual air temperature: 32 degrees F
Geology: igneous and metamorphic

Ecological Unit Composition

50 percent - ABLA/VASC,PIAL Winegar Ecological Type
20 percent - CALE4 Oxyaquic Cryochrepts Ecological Type
15 percent - Rock Outcrop
15 percent - contrasting inclusions

ABLA/VASC,PIAL Winegar (50%)

Setting

Slopes: 4 to 15 percent
Landform position: sideslopes and ridges

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., whitebark pine phase

Present vegetation:

- subalpine fir/grouse whortleberry p.a., whitebark pine phase
- Communities that have an open forest canopy of subalpine fir and whitebark pine over a dispersed herbaceous layer of one or more of the following: Drummond's rush, Hitchcock's smooth woodrush, broadleaf arnica, splitleaf Indian paintbrush, slender hawkweed, creeping sibbaldia and Eschscholtz's buttercup.

Soils

Name: Winegar series
Taxonomic class: Ashy, amorphic Typic Vitricryands
Parent material: local alluvium derived from volcanic ash, loess and glacial till
Typical profile:

- 0 to 4 inches - brown gravelly silt loam
- 4 to 25 inches - light yellowish brown loam
- 25 to 35 inches - light yellowish brown very gravelly sandy loam
- 35 to 60 inches - gray dense basal till that crushes to a very gravelly sandy loam

Depth class: moderately deep (20 to 40 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: moderately well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 4

CALE4 Oxyaquic Cryochrepts (20%)

Setting

Slopes: 4 to 15 percent
Landform position: swales, draws and drainageways

Vegetation

Potential Natural Community

- white marshmarigold c.t.

Present Vegetation

- white marshmarigold c.t.

Soils

Name: Oxyaquic Cryochrepts subgroup
Taxonomic class: Oxyaquic Cryochrepts
Parent material: alluvium derived from loess and glacial till
Typical profile:

- 0 to 5 inches - dark grayish brown silt loam
- 5 to 38 inches - light yellowish brown silt loam
- 38 to 60 inches - light yellowish brown very gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 7.5 inches
Drainage class: somewhat poorly drained
Water table: 0 to 6 inches
Flooding hazard: none
Kw factor: 0.43
T factor: 3

Rock Outcrop (15%)

Setting

Landform position: all positions

Vegetation

Present Vegetation

- lichens

Rock

Name: Rock Outcrop
Features: Rock outcrops that consist of rounded, surface level exposures of hard granite, gneiss and schist bedrock.

Contrasting Inclusions (15%)

Inclusion 1

Slope: 15 to 70 percent
Landform position: sideslopes

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., whitebark pine phase

Present Vegetation

- subalpine fir/grouse whortleberry p.a., whitebark pine phase

Soils: Light colored, loamy soils that are well drained, have greater than 35 percent rock fragments and are greater than 60 inches deep (Koffgo soils).

Inclusion 2

Slope: 4 to 15 percent
Landform position: footslopes and draws

Potential Natural Community

An ecotone of:

- subalpine fir/gooseberry currant p.a., whitebark pine phase
- tall forb communities

Present Vegetation

- fernleaf licoriceroot-duncecap larkspur c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.
- arrowleaf balsamroot-oneflower helianthella c.t

Soils: Soils like the Oxyaquic Cryochrepts that are well drained (Yodal soils).

Inclusion 3

Slope: 0 to 15 percent
Landform position: adjacent to perennial ponds and streams

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Shrub communities dominated by a low layer of barrenground willow or Sitka willow.

Soils: Soils that are poorly or very poorly drained.

Inclusion 4

Slope: 15 to 70 percent
Landform position: adjacent to perennial streams

Potential Natural Community

- tall forb communities

Present Vegetation

- mountain bluebells c.t.

Soils: Loamy or sandy soils that are somewhat poorly drained and have greater than 35 percent rock fragments.

Management and Limitations

ABLA/VASC,PIAL Winegar

- Shallow excavations are severely limited because cutbanks cave.
- The use of heavy equipment for woodland mechanical site preparation is severely limited because the soils are too bouldery.

CALE4 Oxyaquic Cryochrepts

- Activities severely limited because of wetness include: camp and picnic areas, shallow excavations and fencing.
- Foot and saddlestock trails are severely limited because of wetness and the soils erode easily.

Additional Information

- ABLA/VASC,PIAL Winegar Ecological Type description on page 329.
- CALE4 Oxyaquic Cryochrepts Ecological Type description on page 376.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1430—PSME/SYOR2 Kyway, 4 to 30 percent slopes

Summary

This ecological unit is on foothills in a transitional area between the shrub steppe and forested zones (fig. 55). The topography is characterized by south facing slopes that support diverse communities dominated by shrubs and grass with widely dispersed conifers. The slopes are moderately dissected in a parallel pattern by shallow, incised drainageways. Planar to convex summits and hilly drainageway sideslopes are represented. Rock outcrops are common.

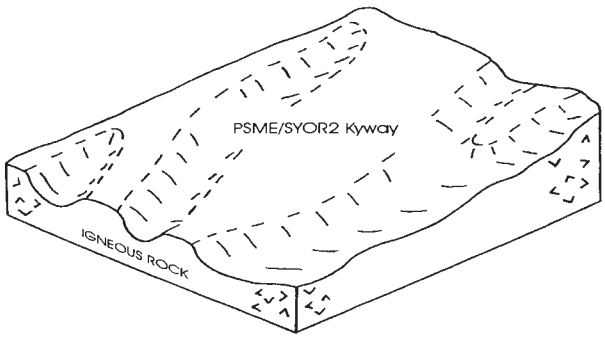


Figure 55. Block diagram of ecological unit 1430.

Ecological Unit Setting

Subsection: Island Park
Landform: foothills
Elevations: 5600 to 6300 feet
Average annual precipitation: 20 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

85 percent - PSME/SYOR2 Kyway Ecological Type
15 percent - contrasting inclusions

PSME/SYOR2 Kyway (85%)

Setting

Slopes: 4 to 30 percent
Landform position: all positions

Vegetation

Potential Natural Community

- Douglas-fir/whortleleaf snowberry p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a shrub layer of bigtooth maple, mountain big sagebrush or whortleleaf snowberry with an herbaceous layer dominated by one or more of the following: bluebunch wheatgrass, California brome, elk sedge or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir.

Soils

Name: Kyway series
Taxonomic class: Coarse-loamy, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from eolian materials, volcanic ash and rhyolite
Typical profile:

- 0 to 18 inches - brown sandy loam
- 18 to 32 inches - brown sandy loam
- 32 inches - hard rhyolite bedrock

Depth class: moderately deep (20 to 40 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 4.0 inches
AWC, surface to hard rhyolite bedrock: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 2

Contrasting Inclusions (15%)

Inclusion 1

Landform position: all positions

Rock: Rock outcrops that consist of surface level exposures to irregular cliffs.

Inclusion 2

Slope: 4 to 50 percent
Landform position: all positions

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.

Soils: Soils like Kyway that are greater than 40 inches deep to hard bedrock.

Inclusion 3

Slope: 4 to 50 percent

Landform position: all positions

Potential Natural Community

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation

- Communities that have a dispersed to open shrub layer of mountain big sagebrush or whortleleaf snowberry with an herbaceous layer dominated by bluebunch wheatgrass or annual forbs.

Soils: Loamy soils that are less than 20 inches deep to hard bedrock.

Management and Limitations

- Shallow excavations are severely limited because of depth to rock.
- Pond reservoir areas are severely limited because of seepage and slope.
- Revegetating cut and fill slopes is severely limited because of depth to rock.
- Off-road vehicle use is severely limited because of slope and the soils erode easily

Additional Information

- PSME/SYOR2 Kyway Ecological Type description on page 469.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1505—ARTRP4/SYOR2/FEID Tetonia, 4 to 15 percent slopes

Summary

This ecological unit is on dissected tablelands in the cool, moist portion of the shrub steppe zone (fig. 56). The landscape is characterized by planar to rolling summits that support communities dominated by sagebrush or grasses. Extensive areas are privately owned inholdings.

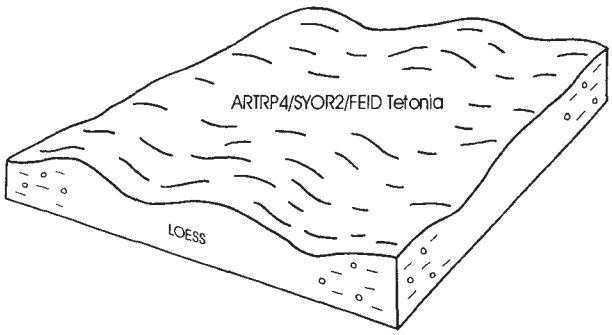


Figure 56. Block diagram of ecological unit 1505.

Ecological Unit Setting

Subsection: Big Hole Mountains and Caribou Range Mountains
Landform: dissected tablelands
Elevations: 5300 to 6200 feet
Average annual precipitation: 16 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

85 percent - ARTRP4/SYOR2/FEID Tetonia Ecological Type
15 percent - contrasting inclusions

ARTRP4/SYOR2/FEID Tetonia (85%)

Setting

Slopes: 4 to 15 percent
Landform position: all positions

Vegetation

Potential Natural Community

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation

- Herbaceous communities dominated by non-native grasses.
- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.
- Communities that have a shrub layer of threetip sagebrush with an herbaceous layer dominated by Idaho fescue or Kentucky bluegrass.

Soils

Name: Tetonia series
Taxonomic class: Coarse-silty, mixed, superactive Calcic Pachic Cryoborolls
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 7 inches - dark grayish brown silt loam
- 7 to 22 inches - brown silt loam
- 22 to 60 inches - light gray silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 11.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.37
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 4 to 15 percent
Landform position: summit margins

Potential Natural Community

- Wyoming big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- Wyoming big sagebrush/bluebunch wheatgrass p.a.
- Herbaceous communities dominated by annual forbs.

Soils: Loamy soils that have carbonates and are less than 20 inches deep to hard bedrock.

Inclusion 2

Slope: 8 to 35 percent

Landform position: ridges and south facing sideslopes

Potential Natural Community

- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation

- basin big sagebrush/bluebunch wheatgrass p.a.

Soils: Soils that have a loamy, dark colored surface layer, 8 to 19 inches thick, over a loamy subsoil layer that has carbonates and 35 to 75 percent rock fragments.

Inclusion 3

Slope: 4 to 15 percent

Landform position: draws and north facing sideslopes

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.

Soils: Dark colored, loamy soils that lack carbonates and are greater than 60 inches deep (Rin soils).

Management and Limitations

- Off-road vehicle use is severely limited because the soils erode easily and compact easily.
- Foot and saddlestock trails are severely limited because the soils erode easily.

Additional Information

- ARTRP4/SYOR2/FEID Tetonia Ecological Type description on page 367.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1506—PSME/SYAL Lagall, till substratum, 4 to 25 percent slopes

Summary

This ecological unit is on dissected tablelands in the warm portion of the forested zone (fig. 57). The landscape is characterized by rolling to hilly slopes that support forests of mixed conifers and quaking aspen. The slopes are moderately dissected by shallow draws, low relief knolls and incised drainageways. Seasonally ponded kettles are common on summits.

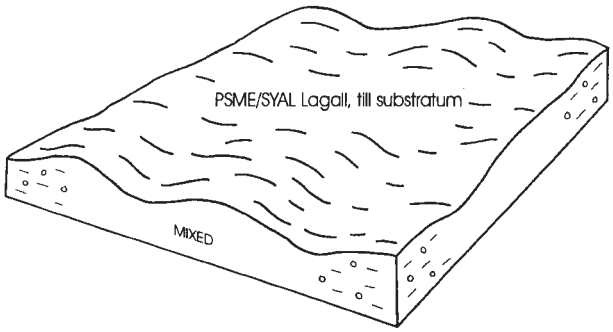


Figure 57. Block diagram of ecological unit 1506.

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5600 to 6500 feet
Average annual precipitation: 23 inches
Average annual air temperature: 39 degrees F
Geology: mixed

Ecological Unit Composition

80 percent - PSME/SYAL Lagall, till substratum Ecological Type
20 percent - contrasting inclusions

PSME/SYAL Lagall, till substratum (80%)

Setting

Slopes: 4 to 25 percent
Landform position: summits and sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.

Soils

Name: Lagall series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium derived from mixed sources
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 14 inches - brown silt loam
- 14 to 35 inches - yellowish brown very gravelly loam
- 35 to 48 inches - light yellowish brown very gravelly loam
- 48 to 60 inches - light yellowish brown very gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 7.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 15 percent
Landform position: all positions

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.

Soils: Soils like Lagall that are 20 to 40 inches deep to dense basal till.

Inclusion 2

Slope: 0 to 4 percent

Landform position: shallow swales and depressions

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Soils like Lagall that are somewhat poorly drained and have seasonal ponding.

Inclusion 3

Slope: 25 to 60 percent

Landform position: north facing sideslopes of knolls and incised drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., blue huckleberry phase
- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community

Soils: Soils like Lagall that have a dark colored surface layer less than 10 inches thick (Koffgo soils).

Inclusion 4

Slope: 25 to 45 percent

Landform position: south facing sideslopes of knolls and incised drainageways

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- quaking aspen-Douglas-fir/Saskatoon serviceberry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.

Soils: Lagall soils.

Inclusion 5

Slope: 30 to 60 percent

Landform position: south facing sideslopes of knolls and incised drainageways

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- Communities that have a shrub layer of subalpine big sagebrush, whortleleaf snowberry or snowbrush ceanothus with an herbaceous layer dominated by California brome or slender wheatgrass.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir, lodgepole pine or Rocky Mountain juniper.

Soils: Soils like Lagall that are slightly more warm and have a dark colored surface layer greater than 16 inches thick (Povey soils).

Management and Limitations

- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- Off-road vehicle use is severely limited because the soils erode easily and compact easily.

Additional Information

- PSME/SYAL Lagall, till substratum Ecological Type description on page 463.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1507—ARTRT/AGSP Buist - ABLA/PHMA5 Lagall complex, 35 to 60 percent slopes

Summary

This ecological unit is on dissected tablelands in a transitional area between the shrub steppe and forested zones (fig. 58). The landscape is characterized by moist north facing and warm south facing sideslopes. Slopes are very steep and complex. The north facing sideslopes support a closed canopy forest. South facing sideslopes support communities dominated by sagebrush. Mass movements are present in some areas.

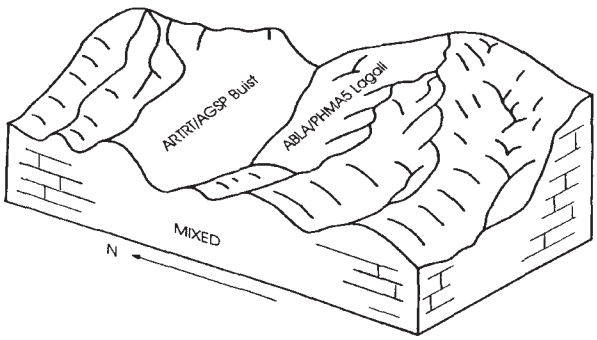


Figure 58. Block diagram of ecological unit 1507.

Ecological Unit Setting

Subsection: Big Hole Mountains and Caribou Range Mountains
Landform: dissected tablelands
Elevations: 5100 to 6500 feet
Average annual precipitation: 18 inches
Average annual air temperature: 39 degrees F
Geology: mixed

Ecological Unit Composition

40 percent - ARTRT/AGSP Buist Ecological Type
40 percent - ABLA/PHMA5 Lagall Ecological Type
20 percent - contrasting inclusions

ARTRT/AGSP Buist (40%)

Setting

Slopes: 35 to 60 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community
- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation
- basin big sagebrush/bluebunch wheatgrass p.a.
- Communities that have an open tree canopy of Rocky Mountain juniper over an herbaceous layer dominated by bluebunch wheatgrass.

Soils

Name: Buist series
Taxonomic class: Loamy-skeletal, mixed, superactive, frigid Calcic Haploxerolls
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:
- 0 to 10 inches - brown gravelly silt loam
- 10 to 32 inches - light gray very gravelly silt loam
- 32 to 60 inches - light yellowish brown very stony loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 3

ABLA/PHMA5 Lagall (40%)

Setting

Slopes: 35 to 60 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/mallow ninebark p.a.

Present Vegetation
- Douglas-fir/mallow ninebark community
- lodgepole pine/mallow ninebark community

Soils

Name: Lagall series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:
- 1 to 0 inches - forest litter
- 0 to 10 inches - brown very gravelly loam
- 10 to 30 inches - pale brown very gravelly loam
- 30 to 60 inches - light yellowish brown extremely cobbly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 15 to 35 percent
Landform position: south facing benches, ridges and footslopes

Potential Natural Community
- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation
- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush or threetip sagebrush with an herbaceous layer dominated by bluebunch wheatgrass.

Soils: Soils like Buist that have less than 35 percent rock fragments in the surface layer and subsoil (Tetonia soils).

Inclusion 2

Slope: 4 to 15 percent
Landform position: summit margins

Potential Natural Community
- Wyoming big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation
- Wyoming big sagebrush/bluebunch wheatgrass p.a.
- Herbaceous communities dominated by annual forbs.

Soils: Loamy soils that have carbonates and are less than 20 inches deep to hard bedrock.

Inclusion 3

Slope: 15 to 60 percent
Landform position: south facing sideslopes

Potential Natural Community
- basin big sagebrush/bluebunch wheatgrass p.a.

Present Vegetation
- basin big sagebrush/bluebunch wheatgrass p.a.

Soils: Soils like Buist that have 5 to 35 percent boulders in the surface layer.

Inclusion 4

Slope: 15 to 35 percent
Landform position: north facing benches, ridges and footslopes

Potential Natural Community
- Douglas-fir/sweetcicely p.a.

Present Vegetation
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium lodgepole pine or Douglas-fir.

Soils: Soils like Lagall that have less than 35 percent rock fragments in the subsoil (Rin soils).

Inclusion 5

Landform position: shoulders

Rock: Rock outcrops that consist of low escarpments.

Management and Limitations

- The slopes of this ecological unit have a moderate potential for mass movement. Small slump-earth flows have been observed on south facing sideslopes. They are commonly associated with areas of seeps and springs.
- Shallow excavations are severely limited because of slope.

Additional Information

- ARTRT/AGSP Buist Ecological Type description on page 370.
- ABLA/PHMA5 Lagall Ecological Type description on page 277.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1516—ABLA/VAGL,VAGL Winegar - ABLA/VASC,CARU Bradco complex, 4 to 15 percent slopes

Summary

This ecological unit is on dissected tablelands in the cool portion of the forested zone (fig. 59). The landscape is characterized by rolling slopes that support reforesting clearcuts and closed canopy forests. The tablelands are lightly dissected by broad, shallow draws and incised drainageways. Kettles with perennial and seasonal ponding are abundant in some areas (Photo 2).

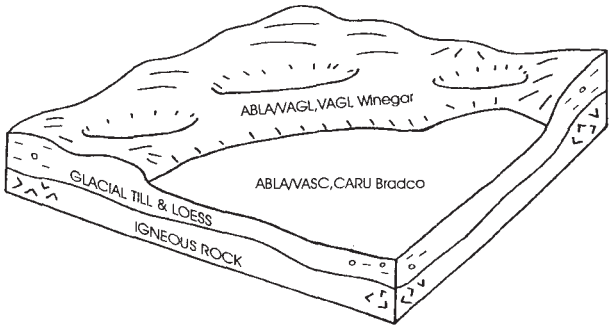


Figure 59. Block diagram of ecological unit 1516.

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: dissected tablelands
Elevations: 6200 to 6700 feet
Average annual precipitation: 32 inches
Average annual air temperature: 37 degrees F
Geology: igneous

Ecological Unit Composition

40 percent - ABLA/VAGL,VAGL Winegar Ecological Type
40 percent - ABLA/VASC,CARU Bradco Ecological Type
20 percent - contrasting inclusions

ABLA/VAGL,VAGL Winegar (40%)

Setting

Slopes: 4 to 15 percent
Landform position: summits and north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.
- Douglas-fir/blue huckleberry community
- lodgepole pine/elk sedge c.t.
- lodgepole pine/pinegrass c.t.
- Communities that have a shrub layer of snowbrush ceanothus or Utah honeysuckle with an herbaceous layer dominated by elk sedge or pinegrass.

Soils

Name: Winegar series
Taxonomic class: Ashy, amorphic Typic Vitricryands
Parent material: local alluvium derived from volcanic ash, loess and glacial till
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 4 inches - dark yellowish brown gravelly silt loam
- 4 to 26 inches - yellowish brown loam
- 26 to 38 inches - light olive brown very gravelly sandy loam
- 38 to 60 inches - gray dense basal till that crushes to a very gravelly sandy loam

Depth class: moderately deep (20 to 40 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 6.5 inches
Drainage class: moderately well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 4

ABLA/VASC,CARU Bradco (40%)

Setting

Slopes: 4 to 15 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/grouse whortleberry c.t.
- Herbaceous communities dominated by elk sedge or pinegrass.

Soils

Name: Bradco series

Taxonomic class: Ashy, amorphic Humic Vitricryands

Parent material: local alluvium derived from volcanic ash, loess and glacial till

Typical profile:

- 2 to 0 inches - forest litter
- 0 to 10 inches - brown fine sandy loam
- 10 to 18 inches - light olive brown gravelly fine sandy loam
- 18 to 29 inches - yellowish brown gravelly sandy loam
- 29 to 36 inches - brownish yellow gravelly sandy loam
- 36 to 60 inches - light brownish gray dense basal till that crushes to a gravelly loamy sand

Depth class: moderately deep (20 to 40 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 4.0 inches

AWC, surface to 60 inches: 6.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.17

T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 0 to 15 percent

Landform position: kettles, swales and bottom of drainageways

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Soils that are somewhat poorly or poorly drained.

Comment: This inclusion commonly occupies distinct bands along the margins of perennial and seasonally ponded kettles. Band width is often less than 40 feet.

Inclusion 2

Slope: 15 to 45 percent

Landform position: south facing sideslopes of knolls and incised drainageways

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- Communities that have a dispersed to open tree canopy of lodgepole pine or sapling quaking aspen with a shrub or herbaceous layer dominated by elk sedge, white spirea or snowbrush ceanothus.
- lodgepole pine/white spirea c.t.
- lodgepole pine/elk sedge c.t.

Soils: Soils like Bradco that have greater than 35 percent rock fragments in the subsoil and are greater than 60 inches deep (Rhylow soils).

Inclusion 3

Slope: 15 to 60 percent

Landform position: north facing sideslopes of knolls and incised drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase
- lodgepole pine/blue huckleberry c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Winegar that have greater than 35 percent rock fragments in the subsoil and are greater than 60 inches deep (Koffgo soils).

Inclusion 4

Slope: 25 to 60 percent

Landform position: south facing sideslopes of knolls and incised drainageways

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.

- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.

Soils: Dark colored, loamy soils that have greater than 35 percent rock fragments and a neutral reaction (Lagall soils).

Management and Limitations

- Shallow excavations are severely limited because cutbanks cave.
- Revegetating cut and fill slopes is severely limited because of depth to rock.

ABLA/VAGL,VAGL Winegar

- The use of heavy equipment for mechanical site preparation is severely limited because the soils are too bouldery.
- Off-road vehicle use is severely limited because the soils compact easily.

Additional Information

- ABLA/VAGL,VAGL Winegar Ecological Type description on page 311.
- ABLA/VASC,CARU Bradco Ecological Type description on page 320.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

Photo 2. Loon Lake is a shallow kettle lake east of Ashton, Idaho in an area of ecological unit 1516 ABLA/VAGL,VAGL Winegar-ABLA/VASC,CARU Bradco complex, 4 to 15 percent slopes.

1570—ABLA/VASC,VASC Dashiki - PIAL/CARO5,PICO Lasac association, 2 to 25 percent slopes

Summary

This ecological unit is on plateaus in the cold, moist portion of the forested zone (fig. 60). The landscape is characterized by undulating to rolling slopes that support reforesting clearcuts and closed canopy forests. Slopes are lightly dissected by shallow, incised drainageways and clusters of low knolls.

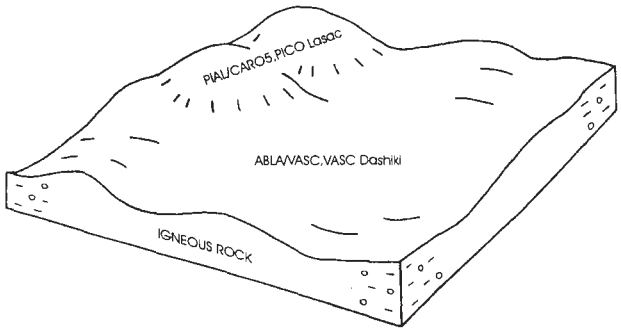


Figure 60. Block diagram of ecological unit 1570.

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: plateaus
Elevations: 7200 to 8300 feet
Average annual precipitation: 50 inches
Average annual air temperature: 32 degrees F
Geology: igneous

Ecological Unit Composition

75 percent - ABLA/VASC,VASC Dashiki Ecological Type
15 percent - PIAL/CARO5,PICO Lasac Ecological Type
10 percent - contrasting inclusions

ABLA/VASC,VASC Dashiki (75%)

Setting

Slopes: 2 to 12 percent
Landform position: sideslopes, swales and ridges

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.
- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Soils

Name: Dashiki series
Taxonomic class: Ashy, glassy Typic Vitricryands
Parent material: local alluvium derived from loess and tephra over tephra
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 9 inches - brown silt loam
- 9 to 31 inches - light yellowish brown gravelly silt loam
- 31 to 37 inches - light brownish gray gravelly loamy coarse sand
- 37 to 75 inches - gray stratified gravelly coarse sand to extremely gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 4.5 inches
AWC, surface to 60 inches: 7.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 3

PIAL/CARO5,PICO Lasac (15%)

Setting

Slopes: 8 to 25 percent
Landform position: knolls and south facing sideslopes of drainages

Vegetation

Potential Natural Community

- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation

- lodgepole pine/Ross' sedge c.t.
- Herbaceous communities dominated by an open layer of Ross' sedge or elk sedge.

Soils

Name: Lasac series

Taxonomic class: Ashy-skeletal, glassy Vitrandic Cryochrepts

Parent material: local alluvium derived from tephra and loess

Typical profile:

- 0 to 6 inches - dark grayish brown gravelly sandy loam
- 6 to 12 inches - light yellowish brown gravelly coarse sandy loam
- 12 to 20 inches - very pale brown very gravelly loamy sand
- 20 to 60 inches - variegated very gravelly coarse sand

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 3.5 inches

Drainage class: somewhat excessively drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 5

Contrasting Inclusions (10%)

Inclusion 1

Slope: 4 to 25 percent

Landform position: north facing sideslopes of incised drainageways

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Dashiki that have greater than 35 percent rock fragments in the subsoil.

Inclusion 2

Slope: 25 to 45 percent

Landform position: south facing sideslopes of incised drainageways

Potential Natural Community

- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation

- lodgepole pine/Ross' sedge c.t.

Soils: Lasac soils

Inclusion 3

Slope: 4 to 35 percent

Landform position: sideslopes, swales and ridges

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase or pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.

Soils: Soils like Dashiki that are greater than 40 inches deep to the substratum (Oleo soils).

Management and Limitations

- Shallow excavations are severely limited because cutbanks cave.
- Pond reservoir areas are severely limited because of seepage.

PIAL/CARO5,PICO Lasac

- Severe rill or gully erosion on exposed soil has been observed following a single rain event.
- Severe hydrophobic conditions in the soil surface layers have been observed after fires. These hydrophobic conditions increase surface runoff and the potential for erosion on all slope positions.
- Revegetating cut and fill slopes is severely limited because the soils are too stony and droughty.

Additional Information

- ABLA/VASC,VASC Dashiki Ecological Type description on page 335.
- PIAL/CARO5, PICO Lasac Ecological Type description on page 396.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1573—ABLA/VASC Oleo - PIAL/CARO5,PICO Lasac association, 2 to 25 percent slopes

Summary

This ecological unit is on plateaus in the cold, moist portion of the forested zone (fig. 61). The landscape is characterized by undulating to rolling slopes that support reforesting clearcuts and closed canopy forests. Slopes are lightly dissected by shallow, incised drainageways and clusters of low knolls.

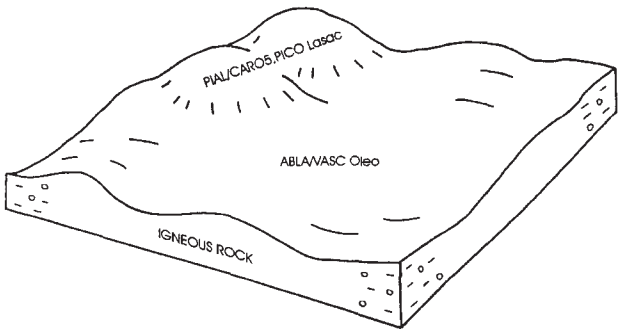


Figure 61. Block diagram of ecological unit 1573.

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: plateaus
Elevations: 6800 to 8200 feet
Average annual precipitation: 50 inches
Average annual air temperature: 32 degrees F
Geology: igneous

Ecological Unit Composition

75 percent - ABLA/VASC Oleo Ecological Type
15 percent - PIAL/CARO5,PICO Lasac Ecological Type
10 percent - contrasting inclusions

ABLA/VASC Oleo (75%)

Setting

Slopes: 2 to 15 percent
Landform position: sideslopes, swales and ridges

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase or pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.

Soils

Name: Oleo series
Taxonomic class: Ashy, glassy Alfic Vitricryands
Parent material: local alluvium derived from loess and tephra
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 2 inches - dark grayish brown silt loam
- 2 to 10 inches - brown silt loam
- 10 to 28 inches - light yellowish brown silt loam
- 28 to 60 inches - pale brown gravelly silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 11.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 5

PIAL/CARO5,PICO Lasac (15%)

Setting

Slopes: 4 to 25 percent
Landform position: knolls and south facing sideslopes of drainages

Vegetation

Potential Natural Community

- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation

- lodgepole pine/Ross' sedge c.t.
- Herbaceous communities dominated by an open layer of Ross' sedge or elk sedge.

Soils

Name: Lasac series

Taxonomic class: Ashy-skeletal, glassy Vitrandic Cryochrepts
Parent material: local alluvium derived from tephra and loess
Typical profile:
- 0 to 6 inches - dark grayish brown gravelly sandy loam
- 6 to 12 inches - light yellowish brown gravelly coarse sandy loam
- 12 to 20 inches - very pale brown very gravelly loamy sand
- 20 to 60 inches - variegated very gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 3.5 inches
Drainage class: somewhat excessively drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 5

Contrasting Inclusions (10%)

Inclusion 1

Slope: 4 to 25 percent
Landform position: north facing sideslopes of shallow drainageways

Potential Natural Community
- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.

Soils: Soils like Oleo that have greater than 35 percent rock fragments in the subsoil.

Inclusion 2

Slope: 2 to 12 percent
Landform position: sideslopes, swales and ridges

Potential Natural Community
- subalpine fir/grouse whortleberry p.a., whitebark pine phase

Present Vegetation
- subalpine fir/grouse whortleberry p.a., limberpine phase

Soils: Soils like Oleo that are more moist and cool.

Comment: This inclusion occurs at the upper elevation range of the ecological unit.

Management and Limitations

- Pond reservoir areas are severely limited because of seepage.
- Revegetating cut and fill slopes is severely limited because the soils are too stony.

PIAL/CARO5,PICO Lasac

- Severe rill or gully erosion on exposed soil has been observed following a single rain event.
- Severe hydrophobic conditions in the soil surface layers have been observed after fires. These hydrophobic conditions increase surface runoff and the potential for erosion on all slope positions.
- Fencing is severely limited because the soils are too rocky.
- Shallow excavations are severely limited because cutbanks cave.

Additional Information

- ABLA/VASC Oleo Ecological Type description on page 317.
- PIAL/CARO5, PICO Lasac Ecological Type description on page 396.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1575—ABLA/CARU,CARU Koffgo - ABLA/VAGL,VAGL Koffgo complex, 8 to 20 percent slopes

Summary

This ecological unit is on plateaus in the cool portion of the forested zone (fig. 62). The landscape is characterized by rolling to hilly slopes that support reforesting clearcuts and closed canopy forests. Slopes are moderately dissected by shallow drainageways in a dendritic pattern.

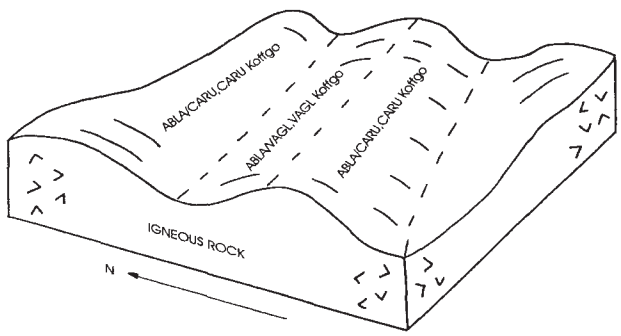


Figure 62. Block diagram of ecological unit 1575.

Ecological Unit Setting

Subsection: Island Park
Landform: plateaus
Elevations: 6600 to 7800 feet
Average annual precipitation: 28 inches
Average annual air temperature: 34 degrees F
Geology: igneous

Ecological Unit Composition

40 percent - ABLA/CARU,CARU Koffgo Ecological Type
40 percent - ABLA/VAGL,VAGL Koffgo Ecological Type
20 percent - contrasting inclusions

ABLA/CARU,CARU Koffgo (40%)

Setting

Slopes: 8 to 20 percent
Landform position: ridges and south facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation
- lodgepole pine/elk sedge c.t.
- lodgepole pine/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- Herbaceous communities dominated by elk sedge.
- Douglas-fir/pinegrass community

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Typical profile:
- 0 to 6 inches - pale brown silt loam
- 6 to 18 inches - light gray gravelly loam
- 18 to 52 inches - light gray extremely cobbly sandy loam
- 52 to 70 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

ABLA/VAGL,VAGL Koffgo (40%)

Setting

Slopes: 8 to 20 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge.
- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community

Soils

Name: Koffgo series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash

Typical profile:
- 2 to 0 inches - forest litter
- 0 to 4 inches - grayish brown gravelly loam
- 4 to 27 inches - pale brown very gravelly sandy loam
- 27 to 41 inches - very pale brown extremely cobbly sandy loam
- 41 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 1.5 inches

AWC, surface to 60 inches: 2.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.10

T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 8 to 20 percent

Landform position: south facing sideslopes

Potential Natural Community
- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation
- Herbaceous communities dominated by elk sedge.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/pinegrass c.t.
- Douglas-fir/pinegrass community

Soils: Soils like Koffgo that are slightly more warm and have a dark colored surface layer greater than 10 inches thick (Rhylow soils).

Inclusion 2

Slope: 8 to 20 percent

Landform position: south facing sideslopes

Potential Natural Community
- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation
- Herbaceous communities dominated by an open layer of Ross' sedge, elk sedge or annual forbs.
- lodgepole pine/Ross' sedge c.t.

Soils: Somewhat excessively drained soils that are derived from tephra (Lasac soils).

Inclusion 3

Slope: 20 to 40 percent

Landform position: short north facing sideslopes

Potential Natural Community
- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation
- Herbaceous communities dominated by elk sedge.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community

Soils: Koffgo soils

Management and Limitations

- Blue huckleberry loses vigor and dies as the tree canopy is opened. This response suggests that the ABLA/VAGL,VAGL Koffgo Ecological Type in this ecological unit is at the dry limit of the subalpine fir/blue huckleberry p.a., blue huckleberry phase.
- Pond reservoir areas are severely limited because of seepage and slope.

ABLA/VAGL,VAGL Koffgo
- Shallow excavations are severely limited because of large stones.
- Revegetating cut and fill slopes is severely limited because the soils are too stony.

Additional Information

- ABLA/CARU,CARU Koffgo Ecological Type description on page 265.
- ABLA/VAGL,VAGL Koffgo Ecological Type description on page 308.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1576—ABLA/ARCO9,ARCO9 Fitzwil - PIAL/ARTRP4 Fitzwil complex, 4 to 25 percent slopes

Summary

This ecological unit is on plateaus near the upper timberline in the cool portion of the forested zone (fig. 63). The landscape is characterized by rolling to hilly slopes that support a mosaic of communities dominated by mixed conifers and sagebrush. A blending of both distinct communities and species is represented in the mosaic. Slopes are lightly dissected by shallow drainageways with intermittent stream channels.

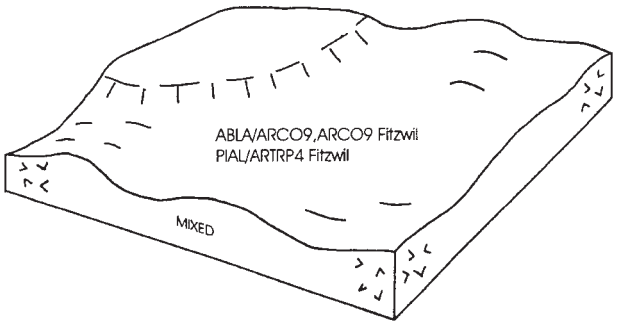


Figure 63. Block diagram of ecological unit 1576.

Ecological Unit Setting

Subsection: Centennial Mountains, Big Hole Mountains and Teton Range
Landform: plateaus
Elevations: 7100 to 9400 feet
Average annual precipitation: 28 inches
Average annual air temperature: 34 degrees F
Geology: mixed

Ecological Unit Composition

50 percent - ABLA/ARCO9,ARCO9 Fitzwil Ecological Type
30 percent - PIAL/ARTRP4 Fitzwil Ecotone
20 percent - contrasting inclusions

ABLA/ARCO9,ARCO9 Fitzwil (50%)

Setting

Slopes: 4 to 25 percent
Landform position: north and east facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/heartleaf arnica p.a., heartleaf arnica phase

Present Vegetation

- subalpine fir/heartleaf arnica p.a., heartleaf arnica phase
- subalpine fir/elk sedge community
- Douglas-fir/elk sedge community
- lodgepole pine/elk sedge c.t.
- subalpine big sagebrush/California brome community
- subalpine big sagebrush/elk sedge community
- Herbaceous communities dominated by native or non-native grasses.

Soils

Name: Fitzwil series
Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 3 inches - dark grayish brown silt loam
- 3 to 10 inches - grayish brown gravelly silt loam
- 10 to 14 inches - pale brown very gravelly loam
- 14 to 25 inches - pale brown and yellowish brown very gravelly loam
- 25 to 60 inches - yellowish brown and very pale brown extremely gravelly loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 3

PIAL/ARTRP4 Fitzwil (30%)

Setting

Slopes: 4 to 25 percent

Landform position: south and west facing sideslopes

Vegetation

Potential Natural Community

An ecotone of:

- whitebark pine/Idaho fescue p.a
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- whitebark pine/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through pole whitebark pine.

Soils

Name: Fitzwil series

Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Parent material: local alluvium or colluvium derived from mixed sources

Typical profile:

- 0 to 5 inches - brown silt loam
- 5 to 10 inches - brown gravelly silt loam
- 10 to 17 inches - pale brown very gravelly loam
- 17 to 26 inches - very pale brown very gravelly sandy loam
- 26 to 60 inches - light brown and very pale brown very gravelly sandy clay loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 5.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.24

T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 25 percent

Landform position: subtle ridges and plateau margins

Potential Natural Community

- Douglas-fir/heartleaf arnica p.a.

Present Vegetation

- Douglas-fir/heartleaf arnica p.a., heartleaf arnica phase or weedy milkvetch phase
- Douglas-fir/whortleleaf snowberry community
- subalpine big sagebrush/California brome p.a.

Soils: Loamy soils that have greater than 35 percent stones or boulders and are 10 to 40 inches deep to hard bedrock.

Inclusion 2

Slope: 4 to 25 percent

Landform position: all positions

Potential Natural Community

- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation

- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Soils: Somewhat excessively drained soils that are derived from tephra (Lasac soils).

Inclusion 3

Slope: 25 to 50 percent

Landform position: north facing sideslopes of drainageways

Potential Natural Community

- subalpine fir/gooseberry currant p.a., whitebark pine phase

Present Vegetation

- subalpine fir/gooseberry currant p.a., whitebark pine phase

Soils: Soils like Fitzwil that are more moist and cool (Koffgo soils).

Inclusion 4

Slope: 4 to 10 percent

Landform position: draws

Potential Natural Community

- white marshmarigold c.t.

Present Vegetation

- Herbaceous communities dominated by prairie-smoke, sticky geranium or sticky cinquefoil.

Soils: Loamy soils that are somewhat poorly drained.

Management and Limitations

- The potential for runoff from rain events or snowmelt is high. Evidence of overland and concentrated flows are common. The soils have reduced infiltration rates because of strong, coarse structure and hydrophobic conditions in the surface layers.
- Off-road vehicle use is severely limited because the soils erode easily.

- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/ARCO9,ARCO9 Fitzwil Ecological Type description on page 249.
- PIAL/ARTRP4 Fitzwil Ecotone description on page 392.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

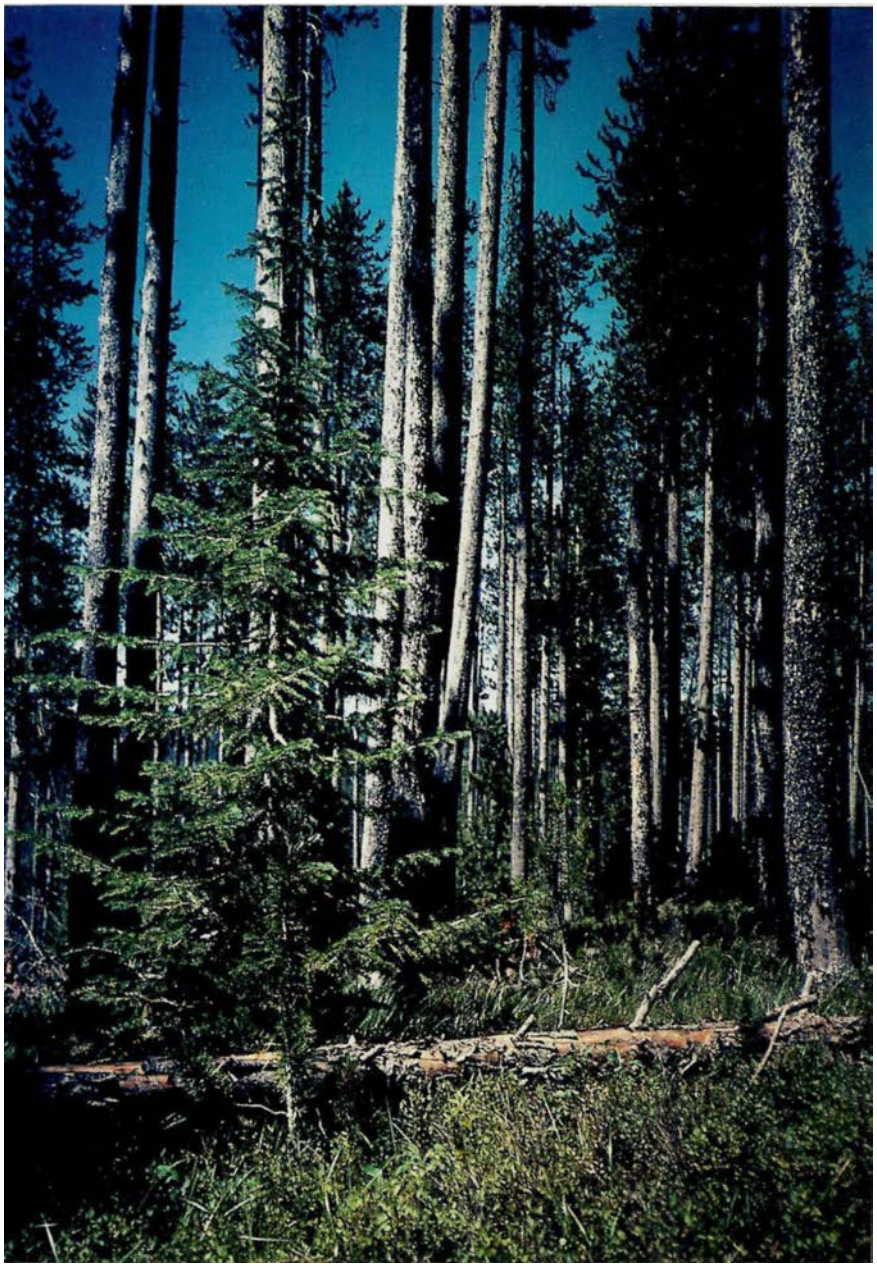


Photo 3. The lodgepole pine/grouse whortleberry c.t. in ecological unit 1585 ABLA/VASC,CARU Rhylow, 15 to 35 percent slopes.

1585—ABLA/VASC,CARU Rhylow, 15 to 35 percent slopes

Summary

This ecological unit is on dissected tablelands in the cool portion of the forested zone (fig. 64). The tablelands are strongly dissected in a parallel pattern by drainageways. Hilly slopes that support reforesting clearcuts characterize the landscape (Photo 3). Relief is 50 to 200 feet.

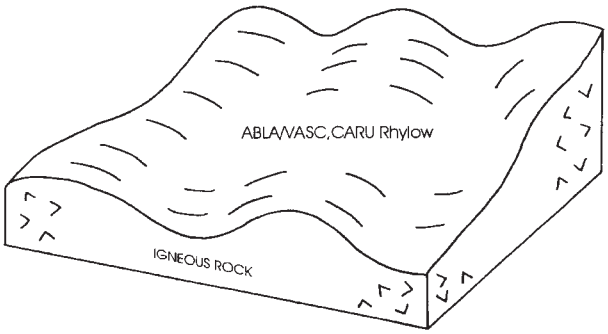


Figure 64. Block diagram of ecological unit 1585.

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: dissected tablelands
Elevations: 6600 to 7900 feet
Average annual precipitation: 30 inches
Average annual air temperature: 36 degrees F
Geology: igneous

Ecological Unit Composition

75 percent - ABLA/VASC,CARU Rhylow Ecological Type
25 percent - contrasting inclusions

ABLA/VASC,CARU Rhylow (75%)

Setting

Slopes: 15 to 35 percent
Landform position: sideslopes

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge or pinegrass.

Soils

Name: Rhylow series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 14 inches - brown gravelly loam
- 14 to 32 inches - yellowish brown gravelly loam
- 32 to 50 inches - light yellowish brown extremely cobbly sandy loam
- 50 to 65 inches - pale brown extremely cobbly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 5.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.17
T factor: 5

Contrasting Inclusions (25%)

Inclusion 1

Slope: 15 to 45 percent
Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- Herbaceous communities dominated by elk sedge.

Soils: Soils like Rhylow that are slightly more cool and have a dark colored surface layer less than 10 inches thick (Koffgo soils).

Inclusion 2

Slope: 1 to 15 percent

Landform position: bottom of drainageways

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- Herbaceous communities dominated by elk sedge.

Soils: Soils like Rhylow that are slightly more cool and have a gravelly loam to very gravelly sandy loam texture to depths of 60 inches or more.

Inclusion 3

Slope: 4 to 15 percent

Landform position: south facing summits and ridges

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present vegetation:

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/pinegrass c.t.

Soils: Rhylow soils

Inclusion 4

Slope: 4 to 20 percent

Landform position: shoulders and ridges

Potential Natural Community

- subalpine fir/white spirea p.a.

Present Vegetation

- lodgepole pine/white spirea c.t.

Soils: Soils like Rhylow that are 20 to 40 inches deep to fragmental material.

Inclusion 5

Slope: 4 to 15 percent

Landform position: north facing summits

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase or pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Rhylow that are slightly more cool and have a silt loam or gravelly silt loam texture to depths of 40 inches or more (Oleo soils).

Management Limitations

- The use of heavy equipment for mechanical site preparation is severely limited because the soils are too bouldery.
- Activities severely limited because of slope include: the use of heavy equipment for woodland harvest, camp and picnic areas, foot and saddle-stock trails, shallow excavations and dwellings without basements.
- Off-road vehicle use is severely limited because the soils erode easily and compact easily.

Additional Information

- ABLA/VASC,CARU Rhylow Ecological Type description on page 326.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1592—PSME/SYAL Lagall, 25 to 50 percent slopes

Summary

This ecological unit is on escarpments of plateaus, foothills and mountains in the warm portion of the forested zone (fig. 65). The landscape is characterized by south facing sideslopes that support forests of mixed conifers and quaking aspen (Photo 4). The slopes are strongly dissected in a parallel pattern by incised drainageways. Local relief is 50 to 200 feet.

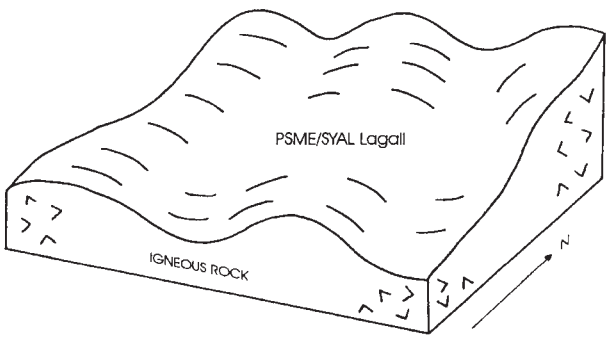


Figure 65. Block diagram of ecological unit 1592.

Ecological Unit Setting

Subsection: Island Park
Landform: escarpments of plateaus, foothills and mountains
Elevations: 5700 to 7000 feet
Average annual precipitation: 23 inches
Average annual air temperature: 39 degrees F
Geology: igneous

Ecological Unit Composition

75 percent - PSME/SYAL Lagall Ecological Type
25 percent - contrasting inclusions

PSME/SYAL Lagall (75%)

Setting

Slopes: 25 to 50 percent
Landform position: all positions

Vegetation

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- quaking aspen-Douglas-fir/Saskatoon serviceberry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/Fendler's meadowrue c.t.
- quaking aspen/Saskatoon serviceberry/brackenfern c.t.
- Shrub communities dominated by snowbrush ceanothus.

Soils

Name: Lagall series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - very dark gray very gravelly loam
- 7 to 15 inches - very dark grayish brown extremely cobbly sandy loam
- 15 to 23 inches - pale brown extremely cobbly loam
- 23 to 60 inches - pale brown extremely cobbly loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 5

Contrasting Inclusions (25%)

Inclusion 1

Slope: 4 to 25 percent
Landform position: bottom of drainageways

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Herbaceous communities dominated by native and non-native grasses.

Soils: Soils like Lagall that have less than 35 percent rock fragments in the surface layer and subsoil.

Inclusion 2

Slope: 4 to 40 percent

Landform position: south facing shoulders, sideslopes and spur ridges

Potential Natural Community

- mountain big sagebrush/whortleleaf snowberry/Idaho fescue p.a.

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass community
- mountain big sagebrush/whortleleaf snowberry/bluebunch wheatgrass community

Soils: Soils like Lagall that are 10 to 40 inches deep to hard bedrock.

Inclusion 3

Slope: 15 to 50 percent

Landform position: north facing sideslopes of spur ridges

Potential Natural Community

- Douglas-fir/Rocky Mountain maple p.a.

Present Vegetation

- Douglas-fir/Rocky Mountain maple p.a.

Soils: Soils like Lagall that are more moist.

Inclusion 4

Slope: 15 to 50 percent

Landform position: narrow south facing sideslopes of spur ridges

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of subalpine big sagebrush, whortleleaf snowberry or snowbrush ceanothus with an herbaceous layer dominated by California brome or slender wheat-grass.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir or lodgepole pine.

Soils: Soils like Lagall that are more dry and warm and have a dark colored surface layer greater than 16 inches thick (Povey soils).

Inclusion 5

Slope: 30 to 50 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckle-berry phase

Present Vegetation

- Douglas-fir/blue huckleberry community

Soils: Soils like Lagall that are more moist and have a dark colored surface layer less than 10 inches thick (Koffgo soils).

Management and Limitations

- Revegetating cut and fill slopes is severely limited because of slope and the soils are too stony.
- Shallow excavations are severely limited because of large stones.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

Additional Information

- PSME/SYAL Lagall Ecological Type description on page 460.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1593—ABLA/VAGL,PAMY Koffgo, 30 to 60 percent slopes

Summary

This ecological unit is on dissected tablelands and foothills in the warm portion of the forested zone (fig. 66). The landscape is characterized by steep, north facing sideslopes that support closed canopy forests. The sideslopes are lightly to moderately dissected by low spur ridges and shallow draws.

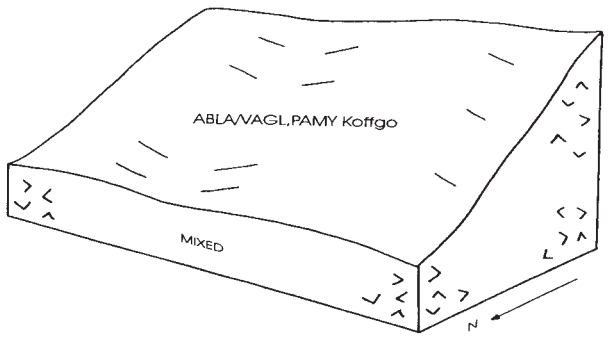


Figure 66. Block diagram of ecological unit 1593.

Ecological Unit Setting

Subsection: Teton Range and Big Hole Mountains
Landform: dissected tablelands and foothills
Elevations: 6600 to 8200 feet
Average annual precipitation: 30 inches
Average annual air temperature: 36 degrees F
Geology: mixed

Ecological Unit Composition

90 percent - ABLA/VAGL,PAMY Koffgo Ecological Type
10 percent - contrasting inclusions

ABLA/VAGL,PAMY Koffgo (90%)

Setting

Slopes: 30 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - grayish brown gravelly silt loam
- 7 to 16 inches - pale brown very gravelly silt loam
- 16 to 55 inches - light gray very cobbly sandy loam
- 55 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

Contrasting Inclusions (10%)

Inclusion 1

Slope: 35 to 60 percent
Landform position: footslopes and benches

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.

Soils: Light colored soils that have a silt loam or loam texture to depths of 40 inches or more.

Inclusion 2

Slope: 20 to 60 percent

Landform position: spur ridges

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.

Soils: Soils like Koffgo that are 20 to 40 inches deep to hard bedrock or fragmental material.

Inclusion 3

Landform position: draws

Rock: Rubble Land that consists of flagstones, stones and boulders derived from igneous rock. Scree is commonly represented.

Management and Limitations

- Fencing is severely limited because the soils are too rocky.
- Unsurfaced roads and parking areas are severely limited because of slope.
- Shallow excavations are severely limited because of slope.
- Pond reservoir areas are severely limited because of seepage.

Additional Information

- ABLA/VAGL,PAMY Koffgo Ecological Type description on page 302.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

Photo 4. Foreground is a Douglas-fir/blue huckleberry community on the ABLA/VAGL,VAGL Koffgo Ecological Type. Background is ecological unit 1592 PSME/SYAL Lagall, 25 to 50 percent slopes on the south face of Moose Creek Butte, east of Ashton, Idaho.

1594—ABLA/VAGL,VAGL Koffgo, 30 to 60 percent slopes

Summary

This ecological unit is on foothills, mountains, dissected tablelands and escarpments of plateaus in the cool portion of the forested zone (fig. 67). The landscape is characterized by steep, north facing sideslopes that are lightly to moderately dissected by low spur ridges and shallow draws. They support reforesting clearcuts and closed canopy forests.

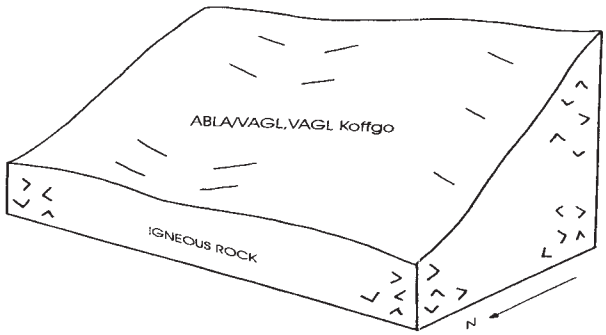


Figure 67. Block diagram of ecological unit 1594.

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands, foothills, escarpments of plateaus and mountains
Elevations: 6200 to 7200 feet
Average annual precipitation: 30 inches
Average annual air temperature: 36 degrees F
Geology: igneous

Ecological Unit Composition

85 percent - ABLA/VAGL,VAGL Koffgo Ecological Type
15 percent - contrasting inclusions

ABLA/VAGL,VAGL Koffgo (85%)

Setting

Slopes: 30 to 60 percent
Landform position: all positions

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community
- subalpine fir/blue huckleberry p.a., blue huckleberry phase
- Communities that have a shrub layer of snowbrush ceanothus with an herbaceous layer dominated by elk sedge.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 2 to 0 inches - forest litter
- 0 to 4 inches - grayish brown gravelly loam
- 4 to 27 inches - pale brown very gravelly sandy loam
- 27 to 41 inches - very pale brown extremely cobbly sandy loam
- 41 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 2.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 4

Contrasting Inclusions (15%)

Inclusion 1

Slope: 35 to 60 percent
Landform position: south facing sideslopes of spur ridges

Potential Natural Community

- Douglas-fir/common snowberry p.a.

Present Vegetation

- Douglas-fir/common snowberry p.a.
- Communities that have a shrub layer of snowbrush ceanothus with an herbaceous layer dominated by California brome.

Soils: Soils like Koffgo that have a dark colored surface layer greater than 10 inches thick and a neutral reaction (Lagall soils).

Inclusion 2

Slope: 35 to 65 percent

Landform position: shoulders and upper sideslopes

Potential Natural Community

- subalpine fir/Rocky Mountain maple p.a.

Present vegetation:

- quaking aspen/Scouler's willow c.t.
- Communities that have a tree canopy of lodgepole pine over a shrub layer dominated by Rocky Mountain maple.

Soils: Soils like Koffgo that are more moist.

Inclusion 3

Slope: 15 to 30 percent

Landform position: footslopes

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.

Soils: Light colored soils that have a silt loam or loam texture to depths of 40 inches or more.

Inclusion 4

Slope: 20 to 60 percent

Landform position: south facing sideslopes of spur ridges

Potential Natural Community

- Douglas-fir/white spirea p.a., pinegrass phase

Present Vegetation

- lodgepole pine/white spirea c.t.

Soils: Soils like Koffgo that are 20 to 40 inches deep to hard bedrock or fragmental material.

Comment: This inclusion is common at the lower precipitation range of the ecological unit. It occurs along the southern portion of the Island Park Caldera rim from Free Use Canyon through Anderson Mill Canyon and along the northwestern portion of Bishop Mountain.

Management and Limitations

- Revegetating cut and fill slopes is severely limited because of slope and the soils are too stony.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Shallow excavations are severely limited because of large stones.

Additional Information

- ABLA/VAGL,VAGL Koffgo Ecological Type description on page 308.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1595—ABLA/VAGL,PAMY Koffgo, 10 to 30 percent slopes

Summary

This ecological unit is on dissected tablelands in the forested zone (fig. 68). The topography is characterized by a parallel pattern of drainageways with complex sideslopes. Local relief is 50 to 200 feet. The sideslopes support reforesting clearcuts and closed canopy forests.

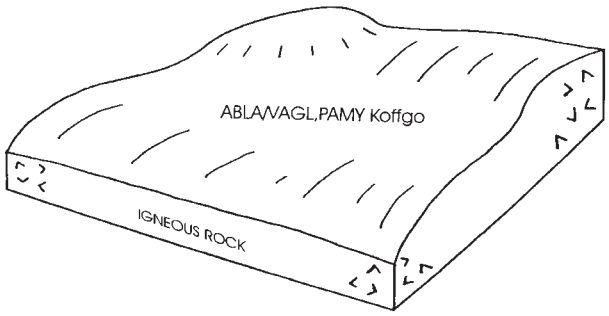


Figure 68. Block diagram of ecological unit 1595.

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains, Island Park and Teton Range
Landform: dissected tablelands
Elevations: 6600 to 7500 feet
Average annual precipitation: 30 inches
Average annual air temperature: 36 degrees F
Geology: igneous

Ecological Unit Composition

85 percent - ABLA/VAGL,PAMY Koffgo Ecological Type
15 percent - contrasting inclusions

ABLA/VAGL,PAMY Koffgo (85%)

Setting

Slopes: 10 to 30 percent
Landform position: all positions

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- lodgepole pine/blue huckleberry c.t.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - grayish brown gravelly silt loam
- 7 to 16 inches - pale brown very gravelly silt loam
- 16 to 55 inches - light gray very cobbly sandy loam
- 55 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

Contrasting Inclusions (15%)

Inclusion 1

Slope: 4 to 20 percent
Landform position: south facing summits and ridges

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass community

Soils: Soils like Koffgo that have a dark colored surface layer greater than 10 inches thick (Fitzwil soils).

Inclusion 2

Slope: 10 to 25 percent
Landform position: bottom of drainageways

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase
- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Koffgo that are colder.

Inclusion 3

Slope: 30 to 60 percent

Landform position: north facing sideslopes of incised drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.

Soils: Koffgo soils

Inclusion 4

Slope: 30 to 60 percent

Landform position: south facing sideslopes of incised drainageways

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Douglas-fir/whortleleaf snowberry p.a.

Soils: Soils like Koffgo that have a dark colored surface layer greater than 16 inches thick and a slightly acid or neutral reaction (Povey soils).

Management and Limitations

- Shallow excavations are severely limited because of slope and large stones.
- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- The use of heavy equipment for woodland harvest is severely limited because the soils erode easily.

Additional Information

- ABLA/VAGL,PAMY Koffgo Ecological Type description on page 302.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1597—ABLA/SPBE2 Koffgo, 35 to 60 percent slopes

Summary

This ecological unit is on foothills and mountains in the cool portion of the forested zone (fig. 69). The landscape is characterized by steep, north facing sideslopes that support closed canopy forests. The sideslopes are lightly to moderately dissected by low spur ridges and shallow draws.

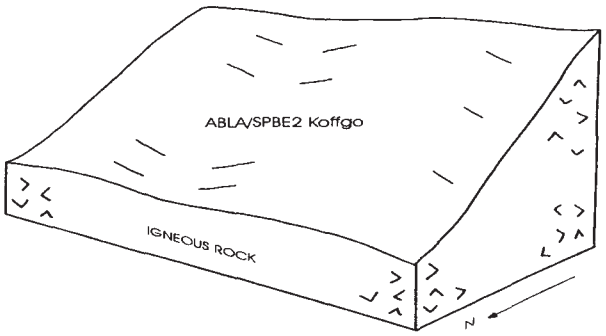


Figure 69. Block diagram of ecological unit 1597.

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: foothills and mountains
Elevations: 6800 to 8400 feet
Average annual precipitation: 27 inches
Average annual air temperature: 34 degrees F
Geology: igneous

Ecological Unit Composition

80 percent - ABLA/SPBE2 Koffgo Ecological Type
20 percent - contrasting inclusions

ABLA/SPBE2 Koffgo (80%)

Setting

Slopes: 35 to 60 percent
Landform position: all positions

Potential Natural Community

- subalpine fir/white spirea p.a.

Present Vegetation

- subalpine fir/white spirea p.a.
- Douglas-fir/white spirea community
- Communities that have a tree canopy of Douglas-fir with a depauperate understory.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Typical profile:

- 2 to 0 inches - forest litter
- 0 to 8 inches - brown gravelly loam
- 8 to 25 inches - light brownish gray extremely gravelly sandy loam
- 25 to 45 inches - pale brown extremely cobbly sandy loam
- 45 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 2.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 40 to 60 percent
Landform position: all positions

Rock: Rubble Land that consists of angular cobbles, stones or boulders derived from rhyolite. Scree is commonly represented.

Inclusion 2

Slope: 35 to 60 percent
Landform position: south facing sideslopes of spur ridges

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass communities

Soils: Soils like Koffgo that have a dark colored surface layer greater than 10 inches thick (Rhylow soils).

Inclusion 3

Slope: 45 to 70 percent

Landform position: strong south facing sideslopes

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Douglas-fir/low Oregongrape p.a., whortleleaf snowberry phase

Soils: Soils like Koffgo that are more warm and dry, and have neutral reaction.

Inclusion 4

Slope: 35 to 60 percent

Landform position: all positions

Potential Natural Community

- whitebark pine/Ross' sedge p.a., lodgepole pine phase

Present Vegetation

- lodgepole pine/Ross' sedge c.t.

Soils: Somewhat excessively drained soils that are derived from tephra (Lasac soils).

Management and Limitations

- Revegetating cut and fill slopes is severely limited because of slope and the soils are too cobbly.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.
- Shallow excavations are severely limited because of slope and large stones.
- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/SPBE2 Koffgo Ecological Type description on page 280.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1600—ABLA/VAGL,VASC Koffgo, 4 to 25 percent slopes

Summary

This ecological unit is on foothills in the cold, moist portion of the forested zone (fig. 70). The landscape is characterized by rolling to hilly slopes that support forests of mixed conifers. Closed canopy forests are common on north facing sideslopes. A mosaic of open canopy forests and scoured rock outcrops occur on south facing sideslopes. Glacial erratics are common.

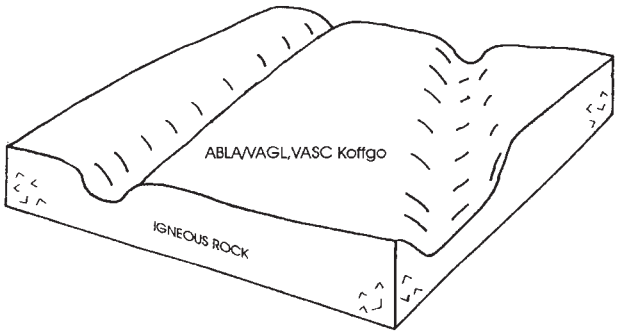


Figure 70. Block diagram of ecological unit 1600.

Ecological Unit Setting

Subsection: Teton Range
Landform: foothills
Elevations: 6500 to 8000 feet
Average annual precipitation: 44 inches
Average annual air temperature: 34 degrees F
Geology: igneous

Ecological Unit Composition

80 percent - ABLA/VAGL,VASC Koffgo Ecological Type
20 percent - contrasting inclusions

ABLA/VAGL,VASC Koffgo (80%)

Setting

Slopes: 4 to 25 percent
Landform position: all positions

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase
- lodgepole pine/blue huckleberry c.t.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 4 inches - brown gravelly loam
- 4 to 29 inches - light yellowish brown very gravelly loam
- 29 to 45 inches - light gray extremely cobbly sandy loam
- 45 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 1.5 inches
AWC, surface to 60 inches: 2.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.10
T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 25 to 60 percent
Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase
- lodgepole pine/blue huckleberry c.t.

Soils: Koffgo soils

Inclusion 2

Landform position: south facing sideslopes

Rock: Rock outcrops that consist of rounded, surface level exposures. Glacial erratics (rounded cobbles, stones and boulders) on the rock outcrops are common.

Inclusion 3

Slope: 2 to 25 percent
Landform position: south facing sideslopes

Potential Natural Community

- subalpine fir/elk sedge p.a.

Present Vegetation

- Douglas-fir/elk sedge community
- lodgepole pine/elk sedge c.t.
- Diverse communities that have a dispersed to open tree canopy of Douglas-fir, lodgepole pine, whitebark pine or limberpine over an herbaceous layer dominated by elk sedge, Ross' sedge, or other sedges or grasses.

Soils: Loamy soils that are less than 20 inches deep to hard bedrock.

Comment: This inclusion commonly occurs in a mosaic with rock outcrops.

Inclusion 4

Slope: 4 to 25 percent
Landform position: south facing sideslopes

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Douglas-fir/pinegrass community
- lodgepole pine/pinegrass c.t.

Soils: Soils like Koffgo that are more warm and dry.

Inclusion 5

Slope: 4 to 25 percent
Landform position: bottom of drainageways

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase

Present Vegetation

- subalpine fir/grouse whortleberry p.a., grouse whortleberry phase
- lodgepole pine/grouse whortleberry c.t.

Soils: Soils like Koffgo that are colder.

Management and Limitations

- Pond reservoir areas are severely limited because of slope.
- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/VAGL,VASC Koffgo Ecological Type description on page 314.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1646—ABLA/VAGL,PAMY Huckridge - ABLA/VAGL, PAMY Koffgo - ABLA/OSCH,PAMY Edgway complex, 15 to 50 percent slopes

Summary

This ecological unit is on unstable foothills in the warm portion of the forested zone (fig. 71). The landscape is characterized by rolling to hilly slopes that are lightly dissected by low escarpments and incised drainageways with short, steep sideslopes. Reforesting clearcuts and forests with variable canopy cover of mixed conifers are commonly supported. Mass movements are common.

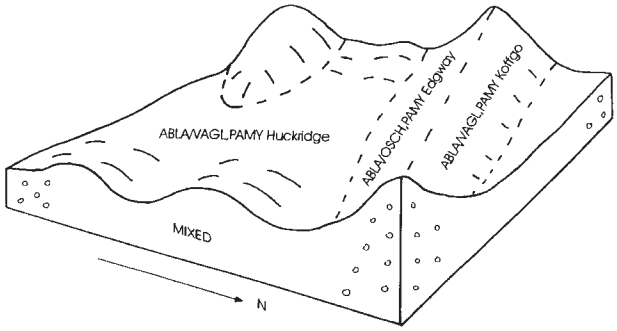


Figure 71. Block diagram of ecological unit 1646

Ecological Unit Setting

Subsection: Big Hole Mountains
Landform: foothills
Elevations: 6000 to 8000 feet
Average annual precipitation: 25 inches
Average annual air temperature: 38 degrees F
Geology: mixed

Ecological Unit Composition

50 percent - ABLA/VAGL,PAMY Huckridge Ecological Type
15 percent - ABLA/VAGL,PAMY Koffgo Ecological Type
15 percent - ABLA/OSCH,PAMY Edgway Ecological Type
20 percent - contrasting inclusions

ABLA/VAGL,PAMY Huckridge (50%)

Setting

Slopes: 15 to 35 percent
Landform position: summits, footslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- Douglas-fir/common snowberry community
- lodgepole pine/common snowberry c.t.
- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- Douglas-fir/blue huckleberry community
- lodgepole pine/blue huckleberry c.t.

Soils

Name: Huckridge series
Taxonomic class: Fine-silty, mixed, superactive Vitrandic Paleboralfs
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 0 to 5 inches - light brownish gray silt loam
- 5 to 27 inches - very pale brown silt loam
- 27 to 48 inches - yellowish brown and very pale brown silt loam
- 48 to 59 inches - light yellowish brown silt loam
- 59 to 70 inches - very pale brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

ABLA/VAGL,PAMY Koffgo (15%)

Setting

Slopes: 30 to 50 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase

Present Vegetation

- subalpine fir/blue huckleberry p.a., myrtle pachistima phase
- lodgepole pine/blue huckleberry c.t.
- Douglas-fir/blue huckleberry community
- Douglas-fir/common snowberry community

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 7 inches - grayish brown gravelly silt loam
- 7 to 16 inches - pale brown very gravelly silt loam
- 16 to 55 inches - light gray very cobbly sandy loam
- 55 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

ABLA/OSCH,PAMY Edgway (15%)

Setting

Slopes: 15 to 50 percent
Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- subalpine fir/sweetcicely p.a., myrtle pachistima phase

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- subalpine fir/sweetcicely p.a., myrtle pachistima phase
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- quaking aspen-subalpine fir/Saskatoon service-berry c.t.
- Douglas-fir/whortleleaf snowberry community

Soils

Name: Edgway series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls
Parent material: local alluvium or colluvium derived from mixed sources
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 11 inches - dark grayish brown silt loam
- 11 to 19 inches - pale brown silt loam
- 19 to 60 inches - light yellowish brown very cobbly silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 7.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.32
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 8 to 20 percent
Landform position: summits and footslopes

Potential Natural Community

- subalpine fir/western meadowrue p.a.

Present Vegetation

- subalpine fir/western meadowrue p.a.
- Communities that have a tree canopy of Douglas-fir or quaking aspen with an herbaceous layer dominated by mesic forbs.

Soils: Soils that have a loamy surface layer 15 to 30 inches thick over a clayey subsoil with a high shrink-swell potential (Nearl soils).

Inclusion 2

Slope: 4 to 20 percent

Landform position: bottom of draws

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Booth's willow/fowl bluegrass c.t.
- Booth's willow/beaked sedge c.t.
- Geyer willow/fowl bluegrass c.t.
- Herbaceous communities dominated by beaked sedge, fowl bluegrass or timothy.

Soils: Loamy soils that are somewhat poorly or poorly drained (Cryaquoll soils).

Inclusion 3

Slope: 15 to 50 percent

Landform position: narrow south facing sideslopes of spur ridges

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of subalpine big sagebrush, whortleleaf snowberry, or snowbrush ceanothus with an herbaceous layer dominated by California brome or slender wheat-grass.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir or lodgepole pine.

Soils: Soils like Edgway that are more warm and dry, and have a dark colored surface layer greater than 16 inches thick.

Inclusion 4

Slope: 30 to 50 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/mallow ninebark p.a.

Present Vegetation

- subalpine fir/mallow ninebark p.a.
- Douglas-fir/mallow ninebark community

Soils: Soils like Koffgo that have a dark colored surface layer greater than 10 inches thick and a neutral reaction (Lagall soils).

Inclusion 5

Slope: 15 to 35 percent

Landform position: south facing shoulders and footslopes

Potential Natural Community

- Douglas-fir/sweetcicely p.a.

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium Douglas-fir or lodgepole pine.

Soils: Soils like Huckridge that have a dark colored surface layer greater than 10 inches thick (Paleboroll soils).

Management and Limitations

- The slopes of this ecological unit have a high potential for mass movement. Large slump-earth flows and small slumps are common in some areas.
- Activities severely limited because of slope include: shallow excavations, dwellings without basements, pond reservoir areas, and unsurfaced roads and parking areas.
- The use of heavy equipment for woodland harvest is severely limited on the sideslopes of low escarpments and incised drainageways because of slope.
- Off-road vehicle use is severely limited because of slope and the soils erode easily and compact easily.

ABLA/VAGL,PAMY Huckridge

- Blue huckleberry loses vigor and dies when the forest canopy is opened. This response suggests that the ABLA/VAGL,PAMY Huckridge Ecological Type is at the dry limit of the subalpine fir/blue huckleberry p.a., myrtle pachistima phase.
- The greatest potential for soil compaction occurs during periods of high soil moisture in late spring and early autumn. A 1 to 2 inch thick compaction pan beginning at surface level to depths of 12 inches has been observed in some areas.
- Foot and saddlestock trails are severely limited because the soils erode easily.
- Dust layers 2 to 8 inches thick have been observed in heavy traffic areas during late summer and early autumn. These dust layers may become saturated with water and erode during snowmelt periods.

ABLA/VAGL,PAMY Koffgo

- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.
- Revegetating cut and fill slopes and foot and saddlestock trails are severely limited because of slope.
- Shallow excavations are severely limited because of large stones.

ABLA/OSCH,PAMY Edgway

- Revegetating cut and fill slopes and foot and saddlestock trails are severely limited because of slope.

Additional Information

- ABLA/VAGL,PAMY Huckridge Ecological Type description on page 298.
- ABLA/VAGL,PAMY Koffgo Ecological Type description on page 302.
- ABLA/OSCH,PAMY Edgway Ecological Type description on page 271.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1700—ABLA/VASC,CARU Koffgo, 4 to 15 percent slopes

Summary

This ecological unit is on dissected tablelands in the cool portion of the forested zone (fig. 72). The landscape is characterized by rolling slopes that support reforesting clearcuts and closed canopy forests. Incised drainageways, 50 to 150 feet deep, lightly dissect the tablelands in a dendritic pattern.

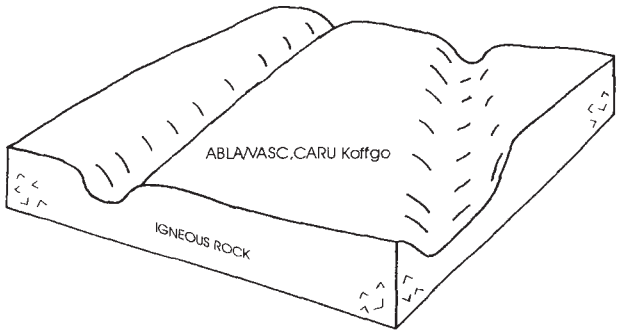


Figure 72. Block diagram of ecological unit 1700.

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 6300 to 6900 feet
Average annual precipitation: 30 inches
Average annual air temperature: 37 degrees F
Geology: igneous

Ecological Unit Composition

75 percent - ABLA/VASC,CARU Koffgo Ecological Type
25 percent - contrasting inclusions

ABLA/VASC,CARU Koffgo (75%)

Setting

Slopes: 4 to 15 percent
Landform position: summits

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/white spirea c.t.
- Herbaceous communities dominated by elk sedge, pinegrass or non-native grasses.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 4 inches - grayish brown silt loam
- 4 to 18 inches - light grayish brown gravelly silt loam
- 18 to 50 inches - light gray extremely cobbly sandy loam
- 50 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

Contrasting Inclusions (25%)

Inclusion 1

Slope: 2 to 4 percent
Landform position: bottom of drainageways

Potential Natural Community

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Communities dominated by a tree canopy of lodgepole pine over an herbaceous layer of non-native grasses.
- lodgepole pine/elk sedge c.t.

- Herbaceous communities dominated by pinegrass, elk sedge or non-native grasses.

Soils: Sandy soils that are moderately well drained and have a seasonal high water table at a depth of 6 to 30 inches (Perfa soils).

Inclusion 2

Slope: 30 to 60 percent

Landform position: sideslopes of incised drainageways

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Communities dominated by a tree canopy of lodgepole pine over an herbaceous layer of non-native grasses.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by pinegrass, elk sedge or non-native grasses.

Soils: Koffgo soils

Inclusion 3

Landform position: south facing sideslopes

Rock: Rock outcrops that consist of surface level exposures or irregular monoliths.

Management and Limitations

- Pond reservoir areas and sewage lagoons are severely limited because of seepage.
- Fencing is severely limited because the soils are too rocky.

Additional Information

- ABLA/VASC,CARU Koffgo Ecological Type description on page 323.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1720—ABLA/VAGL,VAGL Flatstone - ABLA/VASC,CARU Koffgo complex, 2 to 15 percent slopes

Summary

This ecological unit is on dissected tablelands and caldera floors in the cool portion of the forested zone (fig. 73). The landscape is characterized by undulating to rolling slopes that support reforesting clearcuts. Shallow drainageways lightly dissect the tablelands in a dendritic pattern. Relief is commonly less than 100 feet.

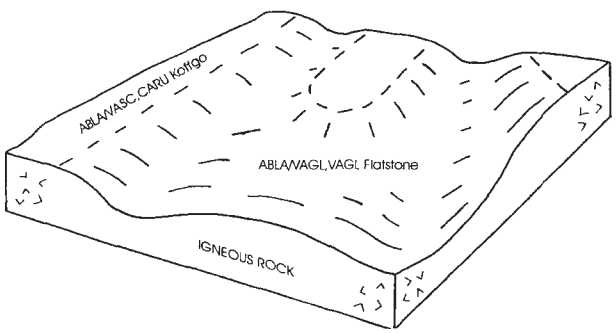


Figure 73. Block diagram of ecological unit 1720.

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands and caldera floors
Elevations: 5900 to 7000 feet
Average annual precipitation: 27 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

60 percent - ABLA/VAGL,VAGL Flatstone Ecological Type
20 percent - ABLA/VASC,CARU Koffgo Ecological Type
20 percent - contrasting inclusions

ABLA/VAGL,VAGL Flatstone (60%)

Setting

Slopes: 4 to 15 percent
Landform position: sideslopes

Vegetation

Potential Natural Community

- subalpine fir/blue huckleberry p.a., blue huckleberry phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.
- Douglas-fir/pinegrass community
- Douglas-fir/blue huckleberry community
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by brome or bluegrass.

Soils

Name: Flatstone series
Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs
Parent material: local alluvium and residuum derived from rhyolitic tuff, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 5 inches - grayish brown silt loam
- 5 to 13 inches - light gray gravelly silt loam
- 13 to 44 inches - light gray extremely stony silt loam
- 44 to 60 inches - pale brown cobbly clay loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 6.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.24
T factor: 3

ABLA/VASC,CARU Koffgo (20%)

Setting

Slopes: 2 to 8 percent
Landform position: ridges

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/grouse whortleberry c.t.
- Douglas-fir/pinegrass community
- Douglas-fir/grouse whortleberry community
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by brome or bluegrass.
- Herbaceous communities dominated by elk sedge, pinegrass, or non-native grasses.

Soils

Name: Koffgo series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 4 inches - grayish brown silt loam
- 4 to 18 inches - light grayish brown gravelly silt loam
- 18 to 50 inches - light gray extremely cobbly sandy loam
- 50 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 2.5 inches

AWC, surface to 60 inches: 5.5 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.28

T factor: 4

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 15 percent

Landform position: summits, footslopes and swales

Potential Natural Community

- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/grouse whortleberry c.t.
- Communities that have a tree canopy of lodgepole pine over an herbaceous layer dominated by non-native grasses.

Soils: Light colored soils that have a silt loam or loam texture to depths of 40 inches or more (Islandpark and Huckridge soils).

Inclusion 2

Slope: 2 to 8 percent

Landform position: draws and drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by one or more of the following: brome, bluegrass, prairie Junegrass, sticky geranium, silvery lupine, Missouri goldenrod, thickstem aster, umber pussytoes, fireweed or heartleaf arnica.

Soils: Dark colored, loamy soils that are 30 to 60 inches deep to a substratum with stratified sand to extremely gravelly coarse sand texture (Rhylow, Fitzwil and Fourme soils).

Inclusion 3

Slope: 2 to 8 percent

Landform position: ridges

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Communities that have a tree canopy of lodgepole pine over an herbaceous layer dominated by non-native grasses.

Soils: Soils like Koffgo that are 20 to 40 inches deep to fragmental material.

Inclusion 4

Slope: 15 to 35 percent

Landform position: south facing sideslopes of knolls and drainageways

Potential Natural Community

- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation

- Herbaceous communities dominated by elk sedge or pinegrass.

Soils: Soils like Koffgo and Flatstone that are slightly more warm and have a dark colored surface layer greater than 10 inches thick (Rhylow and Fitzwil soils).

Inclusion 5

Slope: 4 to 35 percent

Landform position: north facing sideslopes of knolls and bottoms of draws and drainageways

Potential Natural Community

- subalpine fir/blue huckleberry p.a., grouse whortleberry phase

Present Vegetation

- Herbaceous communities dominated by elk sedge or pinegrass.

Soils: Koffgo soils

Management and Limitations

- Fencing is severely limited because the soils are too rocky.

ABLA/VAGL,VAGL Flatstone

- Septic tank absorption fields are severely limited because water percs slowly.
- Revegetating cut and fill slopes is severely limited because the soils are too stony.
- Pond reservoir areas are severely limited because of slope.

ABLA/VASC,CARU Koffgo

- Pond reservoir areas and sewage lagoons are severely limited because of seepage.

Additional Information

- ABLA/VAGL,VAGL Flatstone Ecological Type description on page 305.
- ABLA/VASC,CARU Koffgo Ecological Type description on page 323.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1730—ABLA/VASC,CARU Koffgo - PICO Perfa association, 2 to 30 percent slopes

Summary

This ecological unit is on dissected tablelands in the cool portion of the forested zone (fig. 74). The tablelands are moderately dissected in a parallel pattern by incised drainageways. Summits with rolling to hilly slopes and drainageways with broad, flat bottoms and short, steep sideslopes characterize the topography. Relief is 50 to 150 feet. Reforesting clearcuts and closed canopy forests are commonly supported. A seasonal water table is common in the drainage bottoms.

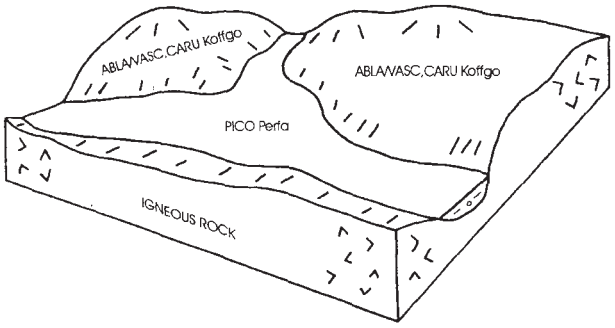


Figure 74. Block diagram of ecological unit 1730.

Ecological Unit Setting

Subsection: Centennial Mountains and Island Park
Landform: dissected tablelands
Elevations: 6300 to 6500 feet
Average annual precipitation: 30 inches
Average annual air temperature: 37 degrees F
Geology: igneous

Ecological Unit Composition

45 percent - ABLA/VASC,CARU Koffgo Ecological Type
40 percent - PICO Perfa Mosaic
15 percent - contrasting inclusions

ABLA/VASC,CARU Koffgo (45%)

Setting

Slopes: 2 to 30 percent
Landform position: sideslopes and summits

Vegetation

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge, pinegrass, or non-native grasses.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 4 inches - grayish brown silt loam
- 4 to 18 inches - light grayish brown gravelly silt loam
- 18 to 50 inches - light gray extremely cobbly sandy loam
- 50 to 60 inches - fragmental material

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 4

PICO Perfa (40%)

Setting

Slopes: 2 to 4 percent
Landform position: drainage bottoms

Vegetation

Potential Natural Community
A mosaic of:

- lodgepole pine/pinegrass c.t.

- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

A mosaic of:

- lodgepole pine/pinegrass c.t.
- Herbaceous communities dominated by non-native grasses.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils

Name: Perfa series

Taxonomic class: Sandy, mixed Oxyaquic Cryochrepts

Parent material: mixed alluvium

Typical profile:

- 1 to 0 inches - forest litter
- 0 to 11 inches - brown sandy loam
- 11 to 62 inches - variegated gravelly coarse sand

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 2.0 inches

AWC, surface to 60 inches: 4.0 inches

Drainage class: moderately well drained

Water table: 6 to 18 inches

Flooding hazard: none

Kw factor: 0.24

T factor: 2

Contrasting Inclusions (15%)

Inclusion 1

Slope: 4 to 15 percent

Landform position: summits

Potential Natural Community

- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.

Soils: Light colored soils that have a silt loam or loam texture to depths of 40 inches or more (Islandpark soils).

Inclusion 2

Slope: 30 to 60 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Herbaceous communities dominated by elk sedge, pinegrass or non-native grasses.

Soils: Koffgo soils

Inclusion 3

Slope: 30 to 60 percent

Landform position: south facing sideslopes

Rock: Rock outcrops that consist of surface level exposures or irregular monoliths.

Management and Limitations

- Pond reservoir areas and sewage lagoons are severely limited because of seepage.

ABLA/VASC,CARU Koffgo

- Fencing is severely limited because the soils are too rocky.
- Off-road vehicle use is severely limited because the soils erode easily and compact easily.
- Activities severely limited because of slope include: shallow excavations, camp and picnic areas, dwellings without basements, and septic tank absorption fields.

PICO Perfa

- This ecological unit has dynamic riparian systems. Present vegetation and depth to the seasonal high water table are directly related to the present vegetation on adjacent uplands.
- When the forest canopy is near maturity on adjacent uplands, the Perfa soils may become droughty. Establishing tree seedlings or revegetating with grass or shrubs may be limited during these periods because of droughtiness.
- When the forest canopy dies or is removed on large areas of the adjacent uplands, the water table rises in the Perfa soils. Established lodgepole pine in the supported communities may drown. Establishing tree seedlings is limited because wetness and plant competition result in seedling mortality.
- The optimum period for seedling establishment occurs when the forest canopy is established and actively growing on adjacent uplands. During these periods the water table is at moderate depths and plant competition is reduced.
- Tree windthrow hazard is severe because the soils are too coarse.

- Fencing is severely limited because of wetness and the soils are too sandy.
- Shallow excavations are severely limited because of wetness and cutbanks cave.
- Septic tank absorption fields are severely limited because of wetness and the soils are a poor filter.
- Activities severely limited because of wetness include: off-road vehicle use, camp and picnic areas, foot and saddlestock trails, unsurfaced roads and parking areas, and dwellings without basements.

Additional Information

- ABLA/VASC,CARU Koffgo Ecological Type description on page 323.
- PICO Perfa Mosaic description on page 399.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1760—PSME/ARTRV Fourme, 0 to 4 percent slopes

Summary

This ecological unit is on alluvial fans and stream terraces in a narrow transitional area between the cool, moist portion of the shrub steppe zone and the cool portion of the forested zone (fig. 75). The landscape is characterized by undulating or concave slopes that support communities dominated by sagebrush. Widely dispersed conifers are common in some areas.

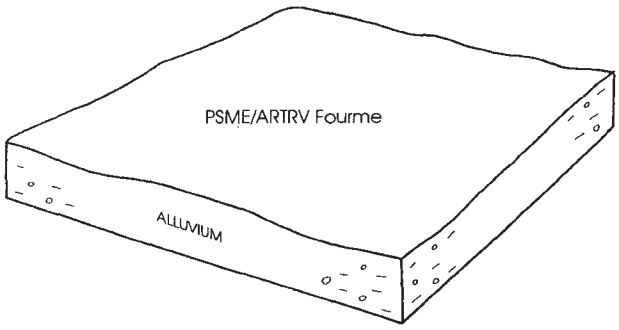


Figure 75. Block diagram of ecological unit 1760.

Ecological Unit Setting

Subsection: Centennial Mountains and Island Park
Landform: alluvial fans and stream terraces
Elevations: 6300 to 7000 feet
Average annual precipitation: 24 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

95 percent - PSME/ARTRV Fourme Ecotone
5 percent - contrasting inclusions

PSME/ARTRV Fourme (95%)

Setting

Slopes: 0 to 4 percent
Landform position: all positions

Vegetation

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of subalpine big sagebrush, whortleleaf snowberry or spiked big sagebrush with an herbaceous layer dominated by California brome, slender wheatgrass or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through large Douglas-fir.

Soils

Name: Fourme series
Taxonomic class: Loamy-skeletal, mixed, superactive Argic Cryoborolls
Parent material: mixed alluvium
Typical profile:

- 0 to 5 inches - dark brown loam
- 5 to 11 inches - yellowish brown gravelly loam
- 11 to 30 inches - light yellowish brown very gravelly sandy clay loam
- 30 to 60 inches - variegated extremely gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 4.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.28
T factor: 3

Contrasting Inclusions (5%)

Inclusion 1

Slope: 0 to 8 percent
Landform position: levees and upper sideslopes

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

- Douglas-fir/whortleleaf snowberry p.a.
- quaking aspen/whortleleaf snowberry/pinegrass c.t.

Soils: Soils like Fourme that are more moist and have a dark colored surface layer greater than 16 inches thick.

Management and Limitations

- The potential natural community of this ecological unit may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the mountain big sagebrush/Idaho fescue p.a. or subalpine big sagebrush/Idaho fescue p.a. The forestland philosophy suggests the Douglas-fir/whortleleaf snowberry p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. The forestland philosophy suggests the potential natural community occurs in the absence of fire disturbance. Reaching the potential natural community may take hundreds of years.
- Fencing is severely limited because the soils are too rocky.
- Shallow excavations are severely limited because cutbanks cave.
- Septic tank absorption fields are severely limited because the soils are a poor filter and water percs slowly.
- Pond reservoir areas are severely limited because of seepage.

Additional Information

- PSME/ARTRV Fourme Ecotone description on page 419.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1970—ABLA Cryoboralfs - PSME/BERE,SYOR2 Cryochrepts, fine association, 15 to 70 percent slopes

Summary

This ecological unit is on mountains in the warm portion of the forested zone (Fig. 76). The topography includes mountain sideslopes, V-shaped canyons, saddles and basins. These positions are strongly dissected in a dendritic pattern by low spur ridges and shallow draws with moist, north facing and dry, south facing sideslopes. Commonly the north facing sideslopes support forests of mixed conifers. The south facing sideslopes support droughty communities with a variable cover of juniper or curlleaf mountain mahogany. U-shaped gullies are common on south facing sideslopes.

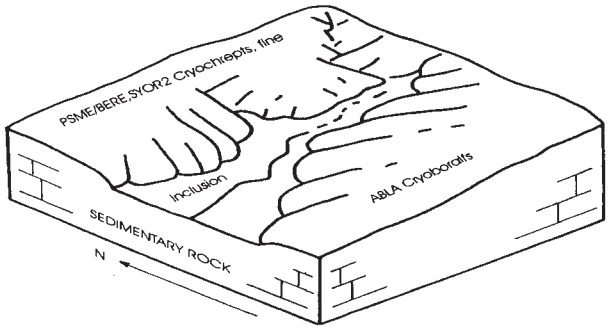


Figure 76. Block diagram of ecological unit 1970.

Ecological Unit Setting

Subsection: Caribou Range Mountains
Landform: mountains
Elevations: 5700 to 8400 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: sedimentary

Ecological Unit Composition

40 percent - ABLA Cryoboralfs Ecological Type
40 percent - PSME/BERE,SYOR2 Cryochrepts, fine Ecological Type
20 percent - contrasting inclusions

ABLA Cryoboralfs (40%)

Setting

Slopes: 15 to 70 percent
Landform position: north facing sideslopes

Vegetation

Potential Natural Community
- subalpine fir/mallow ninebark p.a.
- subalpine fir/pinegrass p.a., pinegrass phase

Present Vegetation
- Douglas-fir/pinegrass community
- Douglas-fir/heartleaf arnica community
- subalpine fir/mallow ninebark p.a.

Soils

Name: Cryoboralfs family
Taxonomic class: Fine, mixed, active Typic Cryoboralfs
Parent material: residuum derived from calcareous shale
Typical profile:
- 2 to 0 inches - forest litter
- 0 to 7 inches - pale brown silt loam
- 7 to 20 inches - pale brown silty clay
- 20 to 31 inches - light yellowish brown flaggy silty clay with 50 percent soft shale fragments
- 31 to 41 inches - light gray weathered shale

Depth class: moderately deep (20 to 40 inches)
Permeability: slow
AWC, surface to 20 inches: 3.5 inches
AWC, surface to light gray weathered shale: 4.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 3

PSME/BERE,SYOR2 Cryochrepts, fine (40%)

Setting

Slopes: 15 to 70 percent

Landform position: south facing sideslopes

Vegetation

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Communities that have a dispersed to open layer of Rocky Mountain juniper or curlleaf mountain mahogany over a low shrub and herbaceous layer dominated by one or more of the following: Oregongrape, whortleleaf snowberry, mountain big sagebrush, subalpine big sagebrush, spiked big sagebrush, rabbitbrush, arrowleaf balsamroot, bluebunch wheatgrass or Indian ricegrass.
- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Soils

Name: Cryochrepts, fine family

Taxonomic class: Fine, carbonatic Typic Cryochrepts

Parent material: residuum derived from calcareous shale

Typical profile:

- 0 to 2 inches - brown channery silty clay loam
- 2 to 18 inches - yellowish brown silty clay loam with 40 percent soft shale fragments
- 18 to 30 inches - yellow silty clay with 85 percent soft shale fragments
- 30 to 40 inches - brownish yellow weathered shale

Depth class: moderately deep (20 to 40 inches)

Permeability: slow

AWC, surface to 20 inches: 2.0 inches

AWC, surface to brownish yellow weathered shale: 3.0 inches

Drainage class: well drained

Water table: none

Flooding hazard: none

Kw factor: 0.20

T factor: 3

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 35 percent

Landform position: summits and drainageways

Potential Natural Community

- Douglas-fir/whortleleaf snowberry p.a.

Present Vegetation

- Communities that have an open tree canopy of Douglas-fir, Rocky Mountain juniper or quaking aspen over a shrub layer dominated by whortleleaf snowberry, Saskatoon serviceberry, black chokecherry or Oregongrape. Bluebunch wheatgrass or basin wildrye are common in the herbaceous layer of these communities.

Soils: Loamy soils that have a dark colored surface layer, 7 to 20 inches thick, and are greater than 60 inches deep to soft bedrock.

Inclusion 2

Slope: 15 to 70 percent

Landform position: south facing sideslopes and ridges

Potential Natural Community

- curlleaf mountain mahogany/bluebunch wheatgrass p.a.

Present Vegetation

- Communities that have a dispersed to open layer of curlleaf mountain mahogany or Rocky Mountain juniper over an herbaceous layer dominated by arrowleaf balsamroot, bluebunch wheatgrass or annual forbs.

Soils: Loamy or clayey soils that have carbonates and are less than 20 inches deep to hard bedrock.

Inclusion 3

Slope: 35 to 70 percent

Landform position: north facing sideslopes

Potential Natural Community

- subalpine fir/mallow ninebark p.a.

Present Vegetation

- Douglas-fir/mallow ninebark community
- subalpine fir/mallow ninebark p.a.

Soils: Loamy soils that have greater than 35 percent rock fragments and are greater than 40 inches deep to hard bedrock (Gany soils).

Inclusion 4

Slope: 35 to 70 percent

Landform position: south facing sideslopes

Potential Natural Community

- Douglas-fir/Oregongrape p.a., whortleleaf snowberry phase

Present Vegetation

- Communities that have a dispersed to open tree canopy dominated by Douglas-fir with an open to closed shrub layer dominated by curlleaf

mountain mahogany. Other trees and shrubs present in these communities include: limber pine, Rocky Mountain juniper, bigtooth maple, whortleleaf snowberry and mountain big sagebrush.

- mountain big sagebrush/bluebunch wheatgrass community

Soils: Loamy soils that have greater than 35 percent rock fragments and are greater than 40 inches deep to hard bedrock (Fritz soils).

Inclusion 5

Landform position: all positions

Present Vegetation

- lichens and mat rockspirea

Soils: Rock outcrops that consist of surface level exposures to linear cliffs 20 feet or more in height.

Comment: Rock outcrops have the highest occurrence and greatest extent on south facing sideslopes.

Management and Limitations

- This ecological unit has a high potential for avalanches. Avalanche chutes and runout areas are common below alpine mountain sideslopes, peaks and ridges.
- Unsurfaced roads and parking areas are severely limited because the soils have low strength.
- Off-road vehicle use is severely limited because the soils erode easily.
- Revegetating cut and fill slopes is severely limited because of slope and depth to rock.
- Foot and saddlestock trails are severely limited because of slope.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of slope.

ABLA Cryoboralfs

- Foot and saddlestock trails are severely limited because the soils erode easily.

PSME/BERE,SYOR2 Cryochrepts, fine

- U-shaped gullies are common on this ecological type. The gullies commonly cut down to layers of soft bedrock and then widen horizontally. The broad headcuts are fan shaped.
- Subsoil layers erode easily. The subsoil may be exposed on sideslopes and headcuts of gullies, freshly cut or unsurfaced roads, landings, barrowpits, trails or other disturbed sites.
- Embankments and dikes are severely limited because the soils are hard to pack.
- Fine sand to channer-size fragments of soft shale are abundant in these soils. Fragments decrease the available water capacity and increase the permeability from that normally predicted for fine textured soils.
- The response of vegetation to management activities mimics that of coarse textured soils because of the abundance of soft shale fragments.
- This ecological type is droughty because of the abundance of soft shale fragments, depth to soft bedrock, and south facing aspect.

Additional Information

- ABLA Cryoboralfs Mosaic description on page 237.
- PSME/BERE,SYOR2 Cryochrepts, fine Ecological Type description on page 431.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

1999—Valleys, 4 to 25 percent slopes

Summary

This ecological unit is on valleys in the mid portion of the forested zone (Fig. 77). The landscape is characterized by stream terraces, ground moraines and mountain footslopes on the floor of glacial troughs. A mosaic of communities dominated by mixed conifers, quaking aspen, mountain shrubs and subalpine or mesic forbs are common. Runout areas for avalanches commonly dissect the unit.

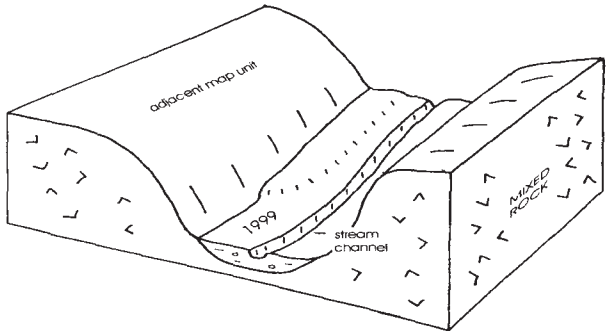


Figure 77. Block diagram of ecological unit 1999.

Ecological Unit Setting

Subsection: Teton Range and Big Hole Mountains
Landform: valleys
Elevations: 6800 to 8000 feet
Average annual precipitation: 28 inches
Average annual air temperature: 36 degrees F
Geology: mixed

Ecological Unit Composition

The vegetation and soil features of this ecological unit are diverse. Specific ecological types that repeat predictably across the unit were not identified.

Vegetation

The following plant associations, community types and communities were observed:

- subalpine fir/blue huckleberry p.a.
- subalpine fir/grouse whortleberry p.a.
- subalpine fir/pinegrass p.a.
- subalpine fir/sweetcicely p.a.
- subalpine fir/western meadowrue p.a.
- subalpine fir/white spirea p.a.
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/pinegrass c.t.
- arrowleaf balsamroot-oneflower helianthella c.t.
- nettleleaf giant hyssop-showy goldeneye c.t.
- fernleaf licoriceroot-duncecap larkspur c.t.
- common cowparsnip-western coneflower c.t.
- California false hellebore c.t.
- Communities that have a tree or shrub layer of seedling or sapling quaking aspen or Greene mountainash over an herbaceous layer dominated by tall forbs.

Soils

Soils similar to the following series were observed:

- Fitzwil
- Huckridge
- Katpa
- Koffgo
- Nearl
- Rhylow
- Winegar

Parent material: alluvium, colluvium, glacial till and loess
Depth class: very deep (greater than 60 inches)
Permeability: slow to moderate
Drainage class: moderately well or well drained

Management and Limitations

- Project specific investigations are needed to determine the limitations and related management concerns for any given area because of the diversity in this ecological unit.
- This ecological unit has a high potential for avalanches. Runout areas are common.
- Debris flow or flash flood runout areas are common. These areas have a high potential for debris flows or flash floods from adjacent south facing mountain sideslopes during heavy rain events.

2000—Graminoid Cryaquolls, 0 to 2 percent slopes

Summary

This ecological unit is on a caldera floor in the cool portion of the forested zone (Fig. 78). The landscape is characterized by closed basins that support riparian communities dominated by grasses and sedges. Seasonal ponding and water tables are common.

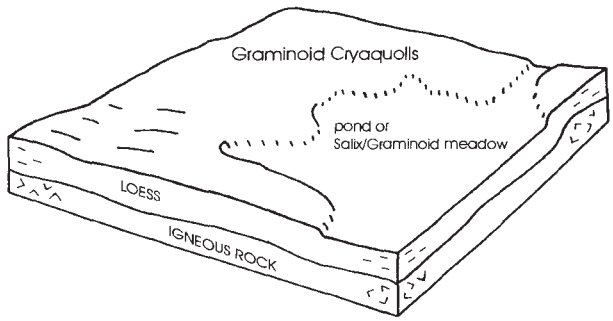


Figure 78. Block diagram of ecological unit 2000.

Ecological Unit Setting

Subsection: Island Park
Landform: caldera floor
Elevations: 5900 to 6800 feet
Average annual precipitation: 24 inches
Average annual air temperature: 38 degrees F
Geology: igneous

Ecological Unit Composition

95 percent - Graminoid Cryaquolls Ecological Type
5 percent - contrasting inclusions

Graminoid Cryaquolls (95%)

Setting

Slopes: 0 to 2 percent
Landform position: all positions

Vegetation

Potential Natural Community

- grass and sedge dominated communities

Present Vegetation

- tufted hairgrass c.t.
- fowl bluegrass c.t.
- Herbaceous communities that are dominated by Buxbaum's sedge, blister sedge or Sierran hare sedge.

Soils

Name: Cryaquolls great group
Taxonomic class: Cryaquolls
Parent material: local alluvium derived from loess and volcanic ash
Typical profile:

- 0 to 16 inches - grayish brown silt loam
- 16 to 44 inches - brown silt loam
- 44 to 60 inches - brown cobbly silty clay

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.5 inches
AWC, surface to 60 inches: 11.5 inches
Drainage class: poorly drained
Ponding: 6 to 0 inches
Flooding hazard: none
Kw factor: 0.32
T factor: 5

Contrasting Inclusions (5%)

Inclusion 1

Slope: 0 to 2 percent
Landform position: lowest swales and adjacent to ponds

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, grasses or sedges. Dominant species include Booth's willow, Geyer's willow and beaked sedge.

Soils: Cryaquoll soils

Inclusion 2

Slope: 0 to 4 percent
Landform position: pressure ridges

Potential Natural Community

An ecotone of:

- lodgepole pine/antelope bitterbrush p.a.
- mountain big sagebrush/Idaho fescue p.a.

Present Vegetation

- Communities that have a shrub layer of mountain big sagebrush or antelope bitterbrush with an herbaceous layer dominated by one or more of the following: California brome, prairie Junegrass, timber oatgrass, other native or non-native grasses or annual forbs.
- Shrub dominated communities that have widely dispersed seedling or sapling lodgepole pine.

Soils: Well drained, loamy soils that are 10 to 20 inches deep to hard bedrock (Spliten soils).

Inclusion 3

Slope: 0 to 8 percent

Landform position: sideslopes of pressure ridges

Potential Natural Community

- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by non-native grasses.
- Herbaceous communities dominated by elk sedge, pinegrass, or other native or non-native grasses.

Soils: Soils like the Cryaquolls that are well drained (Islandpark soils).

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation and depth to seasonal high water table are directly related to the present vegetation on adjacent uplands.
- When the forest canopies die or are removed on large areas of the adjacent uplands, the water table rises. The ponded areas and riparian zones increase in size. In the riparian zone the present vegetation shifts toward communities dominated by riparian sedges. Established lodgepole pine may drown in this ecological unit.
- When forest canopies are well established and actively growing on large areas of the adjacent uplands, the water table lowers. Ponded areas decrease in size and duration. The riparian zones decrease in size and shift position. Present vegetation shifts towards drier upland communities. Some areas may lose their riparian character. Reduced wetness and reduced plant competition in these drier communities allow the establishment of tree seedlings.
- Activities severely limited because of wetness include: camp and picnic areas, foot and saddle-stock trails, shallow excavations, unsurfaced roads and parking areas.
- Off-road vehicle use is severely limited because of wetness and the soils compact easily.
- Septic tank absorption fields are severely limited because of wetness and water percs slowly.

Additional Information

- Graminoid Cryaquolls Ecological Type description on page 381.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

2020—Graminoid Chickreek - Salix/Graminoid Tepete complex, 0 to 1 percent slopes

This ecological unit is on moist outwash plains in the cool portion of the forested zone (Fig. 79). They are commonly associated with Rosgen stream types C3 or C4. Stream flow regimes are perennial with little variation throughout the year. Stream width ranges from 5 to 150 feet. Beaver ponds are few to frequent on stream segments less than 50 feet in width. Seasonal ponding and a seasonal water table are common. Flooding is rare.

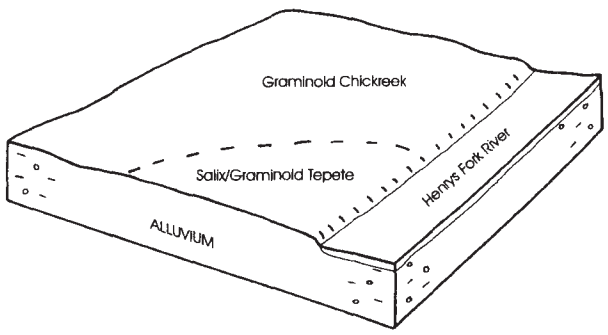


Figure 79. Block diagram of ecological unit 2020.

Ecological Unit Setting

Subsection: Island Park
Landform: outwash plains
Elevations: 6300 to 6600 feet
Average annual precipitation: 26 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

45 percent - Graminoid Chickreek Ecological Type
45 percent - Salix/Graminoid Tepete Ecological Type
10 percent - contrasting inclusions

Graminoid Chickreek (45%)

Setting

Slopes: 0 to 1 percent
Landform position: all positions

Vegetation

Potential Natural Community
- grass and sedge dominated communities

Present Vegetation
- fowl bluegrass c.t.
- tufted hairgrass c.t.
- Herbaceous communities dominated by Buxbaum's sedge, blister sedge or Sierran hare sedge.

Soils

Name: Chickreek series
Taxonomic class: Fine-silty over sandy or sandy-skeletal, mixed, superactive, nonacid Typic Cryaquents
Parent material: diatomaceous earth over mixed alluvium
Typical profile:
- 0 to 6 inches - very dark grayish brown mucky peat
- 6 to 31 inches - white silt loam
- 31 to 66 inches - variegated stratified gravelly sand to extremely gravelly sand

Depth class: very deep (greater than 60 inches)
Permeability: slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 8.5 inches
Drainage class: poorly drained
Ponding: 6 to 0 inches
Flooding hazard: rare
Kw factor: not applicable
T factor: 3

Salix/Graminoid Tepete (45%)

Setting

Slopes: 0 to 1 percent
Landform position: all positions

Vegetation

Potential Natural Community
- willow/grass and sedge dominated communities

Present Vegetation
- Geyer's willow/beaked sedge c.t.
- Booth's willow/beaked sedge c.t.
- diamondleaf willow c.t.
- beaked sedge c.t.

Soils

Name: Tepete series

Taxonomic class: Loamy, mixed euic Terric Borohemists

Parent material: decomposed plant materials over mixed alluvium

Typical profile:

- 0 to 28 inches - very dark gray mucky peat
- 28 to 40 inches - grayish brown fine sandy loam
- 40 to 70 inches - variegated stratified coarse sand and gravel

Depth class: very deep (greater than 60 inches)

Permeability: moderately rapid

AWC, surface to 20 inches: 5.0 inches

AWC, surface to 60 inches: 10.0 inches

Drainage class: very poorly drained

Ponding: 6 to 0 inches

Flooding hazard: rare

Kw factor: not applicable

T factor: 2

Contrasting Inclusions (10%)

Inclusion 1

Slope: 0 to 2 percent

Landform position: subtle gravel bars that are slightly higher in elevation

Potential Natural Community

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by non-native grasses.
- Herbaceous communities dominated by elk sedge, pinegrass, or other native or non-native grasses.

Soils: Sandy soils that are moderately well drained and have a seasonal high water table at a depth of 6 to 30 inches (Perfa soils).

Comment: Mature lodgepole pine are dead and standing, possibly due to a rise in the water table. Younger, live lodgepole pine are present. Depth to water table in these areas is 6 to 12 inches lower than in the main components.

Management and Limitations

- This ecological unit has the potential for rare flooding during the peak snowmelt periods, April through June.
- Foot and saddlestock trails are severely limited because of ponding and excess humus.
- Unsurfaced roads and parking areas are severely limited because of wetness.
- Off-road vehicle use is severely limited because of wetness and excess humus.

Graminoid Chickreek

- Shallow excavations are severely limited because of ponding and cutbanks cave.

Salix/Graminoid Tepete

- Shallow excavations are severely limited because of ponding, excess humus, and cutbanks cave.

Additional Information

- Graminoid Chickreek Ecological Type description on page 378.
- Salix/Graminoid Tepete Ecological Type description on page 477.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

2040—PICO Perfa - ABLA/CACA4,CACA4 Bootjack association, 0 to 4 percent slopes

Summary

This ecological unit is on moist outwash plains in the cool portion of the forested zone (Fig. 80). The topography is characterized by nearly level to undulating stream terraces and overflow channels. The stream terraces have a seasonal water table and support reforesting clearcuts and closed canopy forests. The overflow channels have frequent, low intensity floods, a seasonal water table and support riparian communities dominated by conifers, grasses and sedges.

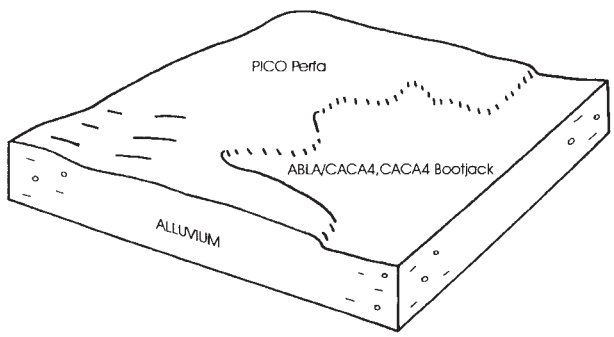


Figure 80. Block diagram of ecological unit 2040.

Ecological Unit Setting

Subsection: Island Park
Landform: outwash plains
Elevations: 6360 to 6460 feet
Average annual precipitation: 30 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

65 percent - PICO Perfa Mosaic
20 percent - ABLA/CACA4,CACA4 Bootjack Ecological Type
15 percent - contrasting inclusions

PICO Perfa (65%)

Setting

Slopes: 0 to 4 percent
Landform position: stream terraces

Vegetation

Potential Natural Community

A mosaic of:

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

A mosaic of:

- lodgepole pine/pinegrass c.t.
- Herbaceous communities dominated by non-native grasses.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Soils

Name: Perfa series
Taxonomic class: Sandy, mixed Oxyaquic Cryochrepts
Parent material: mixed alluvium
Typical profile:

- 1 to 0 inches - forest litter
- 0 to 11 inches - brown sandy loam
- 11 to 62 inches - variegated gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 4.0 inches
Drainage class: moderately well drained
Water table: 6 to 18 inches
Flooding hazard: none
Kw factor: 0.24
T factor: 2

ABLA/CACA4,CACA4 Bootjack (20%)

Setting

Slopes: 0 to 2 percent
Landform position: overflow channels

Vegetation

Potential Natural Community

- subalpine fir/bluejoint p.a., bluejoint phase

Present Vegetation

- lodgepole pine/bluejoint c.t.

- tufted hairgrass c.t.
- Herbaceous communities dominated by slender wheatgrass, sedges or non-native grasses.
- Lodgepole pine over 10 feet in height were dead in all areas observed. The trees appear to have drowned during a recent rise in the water table.

Soils

Name: Bootjack series

Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aeric Cryaquepts

Parent material: alluvium derived from diatomaceous earth and obsidian sands

Typical profile:

- 2 to 0 inches - forest litter
- 0 to 3 inches - light gray silt loam
- 3 to 15 inches - white loam
- 15 to 60 inches - variegated stratified coarse sand and fine sand

Depth class: very deep (greater than 60 inches)

Permeability: moderately slow

AWC, surface to 20 inches: 3.0 inches

AWC, surface to 60 inches: 5.0 inches

Drainage class: poorly drained

Water table: 0 to 18 inches

Flooding hazard: frequent

Kw factor: 0.49

T factor: 2

Contrasting Inclusions (15%)

Inclusion 1

Slope: 0 to 2 percent

Landform position: adjacent to perennial streams on the lowest stream terraces

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Geyer's willow/beaked sedge c.t.
- Booth's willow/beaked sedge c.t.
- diamondleaf willow c.t.
- beaked sedge c.t.

Soils: Poorly and very poorly drained soils that have a layer of peat on the surface (Tepete and Chickreek soils).

Inclusion 2

Slope: 2 to 8 percent

Landform position: highest stream terraces

Potential Natural Community

A mosaic of:

- mountain big sagebrush/Idaho fescue p.a.
- hotsprings sagebrush/Idaho fescue p.a.

Present Vegetation

- Communities that have a shrub layer of mountain big sagebrush or hotsprings sagebrush with an herbaceous layer dominated by bluebunch wheatgrass, other native or non-native grasses or mesic forbs.

Soils: Soils like Perfa that are well drained (Trude soils).

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation and depth to seasonal high water table are directly related to the present vegetation on adjacent uplands.
- When the forest canopies die or are removed on large areas of adjacent uplands, the water table rises. The present vegetation shifts toward communities dominated by bluejoint or beaked sedge. Established lodgepole pine may drown out in these communities.
- When the forest canopies are well established and actively growing on large areas of adjacent uplands, the water table lowers. The present vegetation in this ecological unit shifts toward drier upland communities. Reduced plant competition and reduced wetness allows establishment of tree seedlings in these drier communities.
- Shallow excavations are severely limited because of wetness and cutbanks cave.
- Activities severely limited because of flooding or wetness include: camp and picnic areas, dwellings without basements, unsurfaced roads and parking areas, off-road vehicle use, and foot and saddlestock trails.
- Septic tank absorption fields are severely limited because of wetness and the soils are a poor filter.

PICO Perfa

- When the forest canopy is near maturity on adjacent uplands, the Perfa soils may become droughty. Establishing tree seedlings or revegetating with grass or shrubs may be limited during these periods because of droughtiness.
- When the forest canopy dies or is removed on large areas of the adjacent uplands, the water table rises in the Perfa soils. Established lodgepole pine in the supported communities may

drown. Establishing tree seedlings is limited because wetness and plant competition result in seedling mortality.

- The optimum period for seedling establishment occurs when the forest canopy is established and actively growing on adjacent uplands. During these periods the water table is at moderate depths and plant competition is reduced.
- Tree windthrow hazard is severe because the soils are too coarse.
- Fencing is severely limited because of wetness and the soils are too sandy.

ABLA/CACA4,CACA4 Bootjack

- This ecological type has the potential for frequent flooding of long durations during the peak snowmelt period, April through June.
- Tree windthrow hazard is severe because of wetness.
- The use of heavy equipment for woodland harvest is severely limited because of wetness.
- Fencing is severely limited because of wetness.

Additional Information

- PICO Perfa Mosaic description on page 399.
- ABLA/CACA4,CACA4 Bootjack Ecological Type description on page 255.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

2604—PIEN/GATR3 Cryofluvents, 0 to 2 percent slopes

Summary

This ecological unit is on cool, moist floodplains along the South Fork of the Snake River (Fig. 81). The landscape is characterized by nearly level to undulating river terraces and islands that support forested, riparian communities dominated by an open canopy of cottonwood.

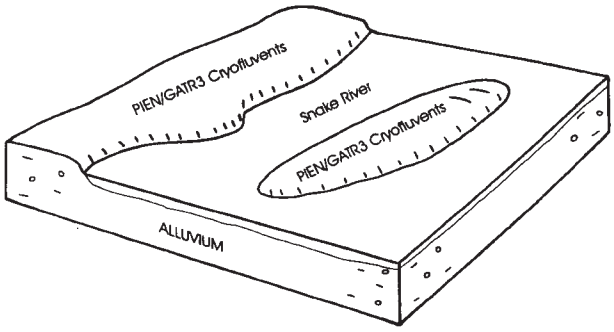


Figure 81. Block diagram of ecological unit 2604.

Ecological Unit Setting

Subsection: Big Hole Mountains and Caribou Range Mountains
Landform: floodplains
Elevations: 5000 to 5600 feet
Average annual precipitation: 17 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

90 percent - PIEN/GATR3 Cryofluvents Ecological Type
10 percent - contrasting inclusions

PIEN/GATR3 Cryofluvents (90%)

Setting

Slopes: 0 to 2 percent
Landform position: floodplains

Vegetation

Potential Natural Community

- Engelmann's spruce/fragrant bedstraw c.t.

Present Vegetation

- narrowleaf cottonwood/redosier dogwood c.t.
- narrowleaf cottonwood/Kentucky bluegrass c.t.
- narrowleaf cottonwood/fragrant bedstraw c.t.
- Engelmann's spruce/redosier dogwood c.t.
- Engelmann's spruce/fragrant bedstraw c.t.
- Communities dominated by narrowleaf cottonwood that have widely dispersed sapling through pole Engelmann's spruce or Douglas-fir.

Soils

Name: Cryofluvents subgroup
Taxonomic class: Oxyaquic Cryofluvents
Parent material: mixed alluvium
Typical profile:

- 0 to 4 inches - very dark grayish brown loamy very fine sand
- 4 to 15 inches - dark grayish brown very fine sand
- 15 to 60 inches - variegated stratified gravelly loamy fine sand to extremely cobbly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately rapid
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 3.0 inches
Drainage class: somewhat poorly drained
Water table: 0 to 36 inches
Flooding hazard: frequent
Kw factor: 0.32
T factor: 2

Contrasting Inclusions (10%)

Inclusion 1

Slope: 0 to 2 percent
Landform position: lower sloughs

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Diverse communities dominated by willows, rushes or cattails.

Soils: Soils like the Cryofluvents that are poorly drained and have a layer of peat on the surface.

Inclusion 2

Slope: 0 to 2 percent
Landform position: high gravel and sand bars

Potential Natural Community

- basin big sagebrush/needleandthread p.a.

Present Vegetation

- Communities dominated by a layer of Rocky Mountain juniper or basin big sagebrush over an open herbaceous layer.

Soils: Sandy soils which are excessively drained, rarely flooded and have 5 to 60 percent pebbles.

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation, depth to the seasonal high water table, flooding potential and perennial stream flows interrelate with each other. The stream flows are governed in part by releases from Palisades Dam.
- This ecological unit has the potential for frequent, long duration flooding during peak snowmelt periods from March through June.
- Shallow excavations are severely limited because of wetness and cutbanks cave.
- Camp and picnic areas are severely limited because of flooding or wetness.
- Unsurfaced roads and parking areas are severely limited because of wetness and flooding.
- Foot and saddlestock trails are severely limited because of wetness.
- Fencing is severely limited because of wetness and the soils are too sandy.
- Pond reservoir areas are severely limited because of seepage.
- The use of heavy equipment for woodland harvest and mechanical site preparation is severely limited because of wetness.
- Ute ladiestresses (*Spiranthes diluvialis*), an orchid listed as a threatened species under the Endangered Species Act of 1973, has been observed in this ecological unit.

Additional Information

- PIEN/GATR3 Cryofluvents Ecological Type description on page 413.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

2606—Salix/Graminoid Cryaquolls and Salix/Graminoid Cryaquolls, poorly drained, 0 to 6 percent slopes

Summary

This ecological unit is on moist floodplains in the shrub steppe and forested zones (Fig. 82). The topography is characterized by flat bottom, very low to moderate gradient (0 to 6 percent), narrow to broad width (40 to 600 feet) floodplains in foothills and dissected tablelands. Rosgen stream types C3 and C4 are represented. Commonly the floodplain crosses the entire valley bottom, stream meanders are confined, flow regimes are perennial or intermittent, and stream width is 1 to 30 feet. Seasonal variation in stream flow is dominated by snowmelt runoff. Beaver ponds are few to frequent. Channel incisement and beaver activity strongly influence the hydrology of the system. One or both components may occur in any delineation of this unit.

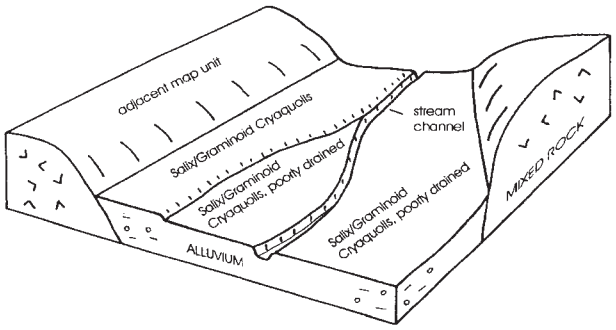


Figure 82. Block diagram of ecological unit 2606.

Ecological Unit Setting

Subsection: all subsections
Landform: floodplains
Elevations: 5600 to 7800 feet
Average annual precipitation: 23 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

0 to 80 percent - Salix/Graminoid Cryaquolls Ecological Type
0 to 80 percent - Salix/Graminoid Cryaquolls, poorly drained Ecological Type
20 percent - contrasting inclusions

Salix/Graminoid Cryaquolls (0 to 80%)

Setting

Slopes: 0 to 6 percent
Landform position: all positions

Vegetation

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Booth's willow/fowl bluegrass c.t.
- Booth's willow/starry false Solomon's seal c.t.
- Geyer's willow/fowl bluegrass c.t.
- shrubby cinquefoil/Kentucky bluegrass community
- Herbaceous communities dominated by one or more of the following: timothy, Kentucky bluegrass, Baltic rush, smallwing sedge, Columbia needlegrass, slender wheatgrass, Virginia strawberry, lambstongue groundsel, Rocky Mountain iris or annual forbs.

Soils

Name: Cryaquolls great group
Taxonomic class: Cryaquolls
Parent material: mixed alluvium
Typical profile:

- 0 to 5 inches - very dark grayish brown silt loam
- 5 to 24 inches - grayish brown silt loam
- 24 to 34 inches - light gray sandy loam
- 34 to 60 inches - variegated extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 7.0 inches
Drainage class: somewhat poorly drained
Water table: 0 to 18 inches
Flooding hazard: frequent
Kw factor: 0.28
T factor: 3
Comment: The percent of the ecological unit represented by this component varies with the stream flow regime and beaver activity. It is the dominant ecological type on intermittent or perennial stream segments with infrequent beaver dams.

Salix/Graminoid Cryaquolls, poorly drained (0 to 80%)

Setting

Slopes: 0 to 2 percent
Landform position: all positions

Vegetation

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Booth's willow/bluejoint c.t.
- Booth's willow/beaked sedge c.t.
- Geyer's willow/bluejoint c.t.
- Geyer's willow/beaked sedge c.t.
- bluejoint community
- beaked sedge c.t.

Soils

Name: Cryaquolls great group, poorly drained phase
Taxonomic class: Cryaquolls
Parent material: mixed alluvium
Typical profile:

- 0 to 13 inches - very dark grayish brown silt loam
- 13 to 20 inches - gray silt loam
- 20 to 60 inches - light gray sandy loam
- 60 to 65 inches - variegated extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 3.5 inches
AWC, surface to 60 inches: 9.5 inches
Drainage class: poorly drained
Ponding: 6 to 0 inches
Flooding hazard: frequent
Kw factor: 0.28
T factor: 3
Comment: The percent of the ecological unit represented by this component varies with the stream flow regime and beaver activity. It is the dominant ecological type on perennial stream segments with frequent beaver ponds and is absent on intermittent stream segments.

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 15 percent
Landform position: higher stream terraces

Potential Natural Community

An ecotone of:

- Douglas-fir/whortleleaf snowberry p.a.
- mountain big sagebrush/Idaho fescue p.a.
- subalpine big sagebrush/California brome p.a.

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Communities that have a shrub layer of mountain big sagebrush or spiked big sagebrush with an herbaceous layer dominated by California brome, slender wheatgrass, non-native grasses or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium Douglas-fir or lodgepole pine.

Soils: Soils like the Cryaquolls that are well drained (Fourme soils).

Inclusion 2

Slope: 2 to 15 percent
Landform position: footslopes of incised canyons

Potential Natural Community

- subalpine fir/bluejoint p.a., bluejoint phase

Present Vegetation

- subalpine fir/bluejoint p.a., bluejoint phase
- lodgepole pine/bluejoint c.t.

Soils: Cryaquolls, poorly drained soils

Inclusion 3

Slope: 0 to 2 percent
Landform position: all positions

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- Booth's willow/bluejoint c.t.
- Booth's willow/beaked sedge c.t.
- Geyer's willow/bluejoint c.t.
- Geyer's willow/beaked sedge c.t.
- beaked sedge c.t.
- bluejoint c.t.

Soils: Soils like the Cryaquolls, poorly drained, that have a layer of peat on the surface.

Comment: This inclusion is commonly associated with old, persistent beaver ponds or valley segments with less than 1 percent gradient.

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation, beaver activity, depth to seasonal high water table, channel incisement and stream flow regime interrelate with each other.
- When stream channels become incised, the water table drops below the major rooting zone and the present vegetation shifts toward upland communities. When beaver activity is high, water tables are at or near the soil surface, localized flooding is frequent, and the present vegetation shifts toward riparian sedge dominated communities.
- These riparian systems respond to subtle changes in management or conditions within the ecological unit and on adjacent uplands.
- This ecological unit has the potential for frequent flooding of long duration during the peak snowmelt periods, April through July. Localized flooding may occur adjacent to beaver ponds and dams throughout the year.
- Unsurfaced roads and parking areas are severely limited because of wetness and flooding.
- Fencing is severely limited because of wetness.
- Pond reservoir areas are severely limited because of seepage.
- Camp and picnic areas, dwellings without basements, and off-road vehicle use are severely limited because of flooding, ponding or wetness.

Salix/Graminoid Cryaquolls

- Foot and saddlestock trails are severely limited because of wetness.
- Shallow excavations are severely limited because of wetness and cutbanks cave.

Salix/Graminoid Cryaquolls, poorly drained

- Foot and saddlestock trails are severely limited because of ponding.
- Shallow excavations are severely limited because of ponding and cutbanks cave.

Additional Information

- Salix/Graminoid Cryaquolls Ecological Type description on page 471.
- Salix/Graminoid Cryaquolls, poorly drained Ecological Type description on page 474.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

2608—ABLA/CACA4,CACA4 Bootjack and Salix/Graminoid Cryaquolls, poorly drained, 0 to 2 percent slopes

Summary

This ecological unit is on moist floodplains in the cool portion of the forested zone (Fig. 83). The topography is characterized by floodplains in trough-like, very low gradient (0 to 2 percent), moderate width (100 to 300 feet) valleys of shallow incised canyons. Rosgen stream types C3 and C4 are commonly represented. There are two or three subtle stream terraces within the floodplain. Meanders are irregular, stream width is 1 to 50 feet, flow regimes are perennial or intermittent, and seasonal variation is dominated by snow melt runoff. Organic debris is infrequent to moderate in occurrence. Beaver dams are few to infrequent. One or both of the components may occur in any delineation of this unit.

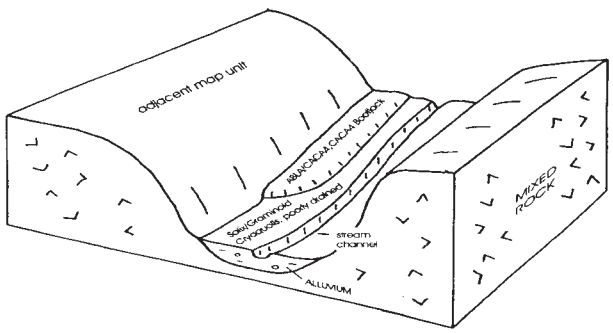


Figure 83. Block diagram of ecological unit 2608

Ecological Unit Setting

Subsection: Madison-Pitchstone Plateaus
Landform: floodplains
Elevations: 5700 to 7200 feet
Average annual precipitation: 26 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

0 to 80 percent - ABLA/CACA4,CACA4 Bootjack Ecological Type
0 to 80 percent - Salix/Graminoid Cryaquolls, poorly drained Ecological Type
20 percent - contrasting inclusions

ABLA/CACA4,CACA4 Bootjack (0 to 80%)

Setting

Slopes: 0 to 2 percent
Landform position: stream terraces, commonly associated with the second and third terraces above perennial stream segments and first terraces of intermittent stream segments

Vegetation

Potential Natural Community
- subalpine fir/bluejoint p.a., bluejoint phase

Present Vegetation
- lodgepole pine/bluejoint c.t.
- bluejoint c.t.

Soils

Name: Bootjack series
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aeric Cryaquepts
Parent material: alluvium derived from diatomaceous earth and obsidian sands
Typical profile:
- 2 to 0 inches - forest litter
- 0 to 3 inches - light gray silt loam
- 3 to 15 inches - white loam
- 15 to 60 inches - variegated stratified coarse sand and fine sand

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 5.0 inches
Drainage class: poorly drained
Water table: 0 to 18 inches
Flooding hazard: frequent
Kw factor: 0.49
T factor: 2
Comment: The percent of the ecological unit represented by this component varies with the stream flow regime and stream width. It is the dominant ecological type on segments where the

stream width is less than 5 feet or the stream is intermittent.

Salix/Graminoid Cryaquolls, poorly drained (0 to 80%)

Setting

Slopes: 0 to 1 percent

Landform position: stream terraces, commonly associated with the first terrace adjacent to perennial stream segments

Vegetation

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- beaked sedge c.t.

Soils

Name: Cryaquolls great group, poorly drained phase

Taxonomic class: Cryaquolls

Parent material: mixed alluvium

Typical profile:

- 0 to 13 inches - very dark grayish brown silt loam
- 13 to 20 inches - gray silt loam
- 20 to 60 inches - light gray sandy loam
- 60 to 65 inches - variegated extremely gravelly sandy loam

Depth class: very deep (greater than 60 inches)

Permeability: moderate

AWC, surface to 20 inches: 3.5 inches

AWC, surface to 60 inches: 9.5 inches

Drainage class: poorly drained

Ponding: 6 to 0 inches

Flooding hazard: frequent

Kw factor: 0.28

T factor: 3

Comment: The percent of the ecological unit represented by this component varies with the stream flow regime and stream width. It is the dominant ecological type on segments where the stream size is greater than 5 feet in width.

Contrasting Inclusions (20%)

Inclusion 1

Slope: 0 to 4 percent

Landform position: stream terraces, commonly associated with the fourth or fifth terraces above the stream channel or on terraces farther removed from the active stream channel

Potential Natural Community

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- lodgepole pine/grouse whortleberry c.t.

Present Vegetation

- lodgepole pine/pinegrass c.t.
- Communities that have a tree canopy of lodgepole pine with an herbaceous layer dominated by non-native grasses.

Soils: Sandy soils that are moderately well drained and have a seasonal high water table at a depth of 6 to 30 inches (Perfa soils).

Inclusion 2

Slope: 4 to 15 percent

Landform position: canyon footslopes

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- lodgepole pine/grouse whortleberry c.t.

Soils: Well drained soils that have a gravelly loam texture in the surface layer and subsoil over a substratum with an extremely cobbly sandy loam texture.

Inclusion 3

Slope: 6 to 15 percent

Landform position: canyon footslopes, commonly associated with seeps and springs

Potential Natural Community

- willow/grass and sedge dominated communities

Present Vegetation

- beaked sedge c.t.

Soils: Soils like Bootjack and Cryaquolls, poorly drained that have 5 to 50 percent stones or boulders.

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation and depth to seasonal high water table are directly related to the present vegetation on adjacent uplands.
- When the forest canopies die or are removed on large areas of adjacent uplands, the water table rises. The present vegetation shifts toward communities dominated by bluejoint or beaked sedge. Established lodgepole pine may drown in these communities.

- When the forest canopies are well established and actively growing on large areas of adjacent uplands, the water table lowers. The present vegetation in this ecological unit shifts towards drier upland communities. Reduced plant competition and reduced wetness allow establishment of tree seedlings in these drier communities.
- This ecological unit has the potential for frequent flooding of long duration during the peak snowmelt periods, April through July.
- Unsurfaced roads and parking areas are severely limited because of wetness and flooding.
- Pond reservoir areas are severely limited because of seepage.
- Fencing is severely limited because of wetness.
- Off-road vehicle use is severely limited because of wetness and the soils compact easily.

ABLA/CACA4,CACA4 Bootjack

- Activities severely limited because of flooding or wetness include: camp and picnic areas, dwellings without basements, septic tank absorption fields, and foot and saddlestock trails.
- Shallow excavations are severely limited because of wetness and cutbanks cave.
- Tree windthrow hazard is severe because of wetness.
- The use of heavy equipment for woodland harvest is severely limited because of wetness.

Salix/Graminoid Cryaquolls, poorly drained

- Shallow excavations are severely limited because of ponding and cutbanks cave.
- Activities severely limited because of flooding, ponding or wetness include: camp and picnic areas, dwellings without basements, and septic tank absorption fields.
- Foot and saddlestock trails are severely limited because of ponding.

Additional Information

- ABLA/CACA4,CACA4 Bootjack Ecological Type description on page 255.
- Salix/Graminoid Cryaquolls, poorly drained Ecological Type description on page 474.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

2609—PIEN Cryaquolls, 2 to 8 percent slopes

Summary

This ecological unit is on cold, moist floodplains in the forested zone (Fig. 84). The topography is characterized by low to high gradient (2 to 8 percent) floodplains in U-shaped mountain valleys. The floodplains vary in width from 40 to 800 feet and streams vary in width from 1 to 15 feet. Microrelief on the floodplain is very broken and irregular. Rosgen stream types A3 and B3 are commonly represented. The streams are perennial or intermittent and seasonal variation in stream flow is dominated by snow melt runoff. Braided channels and confined meanders are common. Medium to large debris affects up to 30 percent of the active stream channels. Beaver dams are infrequent.

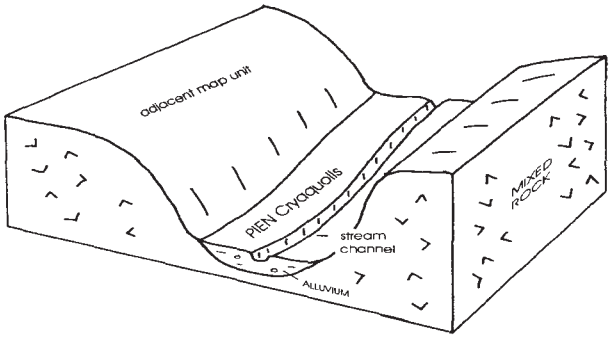


Figure 84. Block diagram of ecological unit 2609

Ecological Unit Setting

Subsection: Big Hole Mountains, Centennial Mountains, Island Park, Madison-Pitchstone Plateaus and Teton Range
Landform: floodplains
Elevations: 5600 to 7800 feet
Average annual precipitation: 25 inches
Average annual air temperature: 36 degrees F
Geology: alluvium

Ecological Unit Composition

90 percent - PIEN Cryaquolls Mosaic
10 percent - contrasting inclusions

PIEN Cryaquolls (90%)

Setting

Slopes: 2 to 8 percent
Landform position: stream terraces and overflow channels

Vegetation

Potential Natural Community

A mosaic of:

- Engelmann's spruce/fragrant bedstraw c.t.
- Engelmann's spruce/field horsetail c.t.

Present Vegetation

- Engelmann's spruce/fragrant bedstraw c.t.
- Engelmann's spruce/field horsetail c.t.
- Engelmann's spruce/redosier dogwood c.t.
- redosier dogwood/common cowparsnip c.t.
- Booth's willow/starry false Solomon's seal c.t.
- thinleaf alder/northern black currant c.t.
- Geyer's willow/mesic forb c.t.
- Bebb willow/stinging nettle community

Soils

Name: Cryaquolls great group
Taxonomic class: Cryaquolls
Parent material: mixed alluvium
Typical profile:

- 0 to 20 inches - black fine sandy loam
- 20 to 30 inches - very dark grayish brown stratified fine sandy loam, sandy loam and gravelly sandy loam
- 30 to 60 inches - variegated extremely cobbly loamy sand

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.5 inches
AWC, surface to 60 inches: 4.5 inches
Drainage class: somewhat poorly drained
Ponding: 6 to 0 inches
Flooding hazard: frequent
Kw factor: 0.15
T factor: 3

Contrasting Inclusions (10%)

Inclusion 1

Slope: 2 to 6 percent

Landform position: all positions

Potential Natural Community

- subalpine fir/bluejoint p.a., bluejoint phase

Present Vegetation

- Engelmann's spruce/bluejoint c.t.
- lodgepole pine/bluejoint community
- Booth's willow/bluejoint c.t.
- Geyer's willow/bluejoint c.t.
- Wolf's willow/bluejoint c.t.
- subalpine fir/bluejoint p.a.

Soils: Soils like the Cryaquolls that are rarely flooded and have a layer of peat on the surface.

Comment: This inclusion is commonly associated with areas that have old, stable beaver dams or springs on high stream terraces.

Inclusion 2

Slope: 4 to 15 percent

Landform position: footslopes and high stream terraces

Potential Natural Community

- subalpine fir/grouse whortleberry p.a., pinegrass phase

Present Vegetation

- subalpine fir/grouse whortleberry p.a., pinegrass phase
- lodgepole pine/grouse whortleberry c.t.
- lodgepole pine/pinegrass c.t.

Soils: Soils that are well drained.

Management and Limitations

- This ecological unit has dynamic riparian systems. Present vegetation, depth to seasonal high water table, channel incisement and stream flow regime interrelate with each other.
- When stream channels become incised, the water table drops below the major rooting zone and the present vegetation shifts towards upland communities.
- These riparian systems respond to subtle changes in management or conditions within the ecological unit and on adjacent uplands.
- This ecological unit has the potential for frequent flooding of long duration during the peak snowmelt periods, April through July. Localized flooding may occur adjacent to beaver ponds and dams throughout the year.
- Tree windthrow hazard is severe because of wetness.
- Activities severely limited because of wetness include: the use of heavy equipment for woodland harvest and mechanical site preparation, off-road vehicle use and fencing.
- Shallow excavations are severely limited because of ponding and cutbanks cave.
- Dwellings without basements, camp areas and picnic areas are severely limited because of flooding or ponding.
- Unsurfaced roads and parking areas are severely limited because of wetness and flooding.
- Pond reservoir areas are severely limited because of seepage.

Additional Information

- PIEN Cryaquolls Mosaic description on page 410.
- A complete set of management and limitation ratings are in the soil interpretation tables on pages 677-730.

3000—Pits

Summary

This ecological unit is on gravel and quarry pits in and below the forested zone. The extent of each pit is commonly greater than 40 acres.

Ecological Unit Setting

Subsection: Caribou Range Mountains and Teton Range
Landform: mountains and stream terraces
Elevations: 5300 to 7500 feet
Geology: mixed

Vegetation

The following communities have been observed:

- Diverse communities of dispersed forbs or grasses are dominant.
- Non-native grass communities are common in reclaimed areas.
- Islands of trees or shrubs are present in lightly disturbed areas within quarry pits.

Soils

Gravel pits on stream terraces and quarry pits on mountain sideslopes are common.

Management and Limitations

- Project specific investigations are needed to determine the limitations and related management concerns.

4028—Greys - Turnerville complex, 1 to 4 percent slopes

Summary

This map unit is on summits of dissected tablelands in the warm portion of the forested zone. The landscape is characterized by undulating slopes that support reforesting clearcuts and closed canopy forests. Relief is less than 100 feet. The unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5550 to 5900 feet
Average annual precipitation: 20 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

45 percent - Greys
40 percent - Turnerville
15 percent - contrasting inclusions

Greys (45%)

Setting

Slopes: 1 to 4 percent
Landform position: all positions

Vegetation

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/Fendler's meadowrue
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium lodgepole pine and Douglas-fir.

Soils

Name: Greys series
Taxonomic class: Fine-silty, mixed, superactive Boralfic Cryoborolls
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - brown silt loam
- 5 to 19 inches - brown over yellowish brown silt loam
- 19 to 95 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

Turnerville (40%)

Setting

Slopes: 1 to 4 percent
Landform position: all positions

Vegetation

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Douglas-fir/pinegrass community
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - pale brown silt loam
- 5 to 15 inches - light yellowish brown silt loam
- 15 to 22 inches - light gray and yellowish brown silt loam
- 22 to 33 inches - brown silt loam
- 33 to 63 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.49
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 4 to 35 percent
Landform position: short sideslopes of bowls and incised drainageways

Soils: Greys and Turnerville soils

Inclusion 2

Slope: 1 to 4 percent
Landform position: near canyon rims

Soils: Soils like Greys and Turnerville that have 5 to 25 percent rock fragments.

Inclusion 3

Slope: 1 to 4 percent
Landform position: all positions

Soils: Soils like Greys that have a dark colored surface layer greater than 16 inches thick.

Additional Information

- Greys Series description on page 482.
- Turnerville Series description on page 496.

4029—Greys - Turnerville complex, 4 to 12 percent slopes

Summary

This map unit is on summits of dissected tablelands in the warm portion of the forested zone. The landscape is characterized by rolling slopes that support reforesting clearcuts and closed canopy forests. Barchan dunes are common in some areas. Relief is less than 100 feet. This unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5400 to 6400 feet
Average annual precipitation: 20 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

45 percent - Greys
40 percent - Turnerville
15 percent - contrasting inclusions

Greys (45%)

Setting

Slopes: 4 to 12 percent
Landform position: all positions

Vegetation

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/Fendler's meadowrue
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium lodgepole pine and Douglas-fir.

Soils

Name: Greys series
Taxonomic class: Fine-silty, mixed, superactive Boralfic Cryoborolls
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - brown silt loam
- 5 to 19 inches - brown over yellowish brown silt loam
- 19 to 95 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

Turnerville (40%)

Setting

Slopes: 4 to 12 percent
Landform position: all positions

Vegetation

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Douglas-fir/pinegrass community
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - pale brown silt loam
- 5 to 15 inches - light yellowish brown silt loam

- 15 to 22 inches - light gray and yellowish brown silt loam
- 22 to 33 inches - brown silt loam
- 33 to 63 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.49
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 4 to 12 percent
Landform position: all positions

Soils: Soils like Greys and Turnerville that are more warm and have greater than 15 percent sand.

Additional Information

- Greys Series description on page 482.
- Turnerville Series description on page 496.

4030—Greys - Turnerville complex, 12 to 20 percent slopes

Summary

This map unit is on summits of dissected tablelands in the warm portion of the forested zone. The landscape is characterized by hilly slopes that support reforesting clearcuts and closed canopy forests. Barchan dunes are common in some areas. Relief is less than 100 feet. The unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5720 to 6840 feet
Average annual precipitation: 20 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

45 percent - Greys
40 percent - Turnerville
15 percent - contrasting inclusions

Greys (45%)

Setting

Slopes: 12 to 20 percent
Landform position: all positions

Vegetation

Present Vegetation

- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/pinegrass c.t.
- quaking aspen/Saskatoon serviceberry-whortleleaf snowberry/Fendler's meadowrue
- quaking aspen/whortleleaf snowberry/pinegrass c.t.
- quaking aspen/pinegrass c.t.
- quaking aspen-Douglas-fir/Saskatoon service-berry c.t.
- quaking aspen-Douglas-fir/whortleleaf snowberry c.t.
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.
- Communities dominated by quaking aspen that have widely dispersed seedling through medium lodgepole pine and Douglas-fir.

Soils

Name: Greys series
Taxonomic class: Fine-silty, mixed, superactive Boralfic Cryoborolls
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - brown silt loam
- 5 to 19 inches - brown over yellowish brown silt loam
- 19 to 95 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderately slow
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

Turnerville (40%)

Setting

Slopes: 12 to 20 percent
Landform position: all positions

Vegetation

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Douglas-fir/pinegrass community
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - pale brown silt loam
- 5 to 15 inches - light yellowish brown silt loam

- 15 to 22 inches - light gray and yellowish brown silt loam
- 22 to 33 inches - brown silt loam
- 33 to 63 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.49
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 12 to 20 percent
Landform position: all positions

Soils: Soils like Greys and Turnerville that are more warm and have greater than 15 percent sand.

Additional Information

- Greys Series description on page 482.
- Turnerville Series description on page 496.

4057—Hapgood - Sebud complex, 15 to 45 percent slopes

Summary

This map unit is on fan remnants in the cool, moist portion of shrub steppe zone. The landscape is characterized by hilly to steep slopes that support communities dominated by sagebrush and grasses. The unit joins the *Soil Survey of Madison County Area, Montana.*

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: fan remnants
Elevations: 6700 to 7400 feet
Average annual precipitation: 20 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

60 percent - Hapgood
30 percent - Sebud
10 percent - contrasting inclusions

Hapgood (60%)

Setting

Slopes: 15 to 45 percent
Landform position: sideslopes and depressional areas

Vegetation

Present Vegetation:

- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Rocky Mountain juniper.

Soils

Name: Hapgood series
Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls
Parent material: mixed alluvium
Typical profile:

- 0 to 18 inches - very dark grayish brown very cobbly loam
- 18 to 60 inches - grayish brown very cobbly loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 3

Sebud (30%)

Setting

Slopes: 15 to 45 percent
Landform position: ridges and south facing sideslopes

Vegetation

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Rocky Mountain juniper.

Soils

Name: Sebud series
Taxonomic class: Loamy-skeletal, mixed, superactive Typic Cryoborolls
Parent material: mixed alluvium
Typical profile:

- 0 to 14 inches - dark grayish brown very stony loam
- 14 to 32 inches - yellowish brown very stony sandy clay loam
- 32 to 60 inches - pale brown very stony sandy loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to 60 inches: 4.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 3

Contrasting Inclusions (10%)

Inclusion 1

Slope: 15 to 45 percent
Landform position: all positions

Soils: Soils like Hapgood and Sebud that have less than 35 percent rock fragments in the subsoil.

Additional Information

- Hapgood Series description on page 484.
- Sebud Series description on page 492.

4064—Lostine, 4 to 8 percent slopes

Summary

This map unit is on summits of dissected tablelands in the cool, moist portion of the shrub steppe zone. The landscape is characterized by rolling slopes that support communities dominated by sagebrush. Widely dispersed conifers are common in some areas. Relief is less than 100 feet. This unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5500 to 5720 feet
Average annual precipitation: 18 inches
Average annual air temperature: 41 degrees F
Geology: loess

Ecological Unit Composition

75 percent - Lostine
25 percent - contrasting inclusions

Lostine (75%)

Setting

Slopes: 4 to 8 percent
Landform position: all positions

Vegetation

Present Vegetation

- Communities dominated by mountain big sagebrush, whortleleaf snowberry or Saskatoon serviceberry.
- Shrub dominated communities that have widely dispersed seedling through large Douglas-fir, lodgepole pine or Rocky Mountain juniper.

Soils

Name: Lostine series
Taxonomic class: Coarse-silty, mixed, superactive, frigid Pachic Haploxerolls
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 20 inches - dark grayish brown silt loam
- 20 to 36 inches - brown silt loam
- 36 to 60 inches - pale brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained drained
Water table: none
Flooding hazard: none
Kw factor: 0.43
T factor: 5

Contrasting Inclusions (25%)

Inclusion 1

Slope: 4 to 8 percent
Landform position: all positions

Soils: Soils like Lostine that have a gravelly silt loam texture in the surface layer and silty clay loam or silty clay texture in the subsoil.

Additional Information

- Lostine Series description on page 489.

4076—Maxville, 2 to 8 percent slopes

Summary

This map unit is on fan remnants in the cool, moist portion of shrub steppe zone. The landscape is characterized by undulating slopes that support communities dominated by sagebrush and grasses. This unit joins the *Soil Survey of Madison County Area, Montana.*

Ecological Unit Setting

Subsection: Centennial Mountains
Landform: fan remnants
Elevations: 6700 to 6900 feet
Average annual precipitation: 19 inches
Average annual air temperature: 38 degrees F
Geology: alluvium

Ecological Unit Composition

85 percent - Maxville
15 percent - contrasting inclusions

Maxville (85%)

Setting

Slopes: 2 to 8 percent
Landform position: fan remnants

Vegetation

Present Vegetation

- mountain big sagebrush/Idaho fescue p.a.
- Shrub dominated communities that have widely dispersed seedling through medium Rocky Mountain juniper.

Soils

Name: Maxville series
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Typic Cryoborolls
Parent material: mixed alluvium
Typical profile:

- 0 to 11 inches - dark grayish brown gravelly loam
- 11 to 19 inches - grayish brown loam
- 19 to 34 inches - pale brown loam
- 34 to 60 inches - pale brown very gravelly loamy sand

Depth class: very deep (greater than 60 inches)
Permeability: moderate over rapid
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 5.5 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 3

Contrasting Inclusions (15%)

Inclusion 1

Slope: 2 to 8 percent
Landform position: all positions
Soils: Soils like Maxville that have greater than 35 percent rock fragments in the subsoil.

Additional Information

- Maxville Series description on page 490.

4120—Stamp, 0 to 4 percent slopes

Summary

This map unit is on cool, wet outwash plains in the cool portion of the forested zone. The landscape is characterized by nearly level to undulating stream terraces that support riparian communities dominated by grasses and sedges. This unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: outwash plains
Elevations: 6280 to 6600 feet
Average annual precipitation: 29 inches
Average annual air temperature: 37 degrees F
Geology: alluvium

Ecological Unit Composition

85 percent - Stamp
15 percent - contrasting inclusions

Stamp (85%)

Setting

Slopes: 0 to 4 percent
Landform position: stream terraces

Vegetation

Present Vegetation

- Communities dominated by grasses and sedges.

Soils

Name: Stamp series
Taxonomic class: Coarse-loamy, mixed, superactive Aquic Cryochrepts
Parent material: mixed alluvium

Typical profile:

- 0 to 11 inches - light brownish gray loam
- 11 to 20 inches - grayish brown loam
- 20 to 38 inches - light brownish gray coarse sandy loam
- 38 to 60 inches - variegated gravelly coarse sand

Depth class: very deep (greater than 60 inches)
Permeability: moderate over rapid
AWC, surface to 20 inches: 3.0 inches
AWC, surface to 60 inches: 5.0 inches
Drainage class: somewhat poorly drained
Water table: 0 to 18 inches
Flooding hazard: rare
Kw factor: 0.32
T factor: 4

Contrasting Inclusions (15%)

Inclusion 1

Slope: 0 to 4 percent
Landform position: higher stream terraces
Soils: Soils like Stamp that are moderately well drained (Perfa soils).

Inclusion 2

Slope: 0 to 2 percent
Landform position: lowest stream terraces and depressions
Soils: Soils like Stamp that are poorly drained (Bootjack and Chickreek soils).

Additional Information

- Stamp Series description on page 494.

4138—Turnerville, 1 to 4 percent slopes

Summary

This map unit is on summits of dissected tablelands in the warm portion of the forested zone. The landscape is characterized by undulating slopes that support reforesting clearcuts and closed canopy forests. Barchan dunes are common in some areas. Relief is less than 100 feet. The unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5500 to 6140 feet
Average annual precipitation: 20 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

85 percent - Turnerville
15 percent - contrasting inclusions

Turnerville (85%)

Setting

Slopes: 1 to 4 percent
Landform position: all positions

Vegetation

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Douglas-fir/pinegrass community
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - pale brown silt loam
- 5 to 15 inches - light yellowish brown silt loam
- 15 to 22 inches - light gray and yellowish brown silt loam
- 22 to 33 inches - brown silt loam
- 33 to 63 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.49
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 1 to 4 percent
Landform position: all positions

Soils: Soils like Turnerville that have a thick dark colored surface layer (Greys soils).

Inclusion 2

Slope: 1 to 4 percent
Landform position: all positions

Soils: Soils like Turnerville that have 5 to 15 percent rock fragments.

Additional Information

- Turnerville Series description on page 496.

4139—Turnerville, 4 to 12 percent slopes

Summary

This map unit is on summits of dissected tablelands in the warm portion of the forested zone. The landscape is characterized by rolling slopes that support reforesting clearcuts and closed canopy forests. Barchan dunes are common in some areas. Relief is less than 100 feet. The unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5550 to 6450 feet
Average annual precipitation: 20 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

80 percent - Turnerville
20 percent - contrasting inclusions

Turnerville (80%)

Setting

Slopes: 4 to 12 percent
Landform position: all positions

Vegetation

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Douglas-fir/pinegrass community
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - pale brown silt loam
- 5 to 15 inches - light yellowish brown silt loam
- 15 to 22 inches - light gray and yellowish brown silt loam
- 22 to 33 inches - brown silt loam
- 33 to 63 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.49
T factor: 5

Contrasting Inclusions (20%)

Inclusion 1

Slope: 4 to 12 percent
Landform position: all positions
Soils: Soils like Turnerville that have a thick dark colored surface layer (Greys soils).

Inclusion 2

Slope: 4 to 12 percent
Landform position: all positions
Soils: Soils like Turnerville that have 5 to 45 percent rock fragments.

Additional Information

- Turnerville Series description on page 496.

4140—Turnerville, 12 to 20 percent slopes

Summary

This map unit is on summits of dissected tablelands in the warm portion of the forested zone. The landscape is characterized by hilly slopes that support reforesting clearcuts and closed canopy forests. Barchan dunes are common in some areas. Relief is less than 100 feet. The unit joins the *Soil Survey of Fremont County, Idaho, Western Part.*

Ecological Unit Setting

Subsection: Island Park
Landform: dissected tablelands
Elevations: 5800 to 6540 feet
Average annual precipitation: 20 inches
Average annual air temperature: 39 degrees F
Geology: loess

Ecological Unit Composition

85 percent - Turnerville
15 percent - contrasting inclusions

Turnerville (85%)

Setting

Slopes: 12 to 20 percent
Landform position: all positions

Vegetation

Present Vegetation

- lodgepole pine/pinegrass c.t.
- lodgepole pine/elk sedge c.t.
- Douglas-fir/pinegrass community
- Herbaceous communities that are dominated by pinegrass, elk sedge or non-native grasses and sedges.

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs
Parent material: local alluvium derived from loess
Typical profile:

- 0 to 5 inches - pale brown silt loam
- 5 to 15 inches - light yellowish brown silt loam
- 15 to 22 inches - light gray and yellowish brown silt loam
- 22 to 33 inches - brown silt loam
- 33 to 63 inches - light yellowish brown silt loam

Depth class: very deep (greater than 60 inches)
Permeability: moderate
AWC, surface to 20 inches: 4.0 inches
AWC, surface to 60 inches: 12.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.49
T factor: 5

Contrasting Inclusions (15%)

Inclusion 1

Slope: 12 to 20 percent
Landform position: all positions

Soils: Soils like Turnerville that have a thick dark colored surface layer (Greys soils).

Inclusion 2

Slope: 12 to 20 percent
Landform position: all positions

Soils: Soils like Turnerville that have 5 to 25 percent rock fragments.

Additional Information

- Turnerville Series description on page 496.

4301—Ike - Rock Outcrop - Jimbee association, 10 to 80 percent slopes

Summary

This map unit is on foothills in a broad transitional area between the warm, dry and cool, dry portions of the shrub steppe zone. The unit joins the unpublished Soil Survey of Butte County, Idaho.

Ecological Unit Setting

Subsection: Lemhi-Medicine Lodge
Landform: foothills
Elevations: 5800 to 7200 feet
Average annual precipitation: 11 inches
Average annual air temperature: 40 degrees F
Geology: limestone

Ecological Unit Composition

40 percent - Ike
20 percent - Rock outcrop
15 percent - Jimbee
25 percent - contrasting inclusions

Ike (40%)

Setting

Slopes: 10 to 80 percent
Landform position: south facing sideslopes

Vegetation

Present Vegetation

- black sagebrush/bluebunch wheatgrass community
- curlleaf mountain mahogany/bluebunch wheat-grass community

Soils

Name: Ike series
Taxonomic class: loamy-skeletal, carbonatic, frigid Lithic Xeric Haplocalcids
Parent material: local alluvium or residuum derived from limestone
Typical profile:

- 0 to 2 inches - pale brown gravelly silt loam
- 2 to 7 inches - very pale brown very gravelly silt loam
- 7 to 18 inches - pale yellow extremely cobbly silt loam
- 18 inches - hard limestone bedrock

Depth class: shallow (10 to 20 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to hard limestone bedrock: 2.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 1

Rock Outcrop (20%)

Setting

Landform position: all positions

Soils

Name: Rock Outcrop
Feature: Rock outcrops of hard limestone bedrock that consist of exposed surface level exposures to irregular cliffs.

Jimbee (15%)

Setting

Slopes: 10 to 80 percent
Landform position: north facing sideslopes

Vegetation

Present Vegetation

- gray low sagebrush/bluebunch wheatgrass community
- curlleaf mountain mahogany/bluebunch wheat-grass community

Soils

Name: Jimbee series
Taxonomic class: loamy-skeletal, carbonatic Lithic Cryoborolls
Parent material: local alluvium, colluvium or residuum derived from limestone
Typical profile:

- 0 to 7 inches - brown gravelly loam
- 7 to 17 inches - very pale brown very stony loam
- 17 inches - hard limestone bedrock

Depth class: shallow (10 to 20 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to hard limestone bedrock: 2.0 inches

Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 1

Contrasting Inclusions (25%)

Inclusion 1

Landform position: south facing sideslopes

Present Vegetation

- Wyoming big sagebrush/bluebunch wheatgrass community

Soils: Very deep, loamy soils that have carbonates and greater than 35 percent rock fragments (Simeroi soils).

Inclusion 2

Landform position: south facing sideslopes

Present Vegetation

- black sagebrush/bluebunch wheatgrass community

Soils: Very deep, loamy soils that have carbonates and greater than 35 percent rock fragments (Simeroi soils).

Inclusion 3

Landform position: south facing sideslopes

Present Vegetation

- black sagebrush/bluebunch wheatgrass community

Soils: Soils like Ike that are 20 to 40 inches deep over hard bedrock.

Inclusion 4

Landform position: north facing sideslopes

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass community

Soils: Very deep, loamy soils that have a dark colored surface layer, carbonates and greater than 35 percent rock fragments (Zeale soils).

Additional Information

- Ike Series description on page 485.
- Jimbee Series description on page 487.

4302—Jimbee - Rock Outcrop - Ike association, 10 to 90 percent slopes

Summary

This map unit is on foothills in a broad transitional area between the warm, dry and cool, dry portions of the shrub steppe zone. The unit joins the unpublished Soil Survey of Butte County, Idaho.

Ecological Unit Setting

Subsection: Caribou Range Mountains
Landform: foothills
Elevations: 5800 to 7200 feet
Average annual precipitation: 11 inches
Average annual air temperature: 40 degrees F
Geology: limestone

Ecological Unit Composition

45 percent - Jimbee
15 percent - Rock outcrop
15 percent - Ike
25 percent - contrasting inclusions

Jimbee (45%)

Setting

Slopes: 10 to 90 percent
Landform position: north facing sideslopes

Vegetation

Present Vegetation

- gray low sagebrush/bluebunch wheatgrass community
- curllleaf mountain mahogany/bluebunch wheat-grass community

Soils

Name: Jimbee series
Taxonomic class: Loamy-skeletal, carbonatic Lithic Cryoborolls
Parent material: local alluvium, colluvium or residuum derived from limestone
Typical profile:

- 0 to 7 inches - brown stony loam
- 7 to 17 inches - pale brown gravelly loam and very pale brown very stony loam
- 17 inches - white lime coated dark gray hard limestone

Depth class: shallow to bedrock (10 to 20 inches)
Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to white lime coated dark gray hard limestone: 2.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.20
T factor: 1

Rock Outcrop (15%)

Setting

Landform position: all positions

Soils

Name: Rock Outcrop
Feature: Rock outcrops of hard limestone bedrock that consist of exposed surface level exposures to irregular cliffs.

Ike (15%)

Setting

Slopes: 10 to 90 percent
Landform position: south facing sideslopes

Vegetation

Present Vegetation

- black sagebrush/bluebunch wheatgrass community
- curlleaf mountain mahogany/bluebunch wheat-grass community

Soils

Name: Ike series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Lithic Xerollic Haplocalcids
Parent material: local alluvium or residuum derived from limestone
Typical profile:

- 0 to 2 inches - pale brown gravelly silt loam
- 2 to 7 inches - very pale brown very gravelly silt loam
- 7 to 18 inches - pale yellow extremely cobbly silt loam
- 18 inches - hard limestone bedrock

Depth class: shallow (10 to 20 inches)

Permeability: moderate
AWC, surface to 20 inches: 2.0 inches
AWC, surface to hard limestone bedrock: 2.0 inches
Drainage class: well drained
Water table: none
Flooding hazard: none
Kw factor: 0.15
T factor: 1

Contrasting Inclusions (25%)

Inclusion 1

Landform position: north facing sideslopes

Present Vegetation

- mountain big sagebrush/bluebunch wheatgrass community

Soils: Very deep, loamy soils that have a dark colored surface layer, carbonates and greater than 35 percent rock fragments (Zeale soils).

Inclusion 2

Landform position: windswept ridges

Present Vegetation

- gray low sagebrush/bluebunch wheatgrass community

Soils: Very deep, cool loamy soils that have carbonates and greater than 35 percent rock fragments.

Inclusion 3

Landform position: south facing sideslopes

Present Vegetation

- black sagebrush/bluebunch wheatgrass community

Soils: Soils like Ike that are 20 to 40 inches deep over hard bedrock.

Inclusion 4

Landform position: upper elevation range of the unit

Present Vegetation

- curlleaf mountain mahogany/bluebunch wheatgrass community

Soils: Very deep, loamy soils that have a dark colored surface layer, carbonates and greater than 35 percent rock fragments (Zeale soils).

Additional Information

- Ike Series description on page 485.
- Jimbee Series description on page 487.

Anatomy of an Ecological Type, Mosaic or Ecotone

Name

Summary

Physiographic features

Potential Natural Community

Vegetation presently found on the type.

Description of successional stages.

Continuation of successional descriptions.

Discussion of ecological relationships.

PSME/SYOR2 Kyway Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. on Kyway soils. It is on south facing foothill sideslopes in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1430
Landform: foothills
Parent material: local alluvium or colluvium derived from eolian materials, volcanic ash and rhyolite
Slope: 4 to 30 percent
Elevation: 5600 to 6300 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.e.
- Communities that have a shrub layer of *Acer grandidentatum, Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Symphoricarpos oreophilus* with an herbaceous layer dominated by one or more of the following: *Agropyron spicatum, Bromus carinatus, Carex geyeri* or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium *Pseudotsuga menziesii.*

Succession

Early seral conditions, as a result of fire, support few residual trees. The shrub layer has low cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Symphoricarpos oreophilus.* The prominent herbaceous layer is dominated by *Agropyron spicatum, Bromus carinatus, Carex geyeri, Festuca idahoensis* and *Poa* species. Forbs have low cover and moderate species diversity.

Mid seral conditions support dispersed *Pseudotsuga menziesii* and *Juniperus scopulorum* seedlings or saplings. These trees establish in the shade provided by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* or residual *Pseudotsuga menziesii.* Small clones of *Populus tremuloides* saplings may be present. The shrub layer has moderate cover and may include *Acer grandidentatum, Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana, Prunus virginiana* var. *melanocarpa* or *Symphoricarpos oreophilus.* The moderate cover in the herbaceous layer is dominated by graminoids.

Late seral and near PNC conditions support an open tree canopy of *Pseudotsuga menziesii. Populus tremuloides* and *Juniperus scopulorum* may be present. The shrub layer has moderate cover and is dominated by *Symphoricarpos oreophilus. Amelanchier alnifolia* or *Prunus virginiana* var. *melanocarpa* may be present. The herbaceous layer has low cover. *Carex rossii* or *Poa nervosa* var. *wheeleri* dominate islands of relatively shade tolerant species in tree shadows. *Agropyron spicatum, Agropyron trachycaulum, Bromus carinatus* or *Festuca idahoensis* dominate in shrub interspaces. Forbs are sparse.

Discussion

Symphoricarpos oreophilus is a pioneer species on highly disturbed sites. This shrub often becomes established in early seral conditions and persists into later stages. Regeneration is vegetative and by seed. Rootcrowns sprout following fire and basal stems sprout after browsing. Regeneration by layering occurs where the lower branches are in contact with the soil surface for an extended period of time.

The loamy soils of this ecological type influence community composition and development. Roots are restricted by hard bedrock at depths of 20 to 40 inches. As a result of weak anchoring, trees are susceptible to windthrow during late spring. Frost heaving in the upper 2 to 4 inches of the soil may tear the roots of tree and shrub seedlings and perennial forbs during the freeze-thaw cycles following snowmelt.

The species constancy and cover documentation for vegetation is on page 608.

Running header

Soil name and taxonomic class.

Location of typical soil pedon.

Description of typical soil pedon.

Range in soil characteristics.

Ecological unit in which the typical soil pedon is located.

Related ecological types.

Soils

Name: Kyway series

Taxonomic class: Coarse-loamy, mixed, superactive Vitrandic Cryoboroils

Typical Pedon Description

Kyway, supporting the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. on a 5 percent slope with south aspect at 6200 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 8 inches; brown (10YR 4/3) sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine irregular pores; 10 percent pebbles; neutral (pH 6.8); clear smooth boundary.

A2--8 to 18 inches; brown (7.5YR 4/2) sandy loam, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; many very fine and common fine tubular pores; 10 percent pebbles; neutral (pH 6.6); clear smooth boundary.

A3--18 to 27 inches; brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; common very fine tubular pores; 10 percent pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bw--27 to 32 inches; light brown (7.5YR 6/3) sandy loam, brown (7.5YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine and fine tubular pores; 10 percent pebbles; slightly acid (pH 6.4); abrupt wavy boundary.

R--32 inches; hard rhyolite bedrock.

Typical Pedon Location

Located in ecological unit 1430.

Legal description: about 900 feet north and 2100 feet west of the southeast corner of section 26, T. 10 N., R. 42 E., Idaho

Latitude: 44 degrees, 09 minutes, 40 seconds, north

Longitude: 111 degrees, 27 minutes, 45 seconds, west

Range in Characteristics

Profile

Depth class: moderately deep (20 to 40 inches)

Restrictive feature: unweathered bedrock (R horizon)

Drainage class: well drained

Mollic epipedon thickness: 16 to 40 inches

Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction

Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent

Phosphate retention: 20 to 50 percent

A horizons

Hue: 7.5YR or 10YR

Value: 3, 4 or 5 dry; 2 or 3 moist

Chroma: 2 or 3 dry; 1, 2 or 3 moist

Texture: sandy loam

Clay content: 10 to 14 percent

Rock fragment content: 0 to 15 percent

Pebbles: 0 to 10 percent

Cobbles: 0 to 5 percent

Stones: 0 to 5 percent

Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizon

Hue: 7.5YR or 10YR

Value: 5 or 6 dry, 3 or 4 moist

Chroma: 2, 3 or 4 dry and moist

Texture: sandy loam

Clay content: 10 to 14 percent

Rock fragment content: 0 to 15 percent

Pebbles: 0 to 10 percent

Cobbles: 0 to 5 percent

Stones: 0 to 5 percent

Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ABLA Cryoboralfs Mosaic

Summary

This mosaic is named for the occurrence of the *Abies lasiocarpa/Physocarpus malvaceus* p.a. or the *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on Cryoboralf soils. It is on moist, north facing mountain sideslopes in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1970
Landform: mountains
Parent material: residuum derived from calcareous shale
Slope: 15 to 70 percent
Elevation: 5700 to 8400 feet
Average annual precipitation: 24 to 30 inches
Average annual air temperature: 34 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

A mosaic of:

- *Abies lasiocarpa/Physocarpus malvaceus* p.a.
- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Abies lasiocarpa/Physocarpus malvaceus* p.a.
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- *Pseudotsuga menziesii/Arnica cordifolia* community

Succession

The *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase and *Abies lasiocarpa/Physocarpus malvaceus* p.a. are combined in this mosaic because of their similar position and small extent. The *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase occurs at lower elevations, and the *Abies lasiocarpa/Physocarpus malvaceus* p.a. occurs at higher elevations. The undergrowth components differentiate the two plant associations.

Early seral conditions in the *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase result from clearcutting or fire. *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. The diverse shrub layer has low cover and may regenerate by sprouting or establish from seed. The prominent herbaceous layer is dominated by *Calamagrostis rubescens*. Forbs are sparse.

Mid seral conditions support a closed tree canopy dominated by *Pseudotsuga menziesii*. *Pinus contorta* may be present. *Abies lasiocarpa* may be established in tree shadows. The sparse shrub layer includes *Berberis repens* and *Pachistima myrsinites*. The herbaceous layer has high cover and is dominated by *Calamagrostis rubescens*. *Arnica cordifolia*, *Aster* species or *Geranium viscosissimum* may be present.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. The depauperate shrub layer may include *Berberis repens* or *Pachistima myrsinites*. The herbaceous layer has moderate cover and is dominated by *Calamagrostis rubescens*. Forbs have low cover and diversity. *Arnica cordifolia* may be present.

Early seral conditions in the *Abies lasiocarpa/Physocarpus malvaceus* p.a. result from clearcutting or fire. *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. The diverse shrub layer has moderate or high cover and regenerates by sprouting. This layer may be dominated by *Physocarpus malvaceus* or codominated by *Acer glabrum*, *Amelanchier alnifolia*, *Physocarpus malvaceus*, *Prunus virginiana* var. *melanocarpa*, *Sorbus scopulina* and *Spiraea betulifolia*. The herbaceous layer has low or moderate cover and includes *Bromus carinatus*, *Elymus glaucus* and *Aster engelmannii*.

Mid seral conditions support an open or closed tree canopy dominated by *Pseudotsuga menziesii*. *Pinus contorta* may be present. *Abies lasiocarpa* may establish in tree shadows. A closed shrub layer dominates the undergrowth. The multistructured shrub layer includes *Acer glabrum*, *Amelanchier alnifolia*, *Physocarpus malvaceus*, *Prunus virginiana* var. *melanocarpa*, *Sorbus scopulina* and *Spiraea betulifolia*. The herbaceous layer has low cover and

includes *Elymus glaucus*, *Aster engelmannii* and *Thalictrum occidentale*.

Late seral and near PNC conditions support a tree canopy codominated by *Abies lasiocarpa* and *Pseudotsuga menziesii*. A closed, multistructured shrub layer dominates the undergrowth. This layer includes *Acer glabrum*, *Amelanchier alnifolia*, *Physocarpus malvaceus*, *Prunus virginiana* var. *melanocarpa* and *Spiraea betulifolia*. The depauperate herbaceous layer may include *Disporum trachycarpum*, *Goodyera oblongifolia*, *Osmorhiza chilensis* and *Thalictrum occidentale*.

Discussion

Physocarpus malvaceus is a deciduous, medium height shrub. Though capable of reproducing by seed, regeneration is primarily vegetative. Sprouts from extensive rhizomes follow low to moderate disturbance. Thick patches of single stems 3 to 5 feet in height may develop following disturbance. As overstory competition increases, the height and cover of *Physocarpus malvaceus* decreases.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth of all seral conditions. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas. The dense sod provides watershed protection and limits tree establishment.

The elevation and precipitation of this mosaic influence community composition and development. Annual precipitation increases with elevation. As site conditions become more moist, undergrowth diversity and shrub cover increase. The herbaceous layer decreases under the closed shrub canopy.

The species constancy and cover documentation for vegetation is on page 501.

Soils

Name: Cryoboralfs family
Taxonomic class: Fine, mixed, active Typic Cryoboralfs

Typical Pedon Description

Cryoboralfs, supporting the *Pseudotsuga menziesii/Calamagrostis rubescens* community on a 60 percent slope with north aspect at 6680 feet elevation. (Colors are for dry soil unless otherwise noted)

Oi--2 to 0 inches; forest litter of leaves, needles and twigs; abrupt smooth boundary.

E--0 to 7 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots, few medium roots; many very fine and fine tubular pores; 5 percent flagstones; neutral (pH 7.3); clear smooth boundary.

Bt--7 to 20 inches; pale brown (10YR 6/3) silty clay, brown (10YR 4/3) moist; weak coarse prismatic structure parting to strong medium angular blocky; hard, firm, slightly sticky and very plastic; many very fine and fine roots, few medium roots; many very fine and fine tubular pores; common distinct clay films on ped faces and lining pores; 5 percent flagstones; neutral (pH 7.3); clear smooth boundary.

Btk--20 to 31 inches; light yellowish brown (10YR 6/4) flaggy silty clay, dark yellowish brown (10YR 4/4) moist; moderate fine angular blocky structure; very hard, very firm, sticky and very plastic; common very fine roots, few fine and medium roots; few very fine and fine tubular pores; few faint clay films on ped faces and lining pores; strongly effervescent; 20 percent flagstones, 50 percent channer-size fragments of soft shale; moderately alkaline (pH 7.9); gradual irregular boundary.

Cr--31 to 41 inches; light gray (2.5Y 7/2) soft shale, light brownish gray (2.5Y 6/2) moist; violently effervescent; 20 percent hard, flagstone-size concretions.

Typical Pedon Location

Located in ecological unit 1970.
Legal description: about 2100 feet east and 700 feet north of the southwest corner of section 9, T. 1 S., R. 43 E., Idaho
Latitude: 43 degrees, 20 minutes, 28 seconds, north
Longitude: 111 degrees, 25 minutes, 26 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: weathered bedrock (Cr horizon)
Drainage class: well drained
O horizon thickness: 1 to 3 inches
Ochric epipedon thickness: 2 to 9 inches

Depth to calcic horizon: 9 to 26 inches

E or A (when present) horizon
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam
Clay content: 18 to 27 percent
Rock fragment content: 0 to 15 percent
Channers: 0 to 15 percent
Cobbles or flagstones: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silty clay or clay
Clay content: 40 to 60 percent
Rock fragment content: 0 to 35 percent
Channers: 0 to 35 percent
Cobbles or flagstones: 0 to 15 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 0 to 10 percent in the less than 2 mm fraction
Effervescence: noneffervescent or very slightly effervescent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Btk horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silty clay loam, silty clay or clay
Clay content: 35 to 60 percent
Rock fragment and soft shale fragment content: 15 to 80 percent
Rock fragment content: 0 to 35 percent
Channers: 0 to 15 percent
Cobbles or flagstones: 0 to 35 percent
Stones: 0 to 5 percent
Soft shale fragments: 15 to 60 percent
Calcium carbonate equivalent: 15 to 60 percent in the less than 2 mm fraction
Effervescence: strongly or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Cr horizon
Other: 5 to 60 percent massive limestone bands that are fractured into flagstones, stones or boulders

Related Types, Mosaics and Ecotones

ABLA/CARU,CARU Fitzwil
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/CARU,CARU Hopburn
- Soils are loamy and lack carbonates.

ABLA/CARU,CARU Koffgo
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/CARU,CARU Rhylow
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/PHMA5 Gany
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/PHMA5 Lagall
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/ACGL Gany Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Acer glabrum* p.a. on Gany soils. It is on moist, north facing mountain sideslopes in the mid portion of the forested zone.

Environmental Setting

Ecological Unit: 1172
Landform: mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 40 to 70 percent
Elevation: 6700 to 9700 feet
Average annual precipitation: 24 to 28 inches
Average annual air temperature: 34 to 37 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Acer glabrum* p.a.

Present Vegetation

- *Abies lasiocarpa/Acer glabrum* p.a.
- *Pseudotsuga menziesii/Acer glabrum* community
- Shrub communities dominated by *Acer glabrum, Sorbus scopulina* or *Amelanchier alnifolia* are common in avalanche chutes.

Succession

Early seral conditions, as a result of avalanche or fire, support few residual trees. *Pseudotsuga menziesii* may establish from seed in microsites shaded by shrubs or residual trees. A diverse shrub layer, dominated by *Acer glabrum* or *Sorbus scopulina*, has moderate or high cover and regenerates by sprouting. *Lonicera utahensis* may be present. The herbaceous layer has low or moderate cover and is dominated by graminoids.

Mid seral conditions support a canopy of *Abies lasiocarpa*, *Picea engelmannii* and *Pseudotsuga menziesii*. *Pseudotsuga menziesii* is often dominant. A diverse, multistructured shrub layer dominates the undergrowth. Shrubs include *Amelanchier alnifolia, Acer glabrum, Berberis repens, Pachistima myrsinites, Sorbus scopulina* and *Spiraea betulifolia*. The diverse herbaceous layer has low to moderate cover and is dominated by *Calamagrostis rubescens* and *Elymus glaucus*. *Carex geyeri* and *Bromus* species are common. Forbs have high diversity and low cover. *Aster engelmannii, Arnica cordifolia, Fragaria vesca, Goodyera oblongifolia, Geranium viscosissimum* or *Thalictrum occidentale* may be present.

Late seral and near PNC conditions support a canopy codominated by *Abies lasiocarpa* and *Pseudotsuga menziesii*. *Picea engelmannii* may be present. The multistructured shrub layer has low or moderate cover. *Acer glabrum, Amelanchier alnifolia, Berberis repens, Pachistima myrsinites, Sorbus scopulina* and *Spiraea betulifolia* codominate the shrub layer. The herbaceous layer has low cover and is codominated by shade tolerant graminoids and forbs. *Calamagrostis rubescens, Elymus glaucus, Aster engelmannii* or *Thalictrum occidentale* may be present.

Discussion

Acer glabrum is a long lived, shade tolerant shrub that reproduces vegetatively and by seed. Seeds need a dormancy and chilling period to germinate. Seedlings commonly establish on bare mineral soil in partial shade. Root crowns sprout following low or moderate intensity fire and develop into multistemmed clumps. *Acer glabrum* has a tall spindly growth form under a closed canopy or a more dense and bushy appearance where the tree canopy is open.

Spiraea betulifolia is a moderately shade tolerant rhizomatous shrub that is highly resistant to fire. Root crowns and rhizomes commonly sprout within one growing season following fire or scarification.

Sorbus scopulina sprouts vigorously from rhizomes after low or moderate intensity fires. A closed layer of *Sorbus scopulina* may be relatively persistent in avalanche chutes.

The cover and diversity of the undergrowth decreases in later seral stages as a result of reduced light and shading under a closed canopy.

The species constancy and cover documentation for vegetation is on page 502.

Soils

Name: Gany series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Cryoborolls

Typical Pedon Description

Gany, supporting the *Abies lasiocarpa/Acer glabrum* p.a. on a 55 percent slope with north aspect at 7440 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 1.5 inches; forest litter of slightly decomposed needles, leaves, twigs and cones; trace cobbles and stones; abrupt smooth boundary.

Oe--1.5 to 0 inches; forest litter of moderately decomposed needles, leaves, twigs and cones; trace cobbles and stones; abrupt smooth boundary.

A1--0 to 2 inches; brown (7.5YR 4/2) extremely gravelly silt loam, dark brown (7.5YR 3/2) moist; weak coarse subangular blocky structure parting to moderate very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; slightly effervescent; 60 percent pebbles, 5 percent cobbles and trace stones; slightly alkaline (pH 7.7); abrupt wavy boundary.

A2--2 to 12 inches; brown (10YR 5/3) extremely gravelly silt loam, dark brown (7.5YR 3/3) moist; moderate fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and few fine roots, common medium and few coarse roots; many very fine irregular pores; common coats of soft powdery lime on underside of rock fragments; slightly effervescent; 65 percent pebbles, 5 percent cobbles and trace stones; slightly alkaline (pH 7.8); clear smooth boundary.

Bk1--12 to 28 inches; yellowish brown (10YR 5/4) extremely gravelly loam, brown (7.5YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots, common medium roots; many very fine tubular pores; few hard pendants of carbonates and many coats of soft powdery lime on underside of rock fragments; violently effervescent; 60 percent pebbles, 15 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); gradual smooth boundary.

Bk2--28 to 48 inches; light yellowish brown (10YR 6/4) extremely gravelly loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and slightly plastic; common very fine and few medium roots; many very fine tubular pores; few hard pendants of carbonates and many coats of soft powdery lime on underside of rock fragments; violently effervescent; 60 percent pebbles, 15 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

Bkq--48 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots; many very fine and common fine irregular pores; many hard pendants of carbonates, few hard pendants of silica and many coats of soft powdery lime on underside of rock fragments; many fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 80 percent pebbles, 5 percent cobbles and trace stones; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 1172.
Legal description: about 4100 feet west and 2600 feet south of the northeast corner of section 34, T. 42 N., R. 118 W., Wyoming
Latitude: 40 degrees, 37 minutes, 51 seconds, north
Longitude: 111 degrees, 59 minutes, 49 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 1/4 to 3 inches
Mollic epipedon thickness: 7 to 15 inches (Requires mixing of the A horizons or the upper 7 inches of the soil profile.)
Depth to calcic horizon: 0 to 15 inches
Clay content in the particle-size control section: average 10 to 22 percent
Calcium carbonate equivalent in the mineralogy control section: weighted average, 25 to 40 percent in the less than 20 mm fraction

A horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 4 or 5 dry; 2, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 20 percent
Rock fragment content: 60 to 80 percent

Pebbles: 50 to 75 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 5 to 15 percent in the less than 2 mm fraction
Effervescence: slightly effervescent to violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 14 to 22 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 80 percent
Cobbles: 0 to 15 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 15 to 30 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 10 to 16 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 80 percent
Cobbles: 5 to 30 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 25 to 60 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- Soils lack carbonates.

ABLA/ACGL Rhylow
- Soils lack carbonates.

ABLA/PHMA5 Gany
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Physocarpus malvaceus* is well represented.

PSME/JUCO6 Gany
- This ecological type occurs on drier positions.
- In the plant association, *Abies lasiocarpa* is absent from the tree layer; *Juniperus communis* is well represented in the undergrowth.

ABLA/ACGL Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Acer glabrum* p.a. on Koffgo soils. It is on moist, north facing canyon and mountain sideslopes in the mid portion of the forested zone.

Environmental Setting

Ecological Unit: 1216 and 1222

Landform: canyons and mountains

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash

Slope: 35 to 70 percent

Elevation: 5300 to 8500 feet

Average annual precipitation: 22 to 28 inches

Average annual air temperature: 34 to 38 degrees F

Soil temperature regime: cryic

Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Acer glabrum* p.a.

Present Vegetation

- *Abies lasiocarpa/Acer glabrum* p.a.
- *Populus tremuloides/Salix scouleriana* c.t.
- *Pseudotsuga menziesii/Acer glabrum* community

Succession

Early seral conditions, as a result of avalanche or fire, support few residual trees. *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. *Populus tremuloides* may regenerate from root suckers. The shrub layer has moderate to high cover and high species diversity. Shrubs may include *Ceanothus velutinus*, *Ribes viscosissimum*, *Salix scouleriana* and *Sorbus scopulina.* The herbaceous layer has low or moderate cover and is codominated by graminoids and forbs. *Epilobium angustifolium* and annuals may be present.

Mid seral conditions support a canopy of *Abies lasiocarpa*, *Picea engelmannii*, *Pinus contorta* and *Pseudotsuga menziesii. Pseudotsuga menziesii* is often dominant. *Populus tremuloides* clones may be present. A diverse, multistructured shrub layer dominates the undergrowth. Shrubs may include *Acer glabrum*, *Amelanchier alnifolia*, *Lonicera utahensis*, *Prunus virginiana* var. *melanocarpa*, *Sorbus scopulina*, *Spiraea betulifolia* and *Vaccinium globulare.* The diverse herbaceous layer has low to moderate cover and is codominated by shade tolerant graminoids and forbs.

Late seral and near PNC conditions support a canopy codominated by *Abies lasiocarpa* and *Pseudotsuga menziesii.* The multistructured shrub layer has low or moderate cover. *Acer glabrum*, *Amelanchier alnifolia*, *Berberis repens*, *Pachistima myrsinites*, *Sorbus scopulina* and *Spiraea betulifolia* codominate the shrub layer. The herbaceous layer has low cover and may include *Calamagrostis rubescens*, *Elymus glaucus*, *Arnica cordifolia*, *Osmorhiza chilensis* or *Thalictrum occidentale.*

Discussion

Acer glabrum is a long lived, shade tolerant shrub that reproduces vegetatively and by seed. Seeds need a dormancy and chilling period to germinate. Seedlings commonly establish on bare mineral soil in partial shade. Root crowns sprout following low or moderate intensity fire and develop into multistemmed clumps. *Acer glabrum* has a tall spindly growth form under a closed canopy or a more dense and bushy appearance where the tree canopy is open.

Sorbus scopulina sprouts vigorously from rhizomes after low or moderate intensity fires. A closed layer of *Sorbus scopulina* may be relatively persistent in avalanche chutes.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 503.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Abies lasiocarpa/Acer glabrum* p.a. on a 63 percent slope with northeast aspect at 6360 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of leaves, needles and twigs; trace cobbles and stones; abrupt smooth boundary.

A1--0 to 2 inches; dark gray (10YR 4/1) silt loam, black (10YR 2/1) moist; moderate very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; many very fine irregular pores; trace pebbles, cobbles and stones; moderately acid (pH 6.0); abrupt smooth boundary.

A2--2 to 9 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate coarse granular structure parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, common medium and coarse roots; many fine irregular pores; 30 percent pebbles, trace cobbles and stones; moderately acid (pH 6.0); abrupt wavy boundary.

Bw--9 to 16 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, common fine and medium roots, few coarse roots; many very fine irregular pores; 35 percent pebbles, 15 percent cobbles, 15 percent stones and 5 percent boulders; slightly acid (pH 6.5); clear wavy boundary.

BC--16 to 54 inches; light brownish gray (10YR 6/2) extremely stony sandy loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots, common fine and medium roots, few coarse roots; many very fine irregular pores; 20 percent pebbles, 30 percent cobbles, 30 percent stones and 5 percent boulders; slightly acid (pH 6.4); diffuse wavy boundary.

C--54 to 60 inches; fragmental material; single grain; loose, nonsticky and nonplastic; many very fine and common fine roots, few coarse roots hanging in pores; many coarse irregular pores; coats of light brownish gray (10YR 6/2) sandy loam on upperside of rock fragments, grayish brown (10YR 5/2) moist; 5 percent pebbles, 10 percent cobbles, 80 percent stones and boulders; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1222.
Legal description: about 1900 feet west and 2600 feet south of the northeast corner of section 31, T. 10 N., R. 45 E., Idaho
Latitude: 44 degrees, 09 minutes, 00 seconds, north
Longitude: 111 degrees, 10 minutes, 52 seconds, west

Range In Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 2 to 14 inches
Depth to fragmental material: 40 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable AL plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons (mixed)
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 30 percent
Cobbles: 0 to 10 percent
Stones or boulders: 0 to 5 percent
Base saturation: 30 to 60 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizon
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 7 to 14
Rock fragment content: 35 to 90 percent
Pebbles: 20 to 55 percent
Cobbles: 10 to 30 percent cobbles
Stones or boulders: 0 to 30 percent
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 10 to 30 percent
Cobbles: 0 to 60 percent
Stones or boulders: 10 to 70 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Gany
- Soils have carbonates.

ABLA/ACGL Rhylow
- Soils have a dark colored surface layer greater than 10 inches thick.

ABLA/CARU,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Calamagrostis rubescens* is well represented.

ABLA/SPBE2 Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Acer glabrum* is poorly represented.

ABLA/THOC Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Acer glabrum* is poorly represented.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Acer glabrum* is poorly represented.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Acer glabrum* is poorly represented.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Acer glabrum* is poorly represented; *Vaccinium scoparium* is abundant.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is well represented.

ABLA/ACGL Rhylow Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Acer glabrum* p.a. on Rhylow soils. It is on canyon and mountain sideslopes in the mid portion of the forested zone.

Environmental Setting

Ecological Unit: 1216 and 1222
Landform: canyons and mountains
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Slope: 35 to 70 percent
Elevation: 5300 to 8500 feet
Average annual precipitation: 22 to 28 inches
Average annual air temperature: 35 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Acer glabrum* p.a.

Present Vegetation

- *Populus tremuloides-Pseudotsuga menziesii Amelanchier alnifolia* c.t.
- *Pseudotsuga menziesii/Acer glabrum* community
- *Pseudotsuga menziesii/Spiraea betulifolia* community
- Tall shrub communities dominated by *Sorbus scopulina* or *Acer glabrum.*

Succession

Early seral conditions, as a result of avalanche or fire, support residual *Pseudotsuga menziesii. Populus tremuloides* root suckers and *Picea engelmannii, Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. The shrub layer has moderate to high cover and high species diversity. Shrubs may include *Acer glabrum, Amelanchier alnifolia, Artemisia tridentata* ssp. *spiciformis, Berberis repens, Ceanothus velutinus, Pachistima myrsinites, Prunus virginiana* var. *melanocarpa, Sorbus scopulina, Symphoricarpos oreophilus* or *Spiraea betulifolia.* The herbaceous layer has moderate cover and is codominated by graminoids and forbs. *Calamagrostis rubescens, Carex geyeri, Bromus carinatus, Agastache urticifolia, Epilobium angustifolium, Geranium viscosissimum, Hackelia micrantha* or *Helianthella uniflora* may be present.

Mid seral conditions support an open to closed canopy of *Pinus contorta* or *Pseudotsuga menziesii. Abies lasiocarpa* seedlings, *Populus tremuloides* clones and *Picea engelmannii* may be present. Relatively shade tolerant species dominate the diverse shrub and herbaceous layers. The shrub layer has moderate to high cover and variable structure. This layer may be dominated by *Sorbus scopulina* or *Spiraea betulifolia* or codominated by *Acer glabrum, Amelanchier alnifolia, Prunus virginiana* var. *melanocarpa* or *Symphoricarpos oreophilus. Berberis repens* and *Pachistima myrsinites* are present. The herbaceous layer has low to moderate cover and may include *Calamagrostis rubescens, Carex geyeri, Bromus carinatus, Poa nervosa* var. *wheeleri, Arnica cordifolia, Geranium viscosissimum, Osmorhiza* species or *Thalictrum* species.

Late seral and near PNC conditions support a closed tree canopy codominated by *Abies lasiocarpa* and *Picea engelmannii* or *Pseudotsuga menziesii.* The multistructured shrub layer has low to moderate cover and is codominated by *Amelanchier alnifolia, Acer glabrum, Berberis repens, Pachistima myrsinites, Prunus virginiana* var. *melanocarpa, Spiraea betulifolia* or *Symphoricarpos oreophilus.* The herbaceous layer has low cover and is codominated by graminoids and forbs. *Calamagrostis rubescens, Carex geyeri, Poa nervosa* var. *wheeleri, Arnica cordifolia, Osmorhiza* species, *Pedicularis racemosa* or *Thalictrum* species may be present.

Discussion

Pinus contorta and *Populus tremuloides* are pioneer species in tree canopy development. In early seral conditions, *Populus tremuloides* roots can sprout following years of dormancy under a closed conifer canopy. *Pinus contorta* seedlings commonly establish in frost pockets, bare mineral soil and under full sun. The fast growth of *Pinus contorta* and *Populus tremuloides* ameliorate site conditions and

enhance the establishment of *Picea engelmannii* and *Pseudotsuga menziesii.*

Picea engelmannii and *Pseudotsuga menziesii* establish in bare mineral soil on shaded microsites. *Picea engelmannii* seedlings tolerate colder and more moist site conditions. *Abies lasiocarpa* may establish in the shade of a closed *Picea engelmannii* or *Pseudotsuga menziesii* canopy. *Abies lasiocarpa*, considered a relatively short lived species, has rapid root growth and the ability to establish in forest litter. *Abies lasiocarpa* has a competitive advantage over *Picea engelmannii* by having faster growth rates, higher seed production and greater shade tolerance.

Acer glabrum and *Sorbus scopulina* are shade tolerant, long-lived shrubs that reproduce vegetatively and from seed. They have a tall and spindly growth form under a closed conifer canopy or a more dense, bushy form under an open tree canopy. Flexible stems withstand deep snowpack and avalanches. Following low and moderate intensity fire, these shrubs regenerate by sprouting. Seedlings may establish from seed on bare mineral soil.

The species constancy and cover documentation for vegetation is on page 504.

Soils

Name: Rhylow series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Typical Pedon Description

Rhylow, supporting the *Pseudotsuga menziesii/Acer glabrum* community on a 55 percent slope with west aspect at 5400 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs, leaves and cones; abrupt broken boundary.

A1--0 to 5 inches; dark grayish brown (10YR 4/2) very gravelly loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many fine irregular pores; 40 percent pebbles and 5 percent cobbles; slightly acid (pH 6.3); clear smooth boundary.

A2--5 to 14 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots, common fine and medium roots, few coarse roots; many very fine irregular pores; 40 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.5); clear smooth boundary.

Bw--14 to 30 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine and fine irregular pores; 45 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.1); clear smooth boundary.

BC--30 to 50 inches; light brownish gray (10YR 6/2) extremely cobbly sandy loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; many very fine irregular pores; 15 percent pebbles, 55 percent cobbles and 10 percent stones; moderately acid (pH 5.6), diffuse wavy boundary.

C--50 to 60 inches; light gray (10YR 7/2) extremely cobbly sandy loam, grayish brown (10YR 5/2) moist; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many very fine irregular pores; 10 percent pebbles, 50 percent cobbles and 25 percent stones; moderately acid (pH 5.6).

Typical Pedon Location

Located in ecological unit 1222.
Legal description: about 1850 feet east and 2300 feet north of the southwest corner of section 6, T. 9 N., R. 44 E., Idaho
Latitude: 44 degrees, 18 minutes, 20 seconds, north
Longitude: 111 degrees, 07 minutes, 49 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Umbric epipedon thickness: 10 to 20 inches
Rock fragment content in the particle-size control section: average 35 to 60 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent

Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 15 percent
Rock fragment content: 35 to 60 percent
Pebbles: 25 to 55 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Base saturation: 25 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bw horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 18 percent
Rock fragment content: 20 to 60 percent
Pebbles: 20 to 50 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Base saturation: 25 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 40 to 80 percent
Pebbles: 10 to 30 percent
Cobbles: 30 to 60 percent
Stones: 0 to 15 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

C horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam
Clay content: 4 to 8 percent
Rock fragment content: 80 to 90 percent
Pebbles: 5 to 30 percent
Cobbles: 40 to 60 percent
Stones: 25 to 55 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/ACGL Gany
- Soils have carbonates.

ABLA/ACGL Koffgo
- Soils have a dark colored surface layer less than 10 inches thick.

ABLA/CARU,CARU Rhylow
- This ecological type occurs on drier positions.
- In the plant association, *Calamagrostis rubescens* is well represented.

ABLA/VASC,CARU Rhylow
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is well represented.

ABLA/ARCO9,ARCO9 Fitzwil Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Arnica cordifolia* p.a., *Arnica cordifolia* phase on Fitzwil soils. It is on plateaus near the upper timberline in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1576
Landform: plateaus
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 4 to 25 percent
Elevation: 7100 to 9400 feet
Average annual precipitation: 25 to 30 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Arnica cordifolia* p.a., *Arnica cordifolia* phase

Present Vegetation

- *Abies lasiocarpa/Arnica cordifolia* p.a., *Arnica cordifolia* phase
- *Abies lasiocarpa/Carex geyeri* community
- *Pseudotsuga menziesii/Carex geyeri* community
- *Pinus contorta/Carex geyeri* community
- *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* community
- *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Carex geyeri* community
- Herbaceous communities dominated by native or non-native grasses.

Succession

Early seral conditions, as a result of fire or clearcutting, may support dispersed trees. *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. The shrub layer has low cover and may include *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Ribes montigenum*, *Ribes viscosissimum*, *Shepherdia canadensis* or *Symphoricarpos oreophilus*. The diverse herbaceous layer has moderate cover and is dominated by *Bromus carinatus* or *Carex geyeri*. Other graminoids and forbs may include *Agropyron spicatum*, *Calamagrostis rubescens*, *Festuca idahoensis*, non-native grasses, *Geranium viscosissimum*, *Potentilla* species or *Senecio serra*.

Mid seral conditions support a closed canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii*. *Abies lasiocarpa* may be present. The depauperate shrub layer has low cover and may include *Berberis repens*, *Ribes montigenum* or *Symphoricarpos oreophilus*. The herbaceous layer has low or moderate cover and is dominated by *Carex geyeri* or *Arnica cordifolia*.

Late seral and near PNC conditions support a dense canopy of *Abies lasiocarpa*. The shrub and herbaceous layers have low species diversity and minimal ground cover. *Ribes montigenum*, *Carex geyeri* and *Arnica cordifolia* may be present.

Discussion

Pinus contorta and *Pseudotsuga menziesii* are pioneer species in tree canopy development. *Pinus contorta* commonly establish in frost pockets under full sun. *Pseudotsuga menziesii* establish in shaded microsites on slightly warmer positions. *Pinus contorta* stands ameliorate site conditions, enhancing further establishment of *Pseudotsuga menziesii*. *Abies lasiocarpa* commonly establish in the shade of a closed *Pseudotsuga menziesii* canopy.

Arnica cordifolia is a rhizomatous forb that may be present in all seral conditions. The forb tolerates both sun and shade. Reproduction is by wind dispersed seed following severe ground disturbance and sprouts from rhizomes following light disturbance. Rhizomes growing in the upper inch of the mineral soil may survive low or moderate intensity fire. *Arnica cordifolia* has low resistance to repeated trampling.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy.

The species constancy and cover documentation for vegetation is on page 505.

Soils

Name: Fitzwil series
Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Typical Pedon Description

Fitzwil, supporting the *Abies lasiocarpa/Carex geyeri* community on a 12 percent slope with southeast aspect at 7930 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A1--0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; strong coarse platy structure parting to strong fine platy; hard, friable, slightly sticky and slightly plastic; few very fine roots; 10 percent pebbles; moderately acid (pH 6.0); abrupt smooth boundary.

A2--3 to 10 inches; grayish brown (10YR 5/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots, many medium and common coarse roots; many very fine tubular pores; 20 percent pebbles and trace cobbles; moderately acid (pH 5.8); abrupt smooth boundary.

E/B--10 to 14 inches; 90 percent pale brown (10YR 6/3) E material, brown (10YR 5/3) moist, and 10 percent yellowish brown (10YR 5/4) B material as streaks and stains, dark yellowish brown (10YR 4/4) moist, that mix to a very gravelly loam; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and common medium roots; many very fine tubular pores; 40 percent pebbles and trace cobbles; moderately acid (pH 5.8); abrupt smooth boundary.

E/Bt--14 to 25 inches; 60 percent pale brown (10YR 6/3) E material, brown (10YR 5/3) moist, and 40 percent yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 4/4) moist, in a fine (less than 1/4 inch) irregular matrix that mixes to a very gravelly loam; moderate coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and medium roots; many very fine tubular pores; few faint, brown (10YR 4/3) moist, clay films lining pores of B material; 45 percent pebbles, 10 percent cobbles and trace stones; moderately acid (pH 5.8); clear smooth boundary.

Bt/E1--25 to 38 inches; 80 percent yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 4/4) moist, and 20 percent very pale brown (10YR 7/3) E material as coats on ped faces, pale brown (10YR 6/3) moist, that mix to an extremely gravelly loam; strong medium subangular blocky structure; few medium roots; many very fine tubular pores; many faint, brown (10YR 4/3) moist, clay films on ped faces, rock fragments and lining pores; 45 percent pebbles, 15 percent cobbles and trace stones; moderately acid (pH 5.8); gradual wavy boundary.

Bt/E2--38 to 60 inches; 60 percent brown (7.5YR 5/4) B material, strong brown (7.5YR 4/6) moist, and 40 percent light gray (10YR 7/2) E material, pale brown (10YR 6/3) moist, in a coarse (greater than 1/2 inch) irregular matrix that mixes to an extremely gravelly loam; weak coarse subangular blocky structure; hard, friable, slightly sticky and slightly plastic; common very fine tubular pores in B material and many very fine tubular pores in E material; many faint, strong brown (7.5YR 4/6) moist, clay films on rock fragments and lining pores of B material; 45 percent pebbles, 15 percent cobbles and trace stones; moderately acid (pH 5.6).

Typical Pedon Location

Located in ecological unit 1576.
Legal description: about 1900 feet west and 1300 feet north of the southeast corner of section 10, T. 12 N., R. 35 E., Idaho
Latitude: 44 degrees, 22 minutes, 20 seconds, north
Longitude: 112 degrees, 19 minutes, 08 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Umbric epipedon thickness: 10 to 20 inches
Depth to argillic horizon: 24 to 40 inches
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A1 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 18 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 30 to 50 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

A2 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 18 percent
Rock fragment content: 15 to 50 percent
Pebbles: 15 to 45 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 30 to 50 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E/B or E (when present) horizon
Hue: 7.5YR or 10YR
Value: E portion - 6 or 7 dry, 4 or 5 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma: E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 7 to 18 percent
Rock fragment content: 20 to 60 percent
Pebbles: 20 to 50 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 50 to 80 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: 85 to 100 percent E material and 0 to 15 percent B material (by volume)

E/Bt horizon
Hue: 7.5YR or 10YR
Value: E portion - 6, 7 or 8 dry; 5 or 6 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma: E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry; 3, 4 or 6 or moist
Texture: loam or sandy loam
Clay content: 12 to 18 percent
Rock fragment content: 35 to 80 percent
Pebbles: 35 to 70 percent
Cobbles: 0 to 15 percent
Stones: 0 to 10 percent
Volcanic glass content: 5 to 60 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: 50 to 85 percent E material and 15 to 50 percent B material (by volume)

Bt/E horizons
Hue: 7.5YR or 10YR
Value: B portion - 5 or 6 dry, 4 or 5 moist
E portion - 6, 7 or 8 dry; 5 or 6 moist
Chroma: B portion - 3 or 4 dry; 3, 4 or 6 moist
E portion - 2 or 3 dry or moist
Texture: loam or sandy clay loam
Clay content: 18 to 27 percent
Rock fragment content: 35 to 80 percent
Pebbles: 30 to 55 percent
Cobbles: 5 to 15 percent
Stones: 0 to 10 percent
Volcanic glass content: 5 to 60 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent B material and 15 to 50 percent E material (by volume)

Related Types, Mosaics and Ecotones

ABLA/CARU,CARU Fitzwil
- This ecological type occurs at lower elevations on warmer and drier positions.
- In the plant association, *Calamagrostis rubescens* is well represented.

PIAL/ARTRP4 Fitzwil
- This ecological type occurs on drier positions that are more exposed to wind.
- In the plant association, *Pinus albicaulis* dominates the tree layer in the forested zone, and *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* dominates the non-forested zone.

ABLA/ARTRS2 Cryumbrepts Mosaic

Summary

This mosaic is named for a blending of the *Abies lasiocarpa/Ribes montigenum* p.a., *Pinus albicaulis* phase and the *Artemisia tridentata* ssp. *spiciformis/Carex geyeri* p.a. on Cryumbrept soils. It is on droughty, south facing mountain sideslopes in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1270
Landform: mountains
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Slope: 25 to 60 percent
Elevation: 7600 to 10,000 feet
Average annual precipitation: 25 to 35 inches
Average annual air temperature: 32 to 34 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

A mosaic of:

- *Abies lasiocarpa/Ribes montigenum* p.a., *Pinus albicaulis* phase
- *Artemisia tridentata* ssp. *spiciformis/Carex geyeri* p.a.

Present Vegetation

A mosaic of:

- *Abies lasiocarpa/Ribes montigenum* p.a.
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* community
- *Pseudotsuga menziesii/Spiraea betulifolia* community
- *Artemisia tridentata* ssp. *spiciformis/Carex geyeri* p.a.
- Communities that have an open shrub layer of *Artemisia tridentata* ssp. *spiciformis* with an herbaceous layer dominated by one or more of the following: *Carex rossii, Bromus carinatus, Senecio crassulus, Epilobium angustifolium* or *Achillea millefolium.*

Succession

The PNC of this mosaic may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *spiciformis/Carex geyeri* p.a. The forestland philosophy suggests the *Abies lasiocarpa/Ribes montigenum, Pinus albicaulis* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance is suppressed for a long time period, a forestland p.a. will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions support graminoids and forbs. As succession progresses, *Artemisia tridentata* ssp. *spiciformis* forms an open shrub layer by establishment from seed or regeneration from sprouting root crowns. *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* may be present. The herbaceous layer has high diversity and moderate cover. *Bromus carinatus, Carex geyeri, Achillea millefolium, Senecio crassulus, Hackelia micrantha* and *Epilobium angustifolium* may be present.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching PNC may take hundreds of years. Succession may be interrupted by recurring fire, causing the communities to regress to earlier seral stages.

Early seral conditions of the *Abies lasiocarpa/Ribes montigenum, Pinus albicaulis* p.a. support the species listed in the rangeland description. *Pinus albicaulis* and *Pseudotsuga menziesii* may establish from seed. *Spiraea betulifolia* regenerates quickly from rhizomes; *Ribes montigenum* and *Symphoricarpos oreophilus* regenerate quickly if seeds were present prior to disturbance.

Mid seral conditions support an open canopy of *Pinus albicaulis* or *Pseudotsuga menziesii. Abies lasiocarpa* seedlings establish in tree shadows. The undergrowth in tree shadows may be depauperate or have low cover. *Ribes montigenum* is the most common shrub. The herbaceous layer may include *Carex rossii, Arnica cordifolia* and *Thalictrum occidentale.* Tree interspaces are similar to early seral conditions.

Late seral and near PNC conditions support clusters of widely dispersed *Abies lasiocarpa* and decadent *Pinus albicaulis*. The undergrowth in tree shadows is depauperate. Scattered *Ribes montigenum*, *Carex rossii*, *Arnica cordifolia* and *Thalictrum occidentale* may be present. The tree interspaces are similar to earlier seral conditions.

Discussion

Pinus albicaulis is slow growing, long lived and moderately shade tolerant. *Pinus albicaulis* distribution is strongly influenced by the seed cache locations of Clark's nutcracker (*Nucifraga columbiana*). *Pinus albicaulis* provides shade and protection for *Abies lasiocarpa* establishment.

Abies lasiocarpa has a spire-like shape, well suited for snow habitats. The branches are tough, short and densely packed together. The lower boughs of the tree often root as they lay on the moist duff-covered ground. The rooted branches produce young leaders that result in a vegetative reproduction called layering. As several branches layer, a circle of young trees is formed around the tree. A hollow center is left in the circle or cluster when the mother tree dies and rots away.

Individual tree clusters may burn from fire initially caused by lightning strikes. Vegetative cover in the tree interspace is commonly too sparse or moist to carry fire to other tree clusters.

The species constancy and cover documentation for vegetation is on page 506.

Soils

Name: Cryumbrepts family
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Typical Pedon Description

Cryumbrepts, supporting the *Abies lasiocarpa/Ribes montigenum* p.a., *Pinus albicaulis* phase on a 28 percent slope with east aspect at 9100 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 5 inches; brown (10YR 5/3) loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; few very fine, fine, medium and coarse roots; many very fine irregular pores; 5 percent pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bw1--5 to 20 inches; brown (10YR 5/3) cobbly loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots, few medium and coarse roots; common very fine tubular pores; 5 percent pebbles, 10 percent cobbles and trace stones; moderately acid (pH 5.8); abrupt wavy boundary.

Bw2--20 to 31 inches; brown (7.5YR 5/3) extremely cobbly loam, dark brown (7.5YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; few very fine, fine, medium and coarse roots; few very fine tubular pores; 25 percent pebbles, 40 percent cobbles and 5 percent stones; moderately acid (pH 5.8); gradual wavy boundary.

Cr--31 to 35 inches; soft weathered igneous bedrock; gradual irregular boundary.

R--35 inches; hard unweathered igneous bedrock.

Typical Pedon Location

Located in ecological unit 1270.
Legal description: about 1600 feet west and 1850 feet south of the northeast corner of section 12, T. 14 N., R. 42 E., Idaho
Latitude: 44 degrees, 33 minutes, 19 seconds, north
Longitude: 111 degrees, 26 minutes, 37 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Umbric epipedon thickness: 20 to 40 inches
Rock fragment content in the particle-size control section: average 35 to 60 percent
Thickness of Cr horizon: 2 to 18 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Base saturation: 20 to 50 percent

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist

Texture: loam
Clay content: 7 to 18 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bw1 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam or silt loam
Clay content: 7 to 18 percent
Rock fragment content: 5 to 35 percent
Pebbles: 0 to 10 percent
Cobbles: 5 to 20 percent
Stones: 0 to 5 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bw2 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam or sandy loam
Clay content: 4 to 15 percent
Rock fragment content: 40 to 80 percent
Pebbles: 25 to 70 percent
Cobbles: 15 to 40 percent
Stones: 0 to 15 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ABLA/CACA4,CACA4 Bootjack Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Calamagrostis canadensis* p.a., *Calamagrostis canadensis* phase on Bootjack soils. It is a riparian ecological type on moist outwash plains and floodplains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1401, 2040 and 2608
Landform: outwash plains and floodplains
Parent material: alluvium derived from diatomaceous earth and obsidian sands
Slope: 0 to 2 percent
Elevation: 5700 to 7200 feet
Average annual precipitation: 24 to 30 inches
Average annual air temperature: 36 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Calamagrostis canadensis p.a., Calamagrostis canadensis* phase

Present Vegetation

- *Pinus contorta/Calamagrostis canadensis* c.t.
- *Calamagrostis canadensis* c.t.
- *Deschampsia cespitosa* c.t.
- Herbaceous communities dominated by *Agropyron trachycaulum*, sedges, or non-native grasses.

Succession

Early seral conditions, as a result of fire or logging, support few trees. *Picea engelmannii* or *Pinus contorta* may establish from seed. Shrubs are widely dispersed and may include *Salix bebbiana*. The herbaceous layer has high cover and is dominated by *Agropyron trachycaulum*, *Calamagrostis canadensis*, *Carex* species, *Deschampsia cespitosa* or non-native graminoids. Forbs may include *Achillea millefolium* and *Geranium viscosissimum*.

Mid seral conditions support a closed canopy dominated by *Picea engelmannii*. *Abies lasiocarpa* may establish in tree shadows. *Salix bebbiana* dominates the poorly developed shrub layer. The herbaceous layer has high cover and is dominated by *Calamagrostis canadensis*. *Carex* species, *Deschampsia cespitosa* and *Fragaria virginiana* may be present.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. The shrub layer has low cover and is codominated by *Vaccinium caespitosum* and *Vaccinium scoparium*. The herbaceous layer has moderate cover and is dominated by *Calamagrostis canadensis*. Forbs have low cover, low diversity and are commonly obscured by graminoids.

Discussion

Achillea millefolium, *Geranium viscosissimum* and other mesic forbs may be restricted to tree hummocks, tree bases and old stumps during the early seral stages. These positions are drier because of an extra 2 to 8 inches of elevation above the water table. As the tree canopy develops, water use increases and the water table is lowered. The mesic forbs disperse from the early seral refuges onto all positions.

Calamagrostis canadensis is a long lived, sod-forming graminoid that reproduces vegetatively and by seed. Regeneration from sprouting rhizomes follows low to moderate intensity fire. Soil-stored or wind-dispersed seeds may be the primary source of plant establishment on severely burned areas. Communities dominated by *Calamagrostis canadensis* can be relatively persistent. *Picea engelmannii* and *Pinus contorta*, pioneers in tree canopy development, establish in bare mineral soil. *Pinus contorta*, a fast growing tree, commonly grows under full sun. *Picea engelmannii*, a slow growing tree, establishes in shaded microsites. Both species are susceptible to windthrow on the wet soils of this ecological type.

The dense *Calamagrostis canadensis* sod restricts tree establishment. Windthrow action of *Picea engelmannii* and *Pinus contorta* scalps the *Calamagrostis canadensis* sod and exposes mineral soil needed for tree seedling establishment.

The wet soils of this ecological type influence community composition and development. There is an apparent water table within 18 inches of the soil

surface. The water table is spring fed and fluctuates slightly in response to snowmelt runoff. Long term fluctuations in the water table are influenced by the presence, age and extent of a timber canopy on this ecological type and adjacent uplands. *Salix* species and conifer establishment are influenced by water table fluctuation.

The species constancy and cover documentation for vegetation is on page 508.

Soils

Name: Bootjack series
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Aeric Cryaquepts

Typical Pedon Description

Bootjack, supporting the *Pinus contorta/Calamagrostis canadensis* c.t. on a 1 percent slope at 6390 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oe--2 to 0 inches; forest litter of partially decomposed needles, twigs and cones; abrupt smooth boundary.

Ag--0 to 3 inches; light gray (10YR 7/1) silt loam, grayish brown (2.5Y 5/2) moist; moderate medium platy structure; slightly hard, firm, slightly sticky and slightly plastic; common very fine, fine and medium roots; few very fine irregular pores; strongly acid (pH 5.1); clear smooth boundary.

Bg1--3 to 7 inches; white (10YR 8/1) silt loam, light brownish gray (2.5Y 6/2) moist; moderate medium subangular blocky structure; slightly hard, firm, slightly sticky and slightly plastic; common very fine, fine and medium roots; few very fine irregular pores; common medium prominent, brownish yellow (10YR 6/6) moist, soft Fe accumulations; strongly acid (pH 5.1); clear smooth boundary.

Bg2--7 to 15 inches; white (10YR 8/1) loam, light brownish gray (2.5Y 6/2) moist; moderate medium subangular blocky structure; slightly hard, firm, nonsticky and nonplastic; few very fine, fine and medium roots; few very fine irregular pores; common medium prominent, light brown (5Y 6/4) moist, soft Fe accumulations; moderately acid (pH 5.6); clear smooth boundary.

2C1-- 15 to 35 inches; variegated stratified coarse sand and fine sand; single grain; loose, nonsticky and nonplastic; few fine roots; common fine irregular pores; common medium distinct, brownish yellow (10YR 6/6) moist, soft Fe accumulations; moderately acid (pH 5.8); abrupt smooth boundary.

2C2--35 to 60 inches; variegated coarse sand; single grain; loose, nonsticky and nonplastic; many fine irregular pores; few medium distinct, pale olive (5Y 6/4) moist, soft Fe accumulations, slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 2040.
Legal description: about 500 feet north and 500 feet east of the southwest corner of section 34, T. 13 N., R. 44 E., Idaho
Latitude: 44 degrees, 29 minutes, 25 seconds, north
Longitude: 111 degrees, 15 minutes, 05 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: poorly drained
Water table, depth: 0 to 18 inches
Water table, kind: apparent
Water table, duration: April to June
Ochric epipedon thickness: 3 to 7 inches
Depth to 2C horizons: 15 to 40 inches

Ag horizon
Hue: 10YR or 2.5Y
Value: 4, 5, 6 or 7 dry; 2, 3, 4 or 5 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam
Clay content: 18 to 25 percent
Rock fragment content: 0 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Bg horizons
Hue: 10YR or 2.5Y
Value: 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam, loam or clay loam
Clay content: 18 to 32 percent
Soft Fe accumulations:
  Abundance - common or many
  Size - fine or medium
  Contrast - distinct or prominent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent

Stones: 0 percent
Reaction: strongly acid to neutral (pH 5.1 to 7.3)

2C horizons
Color: variegated
Texture: stratified fine sand to extremely gravelly coarse sand
Clay content: 3 to 8 percent
Soft Fe accumulations:
  Abundance - few or common
  Size - fine or medium
  Contrast - distinct or prominent
Rock fragment content: 0 to 70 percent
Pebbles: 0 to 60 percent
Cobbles: 0 to 10 percent
Stones: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ABLA/CARU,CARU Fitzwil Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Calamagrostis rubescens p.a., Calamagrostis rubescens* phase on Fitzwil soils. It is on foothill and mountain summits in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1150
Landform: foothills and mountains
Parent material: local alluvium or colluvium derived from loess, volcanic ash and rhyolitic tuff
Slope: 4 to 20 percent
Elevation: 6500 to 8000 feet
Average annual precipitation: 25 to 30 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* community
- Communities that have a tree canopy of *Pseudotsuga menziesii* over an herbaceous layer of non-native grasses.
- Communities that have a shrub layer of *Ceanothus velutinus* with an herbaceous layer dominated by *Carex geyeri.*

Succession

Early seral conditions result from clearcutting or fire. *Pinus contorta* or *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub layer has moderate cover and is dominated by *Ceanothus velutinus, Spiraea betulifolia* or *Symphoricarpos oreophilus. Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* may be present. The herbaceous layer has moderate to high cover and is dominated by *Carex geyeri, Bromus carinatus, Calamagrostis rubescens, Achillea millefolium, Potentilla gracilis* or *Geranium viscosissimum* may be present.

Mid seral conditions support a closed canopy dominated by *Pseudotsuga menziesii. Populus tremuloides* clones and widely dispersed *Pinus contorta* and *Pinus flexilis* may be present. *Abies lasiocarpa* may establish in tree shadows. The shrub layer has low or moderate cover and is dominated by *Symphoricarpos oreophilus. Berberis repens, Prunus virginiana* var. *melanocarpa* or *Spiraea betulifolia* may be present. The herbaceous layer has moderate or high cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri. Arnica cordifolia, Lupinus argenteus* and *Thalictrum occidentale* are conspicuous forb components and commonly form dense patches up to one tenth acre in size.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. *Pseudotsuga menziesii* may be present. The shrub layer is depauperate. The herbaceous layer has low cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri.* Forbs are sparse.

Discussion

Pinus contorta and *Pseudotsuga menziesii* are pioneer species in tree canopy development. *Pinus contorta* commonly establish in frost pockets under full sun. *Pseudotsuga menziesii* establish in shaded microsites on slightly warmer positions. *Pinus contorta* stands ameliorate site conditions, enhancing further establishment of *Pseudotsuga menziesii. Abies lasiocarpa* commonly establish in the shade of a closed *Pseudotsuga menziesii* canopy.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role

in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens up the canopy.

Calamagrostis rubescens is a long lived graminoid. Reproduction from seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fire. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

The species constancy and cover documentation for vegetation is on page 509.

Soils

Name: Fitzwil series
Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Typical Pedon Description

Fitzwil, supporting the *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on a 14 percent slope with south aspect at 7200 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and stems; abrupt smooth boundary.

A1--0 to 7 inches; dark grayish brown (10YR 4/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine irregular pores; 15 percent pebbles; slightly acid (pH 6.4); abrupt smooth boundary.

A2--7 to 14 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak fine granular; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, few fine, medium and coarse roots; many very fine irregular pores; 20 percent pebbles and trace cobbles; slightly acid (pH 6.2); clear smooth boundary.

E--14 to 27 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; common very fine tubular pores; few faint streaks and stains of B material and few fine (less than 1/4 inch) distinct, yellowish brown (10YR 5/4) moist, lamellae; 40 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.2); clear irregular boundary.

E/Bt--27 to 36 inches; 60 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, and 40 percent light yellowish brown (10YR 6/4) B material, yellowish brown (10YR 5/4) moist, in a fine to medium (less than 1/2 inch) irregular matrix that mixes to an extremely gravelly loam; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; common distinct, brown (7.5YR 4/4) moist, clay films on ped faces, on rock fragments and lining pores; 45 percent pebbles, 15 percent cobbles and trace stones; moderately acid (pH 5.6); gradual wavy boundary.

Bt/E1--36 to 50 inches; 50 percent light yellowish brown (10YR 6/4) B material, yellowish brown (10YR 5/4) moist, and 50 percent very pale brown (10YR 8/2) E material, light brownish gray (10YR 6/2) moist, in a fine to medium (less than 1/2 inch) irregular matrix that mixes to an extremely cobbly loam; weak medium subangular blocky structure parting to weak very fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and common fine tubular pores; common distinct, brown (7.5YR 4/4) moist, clay films on ped faces, on rock fragments and lining pores; 15 percent pebbles, 40 percent cobbles and 5 percent stones; moderately acid (pH 5.8); clear smooth boundary.

Bt/E2--50 to 60 inches; 50 percent light yellowish brown (10YR 6/4) B material, dark yellowish brown (10YR 4/4) moist, and 50 percent very pale brown

(10YR 8/2) E material, light brownish gray (10YR 6/2) moist, in a fine to medium (less than 1/2 inch) irregular matrix that mixes to an extremely cobbly loam; weak coarse subangular blocky structure parting to moderate very fine subangular blocky (B material) and weak very fine subangular blocky (E material); slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; few distinct, brown (7.5YR 4/4) moist, clay films on ped faces, on rock fragments and lining pores; 20 percent pebbles, 35 percent cobbles and 10 percent stones; moderately acid (pH 5.6).

Typical Pedon Location

Located in ecological unit 1150.
Legal description: about 2300 feet south and 1200 feet west of the northeast corner of section 28, T. 14 N., R. 41 E., Idaho
Latitude: 44 degrees, 30 minutes, 41 seconds, north
Longitude: 111 degrees, 37 minutes, 23 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Umbric epipedon thickness: 10 to 20 inches
Depth to argillic horizon: 24 to 40 inches
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A1 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 14 percent
Rock fragment content: 15 to 30 percent
Pebbles: 15 to 30 percent
Cobbles: 0 percent
Stones: 0 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 30 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

A2 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 14 percent
Rock fragment content: 15 to 55 percent
Pebbles: 15 to 50 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 30 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

E or E/B (when present) horizon
Hue: 7.5YR or 10YR
Value:
E portion - 6 or 7 dry, 4 or 5 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 7 to 12 percent
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 55 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 85 to 100 percent E material and 0 to 15 percent B material (by volume)

E/Bt horizon
Hue: 7.5YR or 10YR
Value:
E portion - 6, 7 or 8 dry; 5 or 6 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry; 3, 4 or 6 moist
Texture: loam or silt loam
Clay content: 12 to 18 percent
Rock fragment content: 35 to 80 percent
Pebbles: 15 to 50 percent
Cobbles: 15 to 35 percent
Stones: 0 to 10 percent

Volcanic glass content: 5 to 60 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent E material and 15 to 50 percent B material (by volume)

Bt/E horizons
Hue: 7.5YR or 10YR
Value:
B portion - 5 or 6 dry, 4 or 5 moist
E portion - 6, 7 or 8 dry; 5 or 6 moist
Chroma:
B portion - 3 or 4 dry; 3, 4 or 6 moist
E portion - 2 or 3 dry or moist
Texture: loam or silt loam
Clay content: 18 to 27 percent
Rock fragment content: 35 to 80 percent
Pebbles: 15 to 40 percent
Cobbles: 20 to 40 percent
Stones: 0 to 15 percent
Volcanic glass content: 5 to 60 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent B material and 15 to 50 percent E material (by volume)

Related Types, Mosaics and Ecotones

ABLA Cryoboralfs
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/ARCO9,ARCO9 Fitzwil
- This ecological type occurs at higher elevations on cooler positions.
- In the plant association, *Calamagrostis rubescens* is poorly represented.

ABLA/CARU,CARU Hopburn
- Soils have less than 35 percent rock fragments.

ABLA/CARU,CARU Koffgo
- Soils have a dark colored surface layer less than 10 inches thick and lack an argillic horizon.

ABLA/CARU,CARU Rhylow
- Soils lack an argillic horizon.

PIAL/ARTRP4 Fitzwil
- This ecological type occurs at higher elevations on cooler positions.
- In the plant association, *Pinus albicaulis* dominates the tree layer in the forested zone and *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* dominates the non-forested zone.

ABLA/CARU,CARU Hopburn Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on Hopburn soils. It is on undulating to rolling plains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1123
Landform: plains
Parent material: local alluvium derived from loess and volcanic ash
Slope: 1 to 12 percent
Elevation: 6300 to 6800 feet
Average annual precipitation: 24 to 30 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Populus tremuloides-Pinus contorta/Carex geyeri* c.t.

Succession

Early seral conditions result from clearcutting or fire. *Pinus contorta* seedlings and *Populus tremuloides* root suckers may be present. The shrub layer is poorly developed and may include *Purshia tridentata* and *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*. *Calamagrostis rubescens* and *Poa pratensis* dominate a prominent herbaceous layer that includes *Carex rossii*, *Carex geyeri* and *Danthonia intermedia*. *Lupinus* species are usually the only conspicuous forbs.

Mid seral conditions support a tree canopy dominated by *Pinus contorta* or *Populus tremuloides*. *Abies lasiocarpa* or *Pseudotsuga menziesii* seedlings may be present. Widely dispersed seedling and sapling five needle pine have been observed. The sparse shrub layer includes *Arctostaphylos uva-ursi* and *Berberis repens*. A dense cover of *Calamagrostis rubescens* and *Poa pratensis* dominate the prominent herbaceous layer. The sparse forb component has low diversity and is dominated by *Lupinus* species.

Late seral and near PNC conditions support an *Abies lasiocarpa* canopy. *Pseudotsuga menziesii*, *Pinus contorta* and widely dispersed five needle pine may be present. The shrub layer is depauperate. *Calamagrostis rubescens* dominates the prominent herbaceous layer.

Discussion

Poa pratensis is an opportunistic graminoid that reproduces vegetatively and by seed. Seedling recruitment and establishment usually occur on disturbed sites. Abundant, viable seed is produced and, once established, is highly resistant to browsing or trampling. *Poa pratensis* is moderately shade tolerant and is replaced by *Calamagrostis rubescens* as the tree canopy closes.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth of all seral conditions. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas. The dense sod provides watershed protection and limits tree establishment.

Lupinus species have deep tap roots and can survive disturbance associated with scarification or fire. They regenerate by root sprouting and germination of buried seed. Increased sunlight and decreased competition allow the forbs to increase cover in the early successional stages. *Lupinus* species have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizons. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 511.

Soils

Name: Hopburn series
Taxonomic class: Fine-loamy, mixed, superactive Vitrandic Cryoboralfs

Typical Pedon Description

Hopburn, supporting the *Pinus contorta/Calamagrostis rubescens* c.t. on an undulating slope of 3 percent with south aspect at 6450 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1/2 to 0 inches; forest litter of needles and grass leaves; abrupt smooth boundary.

A--0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; strongly acid (pH 5.4); abrupt smooth boundary.

E1--3 to 11 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; moderate coarse subangular blocky structure; hard, very friable, nonsticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine tubular pores; trace stones; moderately acid (pH 6.0); clear smooth boundary.

E2--11 to 21 inches; pale brown (10YR 6/3) silt loam, brown (10YR 5/3) moist; moderate very coarse subangular blocky structure; hard, very friable, nonsticky and slightly plastic; many very fine roots, few medium and coarse roots; many very fine tubular pores; trace stones; slightly acid (pH 6.4); clear smooth boundary.

Bt1--21 to 34 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; strong coarse subangular blocky structure parting to strong medium subangular blocky; hard, friable, sticky and plastic; few very fine and medium roots; few very fine tubular pores; continuous distinct uncoated silt grains on faces of coarse peds and many distinct uncoated silt grains on faces of medium peds; few faint clay films on faces of medium peds and lining pores; trace pebbles and stones; neutral (pH 6.8); clear smooth boundary.

Bt2--34 to 45 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; strong very coarse subangular blocky structure; hard, friable, sticky and plastic; few very fine roots; many very fine and common fine tubular pores; few faint uncoated silt grains on ped faces; few faint clay films on ped faces and lining pores; trace pebbles and stones; neutral (pH 7.0); clear smooth boundary.

BC--45 to 52 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; weak very coarse prismatic structure; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; common faint uncoated silt grains on ped faces; trace pebbles and stones; neutral (pH 7.0); clear smooth boundary.

C--52 to 70 inches; light yellowish brown (10YR 6/4) loam, yellowish brown (10YR 5/4) moist; massive; hard, very friable, slightly sticky and slightly plastic; common very fine and few fine tubular pores; trace pebbles and stones; neutral (pH 7.0).

Typical Pedon Location

Located in ecological unit 1123.
Legal description: about 1100 feet north and 500 feet west of the southeast corner of section 5, T. 12 N., R. 41 E., Idaho
Latitude: 44 degrees, 23 minutes, 36 seconds, north
Longitude: 111 degrees, 38 minutes, 19 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Depth to argillic horizon: 12 to 24 inches
Depth to C horizon: 40 to greater than 60 inches
Clay content in particle-size control section: average 18 to 24 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 4 to 12 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent

Base saturation: 30 to 50 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E horizons
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 3 dry or moist
Texture: silt loam, loam or very fine sandy loam
Clay content: 4 to 12 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Base saturation: 50 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bt horizons
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam, sandy clay loam or fine sandy loam
Clay content: 15 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Base saturation: 80 to 100 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Other: Thickness of uncoated silt grains or silt coats between abutting peds is less than 2 mm

BC or C horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 3 or 4 dry or moist
Texture: loam, fine sandy loam or very fine sandy loam
Clay content: 7 to 18 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Base saturation: 80 to 100 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

ABLA Cryoboralfs
- Soils are clayey and have carbonates.

ABLA/CARU,CARU Fitzwil
- Soils have greater than 35 percent rock fragments.

ABLA/CARU,CARU Koffgo
- Soils have greater than 35 percent rock fragments and lack an argillic horizon.

ABLA/CARU,CARU Rhylow
- Soils have greater than 35 percent rock fragments and lack an argillic horizon.

ABLA/CARU,CARU Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on Koffgo soils. It is on rolling to hilly plateaus in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1575
Landform: plateaus
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Slope: 8 to 20 percent
Elevation: 6600 to 7800 feet
Average annual precipitation: 26 to 30 inches
Average annual air temperature: 34 to 36 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Populus tremuloides/Calamagrostis rubescens* c.t.
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- Herbaceous communities dominated by *Carex geyeri.*

Succession

Early seral conditions result from clearcutting or fire. *Populus tremuloides* root suckers and *Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. The sparse shrub layer includes *Ceanothus velutinus* and *Spiraea betulifolia.* The herbaceous layer has moderate or high cover and is dominated by *Calamagrostis rubescens* and *Carex geyeri.* Forbs have high species diversity and include *Achillea millefolium, Epilobium angustifolium* and *Lupinus argenteus.*

Mid seral conditions support a closed canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii. Abies lasiocarpa* seedlings, *Populus tremuloides* clones and widely dispersed *Pinus albicaulis* may be present. The shrub layer has low cover and includes *Spiraea betulifolia, Symphoricarpos oreophilus* and *Lonicera utahensis. Calamagrostis rubescens* and *Carex geyeri* dominate the herbaceous layer. *Lupinus argenteus* and *Thalictrum occidentale* are present.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. *Pseudotsuga menziesii* or *Pinus albicaulis* may be present. The shrub layer is depauperate. The herbaceous layer has low cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri.* Forbs are sparse.

Discussion

Pinus contorta and *Pseudotsuga menziesii* are pioneer species in tree canopy development. *Pinus contorta* commonly establish in frost pockets under full sun. *Pseudotsuga menziesii* establish in shaded microsites on slightly warmer positions. *Pinus contorta* stands ameliorate site conditions, enhancing further establishment of *Pseudotsuga menziesii. Abies lasiocarpa* commonly establish in the shade of a closed *Pseudotsuga menziesii* canopy.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens up the canopy.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth of all seral conditions.

Calamagrostis rubescens will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas. The dense sod provides watershed protection and limits tree establishment.

The light colored soils of this ecological type influence community composition and development. The soils have a slight capacity to hold or supply nutrients. Available nutrients are held in the forest litter layer and thin A horizons. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 512.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting a community dominated by *Carex geyeri* on an 18 percent slope with south aspect at 7350 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; 10 percent pebbles, trace cobbles and stones; strongly acid (pH 5.4); abrupt smooth boundary.

A2--2 to 6 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak very fine granular; slightly hard, very friable, nonsticky and slightly plastic; many very fine roots, few fine and medium roots; many very fine irregular pores; 10 percent pebbles, trace cobbles and stones; moderately acid (pH 6.0); abrupt broken boundary.

Bw1--6 to 18 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak very fine granular; slightly hard, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; 15 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.4); gradual smooth boundary.

Bw2--18 to 35 inches; very pale brown (10YR 7/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine irregular pores; common distinct, brown (10YR 4/3), clay films on underside of rock fragments, brown (10YR 3/3) moist; 30 percent pebbles, 30 percent cobbles and 5 percent stones; slightly acid (pH 6.4); gradual wavy boundary.

BC--35 to 52 inches; very pale brown (10YR 7/3) extremely cobbly sandy loam, yellowish brown (10YR 5/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine tubular pores; common distinct, brown (10YR 4/3), clay films on underside of rock fragments and in fractures of rock fragments, brown (10YR 3/3) moist; 25 percent pebbles, 40 percent cobbles and 10 percent stones; slightly acid (pH 6.3); gradual smooth boundary.

C--52 to 70 inches; fragmental material; single grain; loose; few very fine roots; many fine irregular pores, few medium and coarse irregular pores; caps of light gray (10YR 7/2), loamy sand on upperside of rock fragments, brown (10YR 5/3) moist; 25 percent pebbles, 50 percent cobbles and 20 percent stones; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1575.
Legal description: about 1800 feet south and 2000 feet west of the northeast corner of section 34, T. 12 N., R. 41 E., Idaho
Latitude: 44 degrees, 19 minutes, 38 seconds, north
Longitude: 111 degrees, 36 minutes, 14 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 2 to 14 inches
Depth to fragmental material: 40 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent

Phosphate retention: 20 to 50 percent

A horizons
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 16 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 5 percent
Stones or boulders: 0 to 5 percent
Base saturation: 30 to 60 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)
Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizons
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam, silt loam or sandy loam
Clay content: 4 to 12 percent
Rock fragment content: 15 to 90 percent
Pebbles: 15 to 35 percent
Cobbles: 5 to 55 percent
Stones or boulders: 0 to 20 percent
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 4 to 8 percent
Rock fragment content: 45 to 90 percent
Pebbles: 5 to 30 percent
Cobbles: 30 to 55 percent
Stones or boulders: 5 to 20 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA Cryoboralfs
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/ACGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Fitzwil
- Soils have a dark colored surface layer greater than 10 inches thick and an argillic horizon.

ABLA/CARU,CARU Hopburn
- Soils have an argillic horizon and less than 35 percent rock fragments.

ABLA/CARU,CARU Rhylow
- Soils have a dark colored surface layer greater than 10 inches thick.

ABLA/SPBE2 Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Spiraea betulifolia* is well represented.

ABLA/THOC Koffgo
- This ecological type occurs on more moist positions.
- In the plant association, *Thalictrum occidentale* is well represented.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is well represented.

ABLA/CARU,CARU Rhylow Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on Rhylow soils. It is on foothill and mountain sideslopes in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1150
Landform: foothills and mountains
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Slope: 15 to 40 percent
Elevation: 6500 to 8000 feet
Average annual precipitation: 25 to 29 inches
Average annual air temperature: 33 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Abies lasiocarpa/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* community
- Communities that have a tree canopy of *Pseudotsuga menziesii* over an herbaceous layer dominated by non-native grasses.
- Communities that have a shrub layer of *Ceanothus velutinus* or *Spiraea betulifolia* with an herbaceous layer dominated by *Carex geyeri.*

Succession

Early seral conditions result from clearcutting or fire. *Populus tremuloides* root suckers and *Pinus contorta* and *Pseudotsuga menziesii* seedlings may be present. The diverse shrub layer has moderate cover and may include *Acer glabrum*, *Ceanothus velutinus*, *Symphoricarpos oreophilus* or *Spiraea betulifolia*. The herbaceous layer has moderate or high cover and is dominated by *Calamagrostis rubescens* and *Carex geyeri*. The forb component has low cover and high diversity. Common forbs include *Achillea millefolium*, *Geranium viscosissimum*, *Lupinus argenteus*, *Potentilla glandulosa* and *Taraxacum officinale*.

Mid seral conditions support a closed canopy dominated by *Pseudotsuga menziesii*. *Abies lasiocarpa* seedlings, *Populus tremuloides* clones and dispersed *Picea engelmannii*, *Pinus albicaulis*, *Pinus contorta* and *Pinus flexilis* may be present. The shrub layer has low or moderate cover and is dominated by *Symphoricarpos oreophilus*. *Lonicera utahensis* and *Spiraea betulifolia* may be present. The diverse herbaceous layer has moderate or high cover and is dominated by *Calamagrostis rubescens* and *Carex geyeri*. *Arnica cordifolia* and *Thalictrum occidentale* form dense patches up to 1/10 acre in size. Other forbs include *Achillea millefolium*, *Geranium viscosissimum*, *Lupinus argenteus* and *Potentilla glandulosa*.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. *Picea engelmannii*, *Pinus albicaulis*, *Pinus flexilis* or *Pseudotsuga menziesii* may be present. The shrub layer is depauperate. The herbaceous layer has low or moderate cover and is codominated by *Calamagrostis rubescens* and *Carex geyeri*. Forbs are sparse.

Discussion

Pinus contorta and *Pseudotsuga menziesii* are pioneer species in tree canopy development. *Pinus contorta* commonly establish in frost pockets under full sun. *Pseudotsuga menziesii* establish in shaded microsites on slightly warmer positions. *Pinus contorta* stands ameliorate site conditions, enhancing further establishment of *Pseudotsuga menziesii*. *Abies lasiocarpa* commonly establish in the shade of a closed *Pseudotsuga menziesii* canopy.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus*

competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth of all seral conditions. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas. The dense sod provides watershed protection and limits tree establishment.

The species constancy and cover documentation for vegetation is on page 513.

Soils

Name: Rhylow series

Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Typical Pedon Description

Rhylow, supporting the *Pseudotsuga menziesii/Symphoricarpos oreophilus* community on a 35 percent slope with southwest aspect at 7300 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles and leaves; abrupt broken boundary.

A1--0 to 4 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, slightly sticky and nonplastic; many very fine and fine roots, few medium roots; many very fine irregular pores; 15 percent pebbles, trace cobbles and stones; slightly acid (pH 6.5); clear smooth boundary.

A2--4 to 12 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots, few medium roots; many very fine irregular pores; 20 percent pebbles, trace cobbles and stones; slightly acid (pH 6.4); gradual smooth boundary.

Bw1--12 to 20 inches; brown (10YR 5/3) gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; many very fine irregular pores; 25 percent pebbles, trace cobbles and stones; slightly acid (pH 6.4); clear wavy boundary.

Bw2--20 to 31 inches; pale brown (10YR 6/3) gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine irregular pores, few fine tubular pores; 30 percent pebbles, trace cobbles and stones; slightly acid (pH 6.4); gradual smooth boundary.

BC--31 to 44 inches; very pale brown (10YR 7/3) extremely cobbly sandy loam, yellowish brown (10YR 5/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; 20 percent pebbles, 30 percent cobbles and 10 percent stones; moderately acid (pH 5.8); gradual smooth boundary.

C--44 to 60 inches; very pale brown (10YR 7/3) extremely stony sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular pores; 20 percent pebbles, 30 percent cobbles and 30 percent stones; moderately acid (pH 5.8).

Typical Pedon Location

Located in ecological unit 1150.

Legal description: about 1450 feet east and 4250 feet north of the southwest corner of section 35, T. 14 N., R. 42 E., Idaho

Latitude: 44 degrees, 29 minutes, 59 seconds, north

Longitude: 111 degrees, 28 minutes, 20 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Umbric epipedon thickness: 10 to 20 inches
Rock fragment content in the particle-size control section: average 35 to 60 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 15 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Base saturation: 25 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bw horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 18 percent
Rock fragment content: 20 to 60 percent
Pebbles: 20 to 50 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Base saturation: 25 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 40 to 80 percent
Pebbles: 10 to 30 percent
Cobbles: 30 to 60 percent
Stones: 0 to 15 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

C horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam
Clay content: 4 to 8 percent
Rock fragment content: 80 to 90 percent
Pebbles: 5 to 30 percent
Cobbles: 40 to 60 percent
Stones: 25 to 55 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

ABLA Cryoboralfs
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/ACGL Rhylow
- This ecological type occurs on more moist positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Fitzwil
- Soils have an argillic horizon.

ABLA/CARU,CARU Hopburn
- Soils have an argillic horizon and less than 35 percent rock fragments.

ABLA/CARU,CARU Koffgo
- Soils have a dark colored surface layer less than 10 inches thick.

ABLA/VASC,CARU Rhylow
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium scoparium* is well represented.

ABLA/OSCH,PAMY Edgway Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Osmorhiza chilensis* p.a., *Pachistima myrsinites* phase on Edgway soils. It is on foothills and mountains in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1303, 1315 and 1646
Landform: foothills and mountains
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 15 to 50 percent
Elevation: 5600 to 8000 feet
Average annual precipitation: 24 to 26 inches
Average annual air temperature: 37 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Osmorhiza chilensis* p.a., *Pachistima myrsinites* phase

Present Vegetation

- *Abies lasiocarpa/Osmorhiza chilensis* p.a., *Pachistima myrsinites* phase
- *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Amelanchier alnifolia* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Symphoricarpos oreophilus* c.t.
- *Populus tremuloides-Abies lasiocarpa/Amelanchier alnifolia* c.t.
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* community

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Populus tremuloides* root suckers and *Picea engelmannii*, *Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. The shrub layer has moderate to high cover and a high species diversity. Shrubs may include *Amelanchier alnifolia*, *Lonicera utahensis*, *Pachistima myrsinites*, *Sorbus scopulina*, *Spiraea betulifolia* or *Symphoricarpos oreophilus*. The diverse herbaceous layer has moderate cover and may include *Calamagrostis rubescens*, *Carex geyeri*, *Elymus glaucus*, *Arnica cordifolia*, *Aster engelmannii*, *Epilobium angustifolium*, *Fragaria vesca*, *Geranium viscosissimum*, *Lupinus argenteus* or *Osmorhiza chilensis*.

Mid seral conditions support an open to closed canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii*. *Abies lasiocarpa* seedlings, *Populus tremuloides* clones and *Picea engelmannii* may be present. Relatively shade tolerant species dominate the diverse shrub and herbaceous layers. The multi-structured shrub layer has moderate cover and is codominated by *Amelanchier alnifolia*, *Lonicera utahensis*, *Pachistima myrsinites*, *Sorbus scopulina*, *Spiraea betulifolia* and *Symphoricarpos oreophilus*. The herbaceous layer has moderate or high cover and is codominated by graminoids and forbs.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. *Picea engelmannii* and *Pseudotsuga menziesii* may be present. The shrub layer has low cover and is dominated by *Pachistima myrsinites* and *Berberis repens*. The prominent herbaceous layer includes *Calamagrostis rubescens*, *Carex geyeri* and a diverse forb component including *Arnica cordifolia*, *Lupinus argenteus*, *Osmorhiza chilensis* and *Thalictrum occidentale*.

Discussion

Pinus contorta and *Populus tremuloides* are pioneer species in tree canopy development. *Populus tremuloides* roots can sprout following years of dormancy under a closed conifer canopy. *Pinus contorta* seedlings commonly establish in frost pockets, bare mineral soil and under full sun. The fast growth of *Pinus contorta* and *Populus tremuloides* ameliorate site conditions and enhance the establishment of *Picea engelmannii* and *Pseudotsuga menziesii*.

Picea engelmannii and *Pseudotsuga menziesii* establish in bare mineral soil on shaded microsites. *Picea engelmannii* seedlings tolerate colder and more moist site conditions. *Abies lasiocarpa* may

establish in the shade of *Pseudotsuga menziesii* or *Picea engelmannii*.

Abies lasiocarpa, considered a relatively short lived species, has rapid root growth and the ability to establish in forest litter. *Abies lasiocarpa* has a competitive advantage over *Picea engelmannii* by having faster growth rates, higher seed production and greater shade tolerance.

Amelanchier alnifolia is a fire tolerant, tall shrub that reproduces vegetatively. The shrub sprouts from rhizomes following fire or severe ground disturbance. Top growth may be stimulated by browsing, clipping or increased exposure to sunlight. By late seral conditions, the shrub may develop multistem, tree-like clumps that are 10 to 20 feet tall.

The species constancy and cover documentation for vegetation is on page 515.

Soils

Name: Edgway series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Typical Pedon Description

Edgway, supporting the *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t. on a 16 percent slope with west aspect at 6620 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1/2 to 0 inches; forest litter of leaves and twigs; abrupt wavy boundary.

A1--0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine and very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, common fine and medium roots; many very fine irregular pores; trace pebbles; slightly acid (pH 6.4); abrupt wavy boundary.

A2--2 to 11 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, fine, medium and coarse roots; many very fine tubular pores; trace pebbles; slightly acid (pH 6.4); clear wavy boundary.

AB--11 to 19 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots; many very fine and fine tubular pores, few medium tubular pores; 5 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bt1--19 to 37 inches; light yellowish brown (10YR 6/4) very cobbly silt loam, brown (7.5YR 4/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, sticky and plastic; few very fine and fine roots; common very fine, fine, medium and coarse tubular pores; common uncoated silt grains and thin (less than 1/16 inch), pale brown (10YR 6/3), silt coats on faces of prisms; common faint clay films on faces of subangular blocks and lining pores; few medium (1/4 to 3/8 inch), dark yellowish brown (10YR 4/4), lamellae, dark yellowish brown (10YR 3/4) moist; 15 percent pebbles and 20 percent cobbles; slightly acid (pH 6.4); gradual wavy boundary.

Bt2--37 to 60 inches; light yellowish brown (10YR 6/4) very cobbly silty clay loam, brown (7.5YR 4/3) moist; weak coarse prismatic structure parting to moderate medium subangular blocky; hard, friable, sticky and plastic; few very fine and fine roots; common very fine and fine tubular pores; common uncoated silt grains and thin (less than 1/16 inch), pale brown (10YR 6/3), silt coats on faces of prisms; common faint clay films on faces of subangular blocks and lining pores; few medium (1/4 to 3/8 inch), dark yellowish brown (10YR 4/4), lamellae, dark yellowish brown (10YR 3/4) moist; 20 percent pebbles and 25 percent cobbles; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1646.
Legal description: about 2100 feet south and 2550 feet west of the northeast corner of section 5, T. 43 N., R. 118 W., Wyoming
Latitude: 43 degrees, 42 minutes, 08 seconds, north
Longitude: 111 degrees, 01 minutes, 51 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 10 to 14 inches
Depth to argillic horizon: 14 to 22 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction

Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam
Clay content: 15 to 24 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

AB or E (when present) horizon
Hue: 10YR
Value: 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 15 to 24 percent
Rock fragment content: 5 to 25 percent
Pebbles: 5 to 20 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bt horizons
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam, silty clay loam or clay loam
Clay content: 24 to 34 percent
Rock fragment content: 35 to 60 percent
Pebbles: 10 to 25 percent
Cobbles: 20 to 35 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

PSME/CARU,CARU Edgway

- This ecological type occurs on warmer and drier positions.
- In the plant association, *Pseudotsuga menziesii* dominates the tree layer; *Calamagrostis rubescens* is well represented in the undergrowth.

ABLA/PHMA5 Gany Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Physocarpus malvaceus* p.a. on Gany soils. It is on moist, north facing mountain sideslopes in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1106
Landform: mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 40 to 70 percent
Elevation: 5200 to 8000 feet
Average annual precipitation: 20 to 24 inches
Average annual air temperature: 34 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Physocarpus malvaceus* p.a.

Present Vegetation

- *Abies lasiocarpa/Physocarpus malvaceus* p.a.
- *Pseudotsuga menziesii/Physocarpus malvaceus* community

Succession

Early seral conditions, as a result of fire, support few residual trees. *Pseudotsuga menziesii* seedlings may establish in the shade of shrubs. The diverse shrub layer has high cover and is dominated by *Physocarpus malvaceus*. The herbaceous layer has moderate cover and includes *Bromus carinatus*, *Elymus glaucus* and *Aster engelmannii*.

Mid seral conditions support an open or closed *Pseudotsuga menziesii* canopy. *Abies lasiocarpa* seedlings may establish in tree shadows. *Physocarpus malvaceus* forms a closed shrub layer. Other shrubs may include *Acer glabrum*, *Amelanchier alnifolia*, *Clematis columbiana*, *Sorbus scopulina* and *Spiraea betulifolia*. The herbaceous layer has low cover and is codominated by relatively shade tolerant graminoids and forbs. *Elymus glaucus*, *Aster engelmannii* and *Thalictrum occidentale* may be present.

Late seral and near PNC conditions support a closed canopy codominated by *Abies lasiocarpa* and *Pseudotsuga menziesii*. The shrub layer has high cover and is dominated by *Physocarpus malvaceus*. *Acer glabrum* may be conspicuous. Other shrubs are sparse. The depauperate herbaceous layer may include *Disporum trachycarpum*, *Goodyera oblongifolia*, *Osmorhiza chilensis* and *Thalictrum occidentale*.

Discussion

The prominent shrubs are pioneer species in early seral stages. Extensive root systems and leaf litter provide watershed protection. Shrubs provide shaded microsites that enhance *Pseudotsuga menziesii* establishment.

Acer glabrum is a long lived, shade tolerant shrub that reproduces vegetatively and from seed. Seeds need a dormancy and chilling period to germinate. Seedlings commonly establish on bare mineral soil in partial shade. Root crowns sprout following low or moderate intensity fire and develop into multistemmed clumps. *Acer glabrum* has a tall spindly growth form under a closed canopy or a more dense and bushy appearance where the tree canopy is open.

Physocarpus malvaceus is a deciduous, medium height shrub. Though capable of reproducing by seed, regeneration is primarily vegetative. Sprouts from extensive rhizomes follow low to moderate disturbance. Thick patches of single stems 3 to 5 feet in height may develop following disturbance. As overstory competition increases, the height and cover of *Physocarpus malvaceus* decreases.

The species constancy and cover documentation for vegetation is on page 517.

Soils

Name: Gany series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Cryoborolls

Typical Pedon Description

Gany, supporting the *Abies lasiocarpa/Physocarpus malvaceus* p.a. on a 55 percent slope with north aspect at 6200 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of slightly decomposed needles, leaves and twigs; abrupt smooth boundary.

A--0 to 8 inches; dark grayish brown (10YR 4/2) gravelly silt loam, very dark brown (10YR 2/2) moist; moderate coarse and moderate medium subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots, many medium and few coarse roots; many very fine irregular pores, few very fine and fine tubular pores; many coats of soft powdery lime on all sides of rock fragments, few fine and medium (1/16 to 1/4 inch) hard pendants of carbonates on underside of rock fragments; noneffervescent; 15 percent pebbles and 5 percent cobbles; slightly alkaline (pH 7.4); clear smooth boundary.

Bk--8 to 19 inches; brown (10YR 5/3) extremely gravelly loam, dark grayish brown (10YR 4/2) moist; moderate medium subangular blocky structure parting to weak very fine granular; slightly hard, firm, slightly sticky and slightly plastic; many very fine roots, common fine and medium roots, few coarse roots; many very fine irregular pores, few very fine tubular pores; many coats of soft powdery lime on all sides of rock fragments, common fine and medium (1/16 to 1/4 inch) hard pendants of carbonates on underside and side of rock fragments; strongly effervescent; 70 percent pebbles and 5 percent cobbles; slightly alkaline (pH 7.8); clear smooth boundary.

Bkq--19 to 62 inches; brown (10YR 5/3) extremely gravelly loam, dark grayish brown (10YR 4/2) moist; weak fine subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots, few fine roots; many very fine irregular pores; many coats of soft powdery lime on all sides of rock fragments, many fine and medium (1/16 to 1/4 inch) hard pendants of carbonates and few hard pendants of silica on underside and side of rock fragments; violently effervescent; 80 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 1106.

Legal description: about 2350 feet north and 20 feet east of the southwest corner of section 19, T. 38 N., R. 118 W., Wyoming

Latitude: 43 degrees, 15 minutes, 52 seconds, north

Longitude: 111 degrees, 02 minutes, 35 seconds, west

Range in characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

O horizon thickness: 1/4 to 3 inches

Mollic epipedon thickness: 7 to 15 inches

Depth to calcic horizon: 0 to 15 inches

Clay content in the particle-size control section: average 10 to 22 percent

Calcium carbonate equivalent in the mineralogy control section: average 25 to 40 percent in the less than 20 mm fraction

A horizon

Hue: 7.5YR, 10YR or 2.5Y

Value: 4 or 5 dry; 2, 3 or 4 moist

Chroma: 2 or 3 dry or moist

Texture: silt loam

Clay content: 12 to 20 percent

Rock fragment content: 15 to 35 percent

Pebbles: 15 to 35 percent

Cobbles: 0 to 5 percent

Stones: 0 to 5 percent

Calcium carbonate equivalent: 0 to 15 percent in the less than 2 mm fraction

Effervescence: noneffervescent

Reaction: slightly alkaline (pH 7.4 to 7.8)

Bk horizon

Hue: 7.5YR, 10YR or 2.5Y

Value: 5, 6 or 7 dry; 4, 5 or 6 moist

Chroma: 2, 3 or 4 dry or moist

Texture: loam or silt loam

Clay content: 14 to 22 percent

Rock fragment content: 60 to 90 percent

Pebbles: 35 to 80 percent

Cobbles: 0 to 15 percent

Stones: 0 to 10 percent

Calcium carbonate equivalent: 15 to 30 percent in the less than 2 mm fraction

Effervescence: strongly effervescent or violently effervescent

Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq horizon

Hue: 7.5YR, 10YR or 2.5Y

Value: 5, 6 or 7 dry; 4, 5 or 6 moist

Chroma: 2, 3 or 4 dry or moist

Texture: loam or sandy loam

Clay content: 10 to 16 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 80 percent
Cobbles: 5 to 30 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 25 to 60 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Related Types, Mosaics and Ecotones

ABLA Cryoboralfs
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/ACGL Gany
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Physocarpus malvaceus* is poorly represented.

ABLA/PHMA5 Lagall
- Soils lack carbonates.

PSME/JUCO6 Gany
- This ecological type occurs on drier positions.
- In the plant association, *Pseudotsuga menziesii* dominates the tree layer; *Juniperus communis* is well represented in the undergrowth.

ABLA/PHMA5 Lagall Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Physocarpus malvaceus* p.a. on Lagall soils. It is on moist, north facing sideslopes of dissected tablelands, foothills and mountains in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1219 and 1507
Landform: dissected tablelands, foothills and mountains
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 35 to 70 percent
Elevation: 5100 to 8500 feet
Average annual precipitation: 18 to 25 inches
Average annual air temperature: 36 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Physocarpus malvaceus* p.a.

Present Vegetation

- *Abies lasiocarpa/Physocarpus malvaceus* p.a.
- *Pseudotsuga menziesii/Physocarpus malvaceus* community
- *Pinus contorta/Physocarpus malvaceus* community
- Shrub communities dominated by *Physocarpus malvaceus.*

Succession

Early seral conditions, as a result of fire, support few residual trees. *Populus tremuloides* may root sucker and *Picea engelmannii*, *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. The shrub layer has moderate to high cover and high species diversity. Shrubs may include *Acer glabrum*, *Amelanchier alnifolia*, *Physocarpus malvaceus*, *Prunus virginiana* var. *melanocarpa*, *Sorbus scopulina* or *Spiraea betulifolia*. The herbaceous layer has moderate cover and is codominated by graminoids and forbs. *Bromus carinatus*, *Elymus glaucus* and *Aster engelmannii* may be present.

Mid seral conditions support an open to closed canopy of *Pinus contorta* or *Pseudotsuga menziesii*. *Abies lasiocarpa* seedlings, *Populus tremuloides* clones and *Picea engelmannii* may be present. Relatively shade tolerant species dominate the diverse shrub and herbaceous layers. The multi-structured shrub layer has high cover and includes *Acer glabrum*, *Amelanchier alnifolia*, *Physocarpus malvaceus*, *Prunus virginiana* var. *melanocarpa*, *Sorbus scopulina* and *Spiraea betulifolia*. The herbaceous layer has low cover and includes *Elymus glaucus*, *Aster engelmannii* and *Thalictrum occidentale.*

Late seral and near PNC conditions support a closed canopy of *Abies lasiocarpa*. *Picea engelmannii* or *Pseudotsuga menziesii* may be present. A closed shrub layer dominates the undergrowth and includes *Acer glabrum*, *Amelanchier alnifolia*, *Physocarpus malvaceus*, *Prunus virginiana* var. *melanocarpa* and *Spiraea betulifolia*. The depauperate herbaceous layer may include *Disporum trachycarpum*, *Goodyera oblongifolia*, *Osmorhiza chilensis* and *Thalictrum occidentale.*

Discussion

The prominent shrubs are pioneer species in early seral stages. Extensive root systems and leaf litter provide watershed protection. Shrubs provide shaded microsites that enhance *Picea engelmannii* and *Pseudotsuga menziesii* establishment.

Acer glabrum is a long lived, shade tolerant shrub that reproduces vegetatively and by seed. Seeds need a dormancy and chilling period to germinate. Seedlings commonly establish on bare mineral soil in partial shade. Root crowns sprout following low or moderate intensity fire and develop into multistemmed clumps. *Acer glabrum* has a tall spindly growth form under a closed canopy or a more dense and bushy appearance where the tree canopy is open.

Amelanchier alnifolia is a fire tolerant, tall shrub that reproduces vegetatively. The shrub sprouts from rhizomes following fire or severe ground disturbance. Top growth may be stimulated by browsing, clipping or increased exposure to sunlight. By late seral conditions, the shrub may develop multistem, tree-like clumps that are 10 to 20 feet tall.

Physocarpus malvaceus is a deciduous, medium height shrub. Though capable of reproducing by seed, regeneration is primarily vegetative. Sprouts from extensive rhizomes follow low to moderate disturbance. Thick patches of single stems 3 to 5 feet in height may develop following disturbance. As overstory competition increases, the height and cover of *Physocarpus malvaceus* decreases.

Spiraea betulifolia is a deciduous, rhizomatous, moderately shade tolerant shrub that usually grows in extensive colonies. The shrub is highly resistant to fire and mechanical disturbance. Root crowns and rhizomes vigorously sprout in the first growing season following disturbance.

The species constancy and cover documentation for vegetation is on page 518.

Soils

Name: Lagall series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Typical Pedon Description

Lagall, supporting the *Abies lasiocarpa/Physocarpus malvaceus* p.a. on a 70 percent slope with north aspect at 6800 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of leaves, needles and twigs; 10 percent cobbles and 5 percent stones; abrupt smooth boundary.

A--0 to 10 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots, many medium and common coarse roots; many very fine irregular pores; 25 percent pebbles, 10 percent cobbles and 10 percent stones; neutral (pH 6.8); clear wavy boundary.

Bw1--10 to 20 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots; many very fine irregular pores, few very fine tubular pores; 30 percent pebbles, 15 percent cobbles and 10 percent stones; neutral (pH 6.8); clear wavy boundary.

Bw2--20 to 30 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots, common fine and medium roots; many very fine irregular pores, few very fine tubular pores; 40 percent pebbles, 15 percent cobbles and 10 percent stones; neutral (pH 6.8); clear wavy boundary.

BC--30 to 60 inches; light yellowish brown (10YR 6/4) extremely cobbly sandy loam, yellowish brown (10YR 5/4) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; few very fine, fine and medium roots; many very fine irregular pores; 20 percent pebbles, 40 percent cobbles and 10 percent stones; neutral (pH 7.3).

Typical Pedon Location

Located in ecological unit 1219.
Legal description: about 1500 feet west and 300 feet north of the southeast corner of section 13, T. 1 S., R. 44 E., Idaho
Latitude: 43 degrees, 19 minutes, 27 seconds, north
Longitude: 111 degrees, 14 minutes, 28 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 1 to 4 inches
Mollic epipedon thickness: 10 to 15 inches
Rock fragment content in the particle-size control section: average 50 to 90 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 10 to 16 percent
Rock fragment content: 35 to 60 percent
Pebbles: 25 to 55 percent
Cobbles: 0 to 10 percent
Stones: 0 to 10 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 3, 4 or 5 moist

Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 7 to 14 percent
Rock fragment content: 40 to 90 percent
Pebbles: 15 to 60 percent
Cobbles: 15 to 50 percent
Stones: 5 to 30 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 5 to 20 percent
Cobbles: 5 to 60 percent
Stones: 10 to 70 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

ABLA Cryoboralfs
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/PHMA5 Gany
- Soils have carbonates.

PSME/SYAL Lagall
- This ecological type occurs on drier positions.
- In the plant association, *Pseudotsuga menziesii* dominates the tree layer; *Symphoricarpos albus* is well represented in the undergrowth.

ABLA/SPBE2 Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Spiraea betulifolia* p.a. on Koffgo soils. It is on foothills and mountains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1144 and 1597
Landform: foothills and mountains
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Slope: 15 to 60 percent
Elevation: 6800 to 8400 feet
Average annual precipitation: 22 to 32 inches
Average annual air temperature: 34 to 36 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Spiraea betulifolia* p.a.

Present Vegetation

- *Abies lasiocarpa/Spiraea betulifolia* p.a.
- *Pseudotsuga menziesii/Spiraea betulifolia* community
- Communities that have a tree canopy of *Pseudotsuga menziesii* with a depauperate understory.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Populus tremuloides* root suckers and *Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. The shrub layer has low or moderate cover and may include *Acer glabrum*, *Ceanothus velutinus*, *Lonicera utahensis*, *Prunus virginiana* var. *melanocarpa*, *Shepherdia canadensis*, *Spiraea betulifolia* or *Symphoricarpos oreophilus*. *Calamagrostis rubescens* and *Carex geyeri* are prominent in the herbaceous layer.

Mid seral conditions support a closed canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii*. *Abies lasiocarpa* establish in tree shadows. The shrub layer has low cover and is dominated by *Spiraea betulifolia*. *Acer glabrum*, *Berberis repens*, *Lonicera utahensis* and *Symphoricarpos oreophilus* may be present. The herbaceous layer has low cover and includes *Calamagrostis rubescens*, *Carex geyeri*, *Arnica cordifolia*, *Pyrola secunda* and *Thalictrum occidentale*.

Late seral and near PNC conditions support a closed canopy dominated by *Abies lasiocarpa*. *Pseudotsuga menziesii* may be present. *Spiraea betulifolia* forms widely dispersed patches in an otherwise depauperate shrub and herbaceous layer. *Pyrola secunda* is the most conspicuous forb.

Discussion

Spiraea betulifolia is a deciduous, rhizomatous, moderately shade tolerant shrub that usually grows in extensive colonies. The shrub is highly resistant to fire and mechanical disturbance. Root crowns and rhizomes vigorously sprout in the first growing season following disturbance. Overall seed production and dispersal is low.

The cold, light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content. Soil temperatures are cold throughout the growing season. As shading from the tree canopy increases, summer soil temperatures decrease. The cold soil temperatures and dense shading may account for depauperate undergrowth in late seral and near PNC conditions.

The species constancy and cover documentation for vegetation is on page 519.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Abies lasiocarpa/Spiraea betulifolia* p.a. on a 50 percent slope with north aspect at 7600 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of needles and fungal hyphae; abrupt smooth boundary.

A--0 to 8 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots, common fine, medium and coarse roots; many very fine irregular pores; 25 percent pebbles, 5 percent cobbles and trace stones; strongly acid (pH 5.4); abrupt smooth boundary.

Bw--8 to 25 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine irregular pores; 50 percent pebbles, 20 percent cobbles and 10 percent stones; moderately acid (pH 5.8); diffuse smooth boundary.

BC--25 to 45 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; single grain; loose, nonsticky and nonplastic; few very fine and medium roots; many very fine irregular pores; few distinct, brown (7.5YR 5/4), clay films on underside of rock fragments, light brown (7.5YR 6/4) moist; many thin (less than 1/8 inch), very pale brown (10YR 8/2), silt coats on upperside of rock fragments, light gray (10YR 7/2) moist; 15 percent pebbles, 60 percent cobbles and 10 percent stones; moderately acid (pH 5.8); diffuse wavy boundary.

C--45 to 60 inches; fragmental material; single grain; loose, nonsticky and nonplastic; few very fine and medium roots; many medium irregular pores; few distinct, brown (7.5YR 5/4), clay films on underside of rock fragments, light brown (7.5YR 6/4) moist; many thin (less than 1/8 inch), very pale brown (10YR 8/2), silt coats on upperside of rock fragments, light gray (10YR 7/2) moist; 20 percent pebbles, 70 percent cobbles and 10 percent stones.

Typical Pedon Location

Located in ecological unit 1597.

Legal description: about 1000 feet south and 600 feet east of the northwest corner of section 19, T. 13 N., R. 38 E., Idaho

Latitude: 44 degrees, 26 minutes, 38 seconds, north

Longitude: 112 degrees, 02 minutes, 14 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

Ochric epipedon thickness: 2 to 14 inches

Depth to fragmental material: 40 to greater than 60 inches

Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction

Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent

Phosphate retention: 20 to 50 percent

A horizon

Hue: 10YR

Value: 4, 5 or 6 dry; 2, 3 or 4 moist

Chroma: 1, 2 or 3 dry or moist

Texture: loam

Clay content: 7 to 16 percent

Rock fragment content: 15 to 35 percent

Pebbles: 15 to 30 percent

Cobbles: 0 to 10 percent

Stones or boulders: 0 to 5 percent

Base saturation: 30 to 60 percent

Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizon

Hue: 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2, 3 or 4 dry or moist

Texture: loam or sandy loam

Clay content: 7 to 14 percent

Rock fragment content: 35 to 90 percent

Pebbles: 20 to 55 percent

Cobbles: 10 to 30 percent

Stones or boulders: 0 to 30 percent

Base saturation: 50 to 80 percent

Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon

Hue: 10YR

Value: 6 or 7 dry; 4, 5 or 6 moist

Chroma: 1, 2, 3 or 4 dry or moist

Texture: sandy loam

Clay content: 5 to 12 percent

Rock fragment content: 60 to 90 percent

Pebbles: 10 to 30 percent
Cobbles: 0 to 60 percent
Stones or boulders:10 to 70 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Koffgo
- This ecological type occurs on drier positions.
- In the plant association, *Calamagrostis rubescens* is well represented.

ABLA/THOC Koffgo
- This ecological type occurs on more moist positions.
- In the plant association, *Thalictrum occidentale* is well represented.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium scoparium* is well represented.

Photo 5. Tall forb communities and islands of subalpine fir/gooseberry currant p.a., whitebark pine phase in ecological unit 1170 ABLA/Tall Forb Yodal, 4 to 35 percent slopes. Fernleaf licoriceroot and thickleaf groundsel dominated these tall forb communities on July 20, 1996. Teton Basin and the Big Hole Mountains are in the background.

ABLA/Tall Forb Yodal Mosaic

Summary

This mosaic is named for a blending of the *Abies lasiocarpa/Ribes montigenum* p.a., *Pinus albicaulis* phase and tall forb communities on Yodal soils. It is on mountain summits, sideslopes and basins in a broad transitional area between the forested and alpine zones (Photo 5).

Environmental Setting

Ecological Unit: 1170 and 1175
Landform: mountains
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 4 to 60 percent
Elevation: 7600 to 9800 feet
Average annual precipitation: 30 to 60 inches
Average annual air temperature: 26 to 34 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

A mosaic of:

- *Abies lasiocarpa/Ribes montigenum* p.a., *Pinus albicaulis* phase
- tall forb communities

Present Vegetation

- *Ligusticum filicinum-Delphinium occidentale* c.t.
- *Agastache urticifolia-Viguiera multiflora* c.t.
- islands and ribbons of *Abies lasiocarpa/Ribes montigenum* p.a., *Pinus albicaulis* phase

Succession

The PNC of this mosaic may be considered from either a tall forb or a forestland philosophy. The tall forb philosophy suggests the tall forb community. The forestland philosophy suggests the *Abies lasiocarpa/Ribes montigenum*, p.a. *Pinus albicaulis* phase.

The factors that determine the establishment of one potential natural community versus the other are not clearly understood. The extensive tall forb communities are interrupted by islands and stringers of the *Abies lasiocarpa/Ribes montigenum*, *Pinus albicaulis* p.a. The islands are seldom greater than one quarter acre in size. Over time, the forested communities may migrate across the landscape. Distinct forested and tall forb communities persist and appear to maintain their relative abundance in the composition of this mosaic.

In the tall forb communities, early seral conditions result from severe ground disturbance or disease and support an herbaceous community. Annual forbs are dominant and include *Agoseris glauca*, *Epilobium* species, *Microsteris gracilis* and *Polygonum* species. Graminoids are common. *Artemisia tridentata* ssp. *spiciformis* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* may be present on dry microsites. Mid seral conditions support an herbaceous community that has high species diversity. Perennial forbs are dominant and include *Aster engelmannii*, *Geranium viscosissimum*, *Lupinus argenteus* and *Senecio crassulus*. Prominent graminoids include *Bromus carinatus*, *Carex hoodii* and *Melica spectabilis*. Late seral conditions support a prominent herbaceous community that includes *Agastache urticifolia*, *Aster engelmannii*, *Delphinium occidentale*, *Helianthella uniflora*, *Ligusticum filicinum*, *Senecio crassulus* and *Valeriana occidentalis*.

The forestland philosophy suggests PNC occurs in the absence of ground disturbance, disease or fire. Reaching PNC may take hundreds of years. Succession may be interrupted by disturbance, causing the communities to regress to earlier seral stages.

Early seral conditions of the *Abies lasiocarpa/Ribes montigenum*, *Pinus albicaulis* p.a. support the species listed in the tall forb communities description. *Pinus albicaulis* may establish from seed caches. *Ribes montigenum* regenerates quickly if seeds were present prior to disturbance. Mid seral conditions support *Pinus albicaulis*. *Abies lasiocarpa* seedlings establish in tree shadows. *Ribes montigenum* and *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* codominate the shrub layer. Shade tolerant forbs dominate the herbaceous layer and include *Geranium viscosissimum*, *Osmorhiza chilensis* and *Thalictrum occidentale*.

Late seral and near PNC conditions of the *Abies lasiocarpa/Ribes montigenum* p.a, *Pinus albicaulis*

phase support an *Abies lasiocarpa* canopy. Decadent *Pinus albicaulis* is present. *Ribes montigenum* dominates the sparse shrub layer. The herbaceous layer is depauperate and often includes *Arnica cordifolia*, *Senecio crassulus* and *Thalictrum occidentale.*

Discussion

Pinus albicaulis is slow growing and moderately shade tolerant. Distribution of *Pinus albicaulis*, and migration of the forest communities across the landscape, is strongly influenced by seed cache locations of the Clark's nutcracker (Nucifraga columbiana). *Pinus albicaulis* provides shade and protection for *Abies lasiocarpa* establishment.

Abies lasiocarpa has a spire-like shape, well suited for snow habitats. The branches are tough, short and densely packed together. The lower boughs of the tree often root as they lay on the moist duff-covered ground. The rooted branches produce young leaders that result in vegetative reproduction called layering. As several branches layer, a circle of young trees is formed around the tree. A hollow center is left in the circle or cluster when the mother tree dies and rots away.

Climatic conditions of this ecological type influence community composition and development. Defoliation by windblown snow limits new tree establishment and expansion of existing tree ribbons and islands.

The species constancy and cover documentation for vegetation is on page 520.

Soils

Name: Yodal series

Taxonomic class: Fine-loamy, mixed, active Abruptic Paleboralfs

Typical Pedon Description

Yodal, supporting the *Ligusticum filicinum-Delphinium occidentale* c.t. on a 35 percent slope with east aspect at 9100 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 3 inches; brown (7.5YR 5/3) gravelly loam, dark brown (7.5YR 3/3) moist; weak coarse subangular blocky structure parting to moderate medium granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine roots; many very fine vesicular pores; 30 percent pebbles; slightly acid (pH 6.5); clear smooth boundary.

AE--3 to 17 inches; brown (7.5YR 5/3) gravelly loam, brown (7.5YR 4/3) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common fine roots, few medium and coarse roots; common fine and medium tubular pores; 20 percent pebbles; strongly acid (pH 5.5); clear smooth boundary.

E--17 to 38 inches; light yellowish brown (7.5YR 6/4) gravelly loam, brown (7.5YR 4/4) moist; weak coarse subangular blocky structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few fine and medium roots; common fine and medium tubular pores; common uncoated silt grains on ped faces; 20 percent pebbles and 5 percent cobbles; strongly acid (pH 5.5); clear smooth boundary.

E/B--38 to 55 inches; 95 percent reddish yellow (5YR 6/6) E material, yellowish red (5YR 4/6) moist, and 5 percent light red (2.5YR 6/6) B material as irregular masses and lamellae, red (2.5YR 5/6) moist, that mix to a very gravelly very fine sandy loam; massive; hard, friable, slightly sticky and slightly plastic; few fine roots; few medium tubular pores; 30 percent pebbles and 20 percent cobbles; strongly acid (pH 5.1); clear wavy boundary.

Bt/E--55 to 70 inches; 90 percent red (2.5YR 5/8) B material, red (2.5YR 4/8) moist, and 10 percent white (10YR 8/1) E material as skeletans less than 1 cm thick on ped faces, light gray (10YR 7/2) moist, that mix to a silty clay; moderate coarse prismatic structure parting to moderate coarse subangular blocky; very hard, firm, sticky and very plastic; few very fine and fine roots; many very fine tubular pores, few fine and medium tubular pores; common faint clay films on ped faces and lining pores; 5 percent pebbles; strongly acid (pH 5.2).

Typical Pedon Location

Located in ecological unit 1170.

Legal description: about 500 feet east and 400 feet north of the southwest corner of section 15, T. 41 N., R. 118 W., Wyoming

Latitude: 43 degrees, 57 minutes, 37 seconds, north

Longitude: 111 degrees, 57 minutes, 37 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

Color after mixing the upper 7 inches: value greater than 5 dry or 3 moist or chroma greater than 3
Depth to argillic horizon: 40 to greater than 60 inches
Clay content in particle-size control section: average 18 to 27 percent
Rock fragment content in the particle-size control section: average 15 to 35 percent

A horizon
Hue: 5YR, 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam
Clay content: 12 to 22 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

AE horizon
Hue: 5YR, 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3 or 4 moist
Chroma: 2, 3 or 4 dry; 3 or 4 moist
Texture: silt loam or loam
Clay content: 15 to 25 percent
Rock fragment content: 5 to 35 percent
Pebbles: 5 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E horizon
Hue: 5YR, 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry; 3 or 4 moist
Texture: loam or silt loam
Clay content: 18 to 27 percent
Rock fragment content: 15 to 35 percent
Pebbles: 5 to 30 percent
Cobbles: 0 to 20 percent
Stones: 0 to 10 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E/B horizon
Hue: 2.5YR, 5YR, 7.5YR or 10YR
Value, mixed: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma, mixed: 3, 4, or 6 dry or moist
Texture: very fine sandy loam or loam
Clay content: 15 to 25 percent
Rock fragment content: 35 to 60 percent
Pebbles: 10 to 40 percent
Cobbles: 5 to 30 percent
Stones: 0 to 10 percent
Reaction: strongly acid to neutral (pH 5.1 to 7.3)
Other: less than 15 percent B material (by volume)

Bt/E horizon
Hue: 2.5YR, 5YR, 7.5YR, 10YR or 5Y
Value:
B portion - 5 or 6 dry, 4 or 5 moist
E portion - 7 or 8 dry, 6 or 7 moist
Chroma:
B portion - 6 or 8 dry or moist
E portion - 1 or 2 dry or moist
Texture: silty clay or clay
Clay content: 40 to 60 percent
Rock fragment content: 5 to 35 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 20 percent
Stones: 0 to 10 percent
Soft shale or sandstone fragments: 0 to 40 percent
Reaction: strongly acid to neutral (pH 5.1 to 7.3)
Other: less than 15 percent E material (by volume)

Related Types, Mosaics and Ecotones

ABLA/THOC Jumpstart
- Soils have a dark colored surface layer less than 10 inches thick.

ABLA/THOC Katpa
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/THOC Koffgo
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/THOC Jumpstart Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Thalictrum occidentale* p.a. on the Jumpstart soils. It is on moist, north facing foothill and mountain sideslopes in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1303
Landform: foothills and mountains
Parent material: local alluvium, colluvium or residuum derived from shale
Slope: 30 to 50 percent
Elevation: 5600 to 8000 feet
Average annual precipitation: 24 to 30 inches
Average annual air temperature: 35 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Thalictrum occidentale* p.a.

Present Vegetation

- *Abies lasiocarpa/Thalictrum occidentale* p.a.
- *Ligusticum filicinum-Delphinium occidentale* c.t.
- *Agastache urticifolia-Viguiera multiflora* c.t.
- Communities that have a mixed tree canopy of *Abies lasiocarpa, Pseudotsuga menziesii, Picea engelmannii, Pinus contorta* and *Populus tremuloides* over an herbaceous layer dominated by *Bromus vulgaris.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Populus tremuloides* root suckers and *Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. The shrub layer has low cover and includes *Acer glabrum*, *Amelanchier alnifolia*, *Ribes viscosissimum*, *Rubus parviflorus*, *Salix scouleriana* or *Sorbus scopulina*. The prominent herbaceous layer is dominated by graminoids or forbs. *Bromus vulgaris*, *Delphinium occidentale*, *Ligusticum filicinum*, *Osmorhiza chilensis* and *Thalictrum occidentale* may be present.

Mid seral conditions support an open canopy codominated by *Pinus contorta* and *Pseudotsuga menziesii*. *Populus tremuloides* clones may be present. *Abies lasiocarpa* and *Picea engelmannii* may establish in tree shadows. The sparse shrub layer includes *Acer glabrum*, *Salix scouleriana* and *Sorbus scopulina*. The herbaceous layer has high cover and is codominated by graminoids and forbs. *Bromus vulgaris* is the dominant graminoid. The forb component has high species diversity.

Late seral and near PNC conditions support a closed canopy of *Abies lasiocarpa*. Shrubs are sparse. The herbaceous layer has low or moderate cover and is dominated by *Bromus vulgaris*, *Calamagrostis rubescens* and *Thalictrum occidentale*.

Discussion

Pinus contorta and *Populus tremuloides* are pioneer species in tree canopy development. *Populus tremuloides* roots can sprout following years of dormancy under a closed conifer canopy. *Pinus contorta* seedlings commonly establish in frost pockets, bare mineral soil and under full sun. The fast growth of *Pinus contorta* and *Populus tremuloides* ameliorate site conditions and enhance the establishment of *Picea engelmannii* and *Pseudotsuga menziesii*.

Picea engelmannii and *Pseudotsuga menziesii* establish in bare mineral soil on shaded microsites. *Picea engelmannii* seedlings tolerate colder and more moist site conditions. *Abies lasiocarpa* may establish in the shade of *Pseudotsuga menziesii* or *Picea engelmannii*.

Abies lasiocarpa, considered a relatively short lived species, has rapid root growth and the ability to establish in forest litter. *Abies lasiocarpa* has a competitive advantage over *Picea engelmannii* by having faster growth rates, higher seed production and greater shade tolerance.

Bromus vulgaris is a native perennial bunchgrass that reproduces vegetatively and from seed. The graminoid can establish in full sun or on shaded sites. Root crowns commonly sprout following low or moderate intensity fire.

The species constancy and cover documentation for vegetation is on page 522.

Soils

Name: Jumpstart series
Taxonomic class: Fine, mixed, active Mollic Cryoboralfs

Typical Pedon Description

Jumpstart, supporting the *Abies lasiocarpa/Bromus carinatus* community on a 43 percent slope with northwest aspect at 7200 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of grass leaves and stems; abrupt smooth boundary.

A1--0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and non plastic; many very fine and fine roots, common medium and few coarse roots; many very fine irregular pores; trace pebbles and cobbles; neutral (pH 6.8); abrupt smooth boundary.

A2--2 to 9 inches; reddish brown (5YR 5/3) silt loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure parting to moderate fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many very fine and fine irregular pores; trace pebbles and cobbles; slightly acid (pH 6.2); clear smooth boundary.

E--9 to 15 inches; light reddish brown (5YR 6/3) loam, reddish brown (5YR 4/3) moist; moderate medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; many very fine and fine tubular pores; trace pebbles and cobbles; slightly acid (pH 6.5); clear smooth boundary.

Bt1--15 to 20 inches; reddish brown (5YR 5/3) clay loam, dark reddish brown (5YR 3/3) moist; moderate medium subangular blocky structure; hard, very friable, sticky and plastic; common very fine, fine, medium and coarse roots; many very fine and fine tubular pores; few faint clay films on ped faces and lining pores; trace pebbles and cobbles; slightly acid (pH 6.5); clear smooth boundary.

Bt2--20 to 25 inches; reddish brown (5YR 5/4) silty clay, dark reddish brown (5YR 3/4) moist; strong coarse subangular blocky structure; very hard, very firm, sticky and very plastic; common very fine and fine roots, few medium and coarse roots; few very fine tubular pores; many faint clay films on ped faces and lining pores; trace pebbles and cobbles; neutral (pH 6.7); gradual smooth boundary.

Bt3--25 to 43 inches; light reddish brown (5YR 6/4) silty clay loam, reddish brown (5YR 5/4) moist; strong coarse subangular blocky structure; very hard, very firm, sticky and very plastic; few very fine, fine and medium roots; common very fine and fine tubular pores; continuous faint clay films on ped faces and lining pores; many coarse distinct, gray (5YR 6/1), relic Fe/Mn depletions in matrix, gray (5YR 5/1) moist; trace pebbles and cobbles; neutral (pH 7.3); abrupt smooth boundary.

Bk--43 to 60 inches; red (2.5YR 5/6) silty clay loam, dark red (2.5YR 3/6) moist; moderate fine subangular blocky structure; hard, firm, slightly sticky and plastic; few very fine roots; common very fine and fine tubular pores; strongly effervescent (13 percent CaC03 equivalent); 5 percent cobbles and 5 percent stones; slightly alkaline (pH 7.8).

Typical Pedon Location

Located in ecological unit 1303.
Legal description: about 2560 feet south and 15 feet west of the northeast corner of section 33, T. 1 S., R. 43 E., Idaho
Latitude: 43 degrees, 17 minutes, 20 seconds, north
Longitude: 111 degrees, 24 minutes, 37 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: moderately well drained
O horizon thickness: 1/2 to 4 inches
Depth to argillic horizon: 8 to 24 inches
Depth to carbonates: 40 to 60 inches

A horizons
Hue: 5YR, 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

E horizon
Hue: 5YR, 7.5YR, or 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: loam or silt loam
Clay content: 18 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt horizons
Hue: 2.5YR, 5YR, 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: clay loam, silty clay loam or silty clay
Clay content: 35 to 55 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bk horizon
Hue: 2.5YR, 5YR or 7.5YR
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3, 4 or 6 dry or moist
Texture: silty clay loam, silty clay or clay loam
Clay content: 30 to 45 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Soft shale fragments: 0 to 60 percent
Effervescence: slightly effervescent or strongly effervescent
Calcium carbonate equivalent: 5 to 20 percent in the less than 2 mm fraction
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

ABLA/THOC Katpa
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/THOC Koffgo
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/THOC Nearl
- Soils have a dark colored surface layer greater than 10 inches thick.

ABLA/THOC Katpa Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Thalictrum occidentale* p.a. on Katpa soils. It is on south facing mountain draws in the mid portion of the forested zone.

Environmental Setting

Ecological Unit: 1172
Landform: mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 40 to 70 percent
Elevation: 6700 to 9700 feet
Average annual precipitation: 24 to 34 inches
Average annual air temperature: 34 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Thalictrum occidentale* p.a.

Present Vegetation

A mosaic of:

- *Abies lasiocarpa/Thalictrum occidentale* p.a.
- *Agastache urticifolia-Viguiera multiflora* c.t.
- *Balsamorhiza sagittata-Helianthella uniflora* c.t.

Succession

Early seral conditions, as a result of fire, support few residual trees. *Pinus flexilis* or *Pseudotsuga menziesii* may establish from seed. The diverse shrub layer has low or moderate cover and may include *Acer glabrum*, *Amelanchier alnifolia*, *Pachistima myrsinites*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus*. The herbaceous layer has high species diversity, moderate cover and is codominated by relatively shade intolerant graminoids and forbs. *Agropyron trachycaulum*, *Bromus carinatus* and *Elymus glaucus* are common graminoids. Prominent forbs include *Agastache urticifolia*, *Arnica cordifolia*, *Aster engelmannii*, *Balsamorhiza sagittata*, *Epilobium angustifolium*, *Geranium viscosissimum* and *Helianthella uniflora*.

Mid seral conditions support an open canopy of *Pinus flexilis* or *Pseudotsuga menziesii*. *Abies lasiocarpa* or *Picea engelmannii* may establish in tree shadows. The shrub layer has low cover and may include *Amelanchier alnifolia*, *Berberis repens*, *Pachistima myrsinites* or *Symphoricarpos oreophilus*. The herbaceous layer has low or moderate cover in tree shadows and is codominated by relatively shade tolerant graminoids and forbs. Common graminoids include *Calamagrostis rubescens*, *Carex geyeri* and *Poa nervosa* var. *wheeleri*. *Arnica cordifolia*, *Aster engelmannii*, *Osmorhiza chilensis* or *Thalictrum occidentale* are conspicuous forbs. Tree interspaces are similar to early seral conditions.

Late seral and near PNC conditions support an open canopy or dispersed islands and ribbons of *Abies lasiocarpa*. *Picea engelmannii* may be present. *Berberis repens* or *Pachistima myrsinites* may form a depauperate shrub layer in tree shadows. The herbaceous layer has low cover in tree shadows and is dominated by *Thalictrum occidentale*. *Arnica cordifolia*, *Aster engelmannii* or *Osmorhiza chilensis* may be present. Tree interspaces support early and mid seral conditions.

Discussion

Pinus flexilis, prominent in early and mid seral stages, is a pioneer in tree establishment. Regeneration is by seed. Distribution is influenced by seed cache location of the Clark's nutcracker (*Nucifraga columbiana*), chipmunks, squirrels and deer mice. This hardy, slow growing tree is tolerant of cold, drought and wind. Relatively shade intolerant and susceptible to white pine blister rust, *Pinus flexilis* decreases in canopy cover as succession moves to late seral stages.

Picea engelmannii and *Pseudotsuga menziesii* establish in bare mineral soil on shaded microsites. *Picea engelmannii* seedlings tolerate colder and more moist site conditions. *Abies lasiocarpa* may establish in the shade of *Pseudotsuga menziesii* or *Picea engelmannii*.

Abies lasiocarpa has a spire-like shape, well suited for snow habitats. The branches are tough, short and densely packed together. The lower boughs of the tree often root as they lay on the moist duff-covered ground. The rooted branches produce young leaders

that result in vegetative reproduction called layering. As several branches layer, a circle of young trees is formed around the tree. A hollow center is left in the circle or cluster when the mother tree dies and rots away.

Climatic conditions of this ecological type influence community composition and development. Defoliation by windblown snow limits new tree establishment and expansion of existing tree ribbons and islands.

The species constancy and cover documentation for vegetation is on page 523.

Soils

Name: Katpa series
Taxonomic class: Loamy-skeletal, carbonatic Calcic Pachic Cryoborolls

Typical Pedon Description

Katpa, supporting the *Abies lasiocarpa/Thalictrum occidentale* p.a. on a 46 percent slope with south aspect at 8480 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1/2 inch to 0 inches; discontinuous forest litter of non- decomposed and decomposed needles and leaves; abrupt broken boundary.

A1--0 to 2 inches; brown (10YR 5/3) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse granular structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; 20 percent pebbles, trace cobbles and stones; neutral (pH 6.6); abrupt smooth boundary.

A2--2 to 7 inches; brown (10YR 4/3) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to weak fine granular; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and few medium roots; many very fine irregular pores; 25 percent pebbles, trace cobbles and stones; slightly alkaline (pH 7.5); abrupt wavy boundary.

A3--7 to 16 inches; brown (10YR 5/3) very gravelly silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine and few medium roots; many very fine tubular pores; 40 percent pebbles, trace cobbles and stones; slightly alkaline (pH 7.6); clear wavy boundary.

Bk1--16 to 32 inches; brown (10YR 5/3) extremely gravelly silt loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine and common medium roots; many very fine irregular pores; common hard pendants of carbonates and many coats of soft powdery lime on underside of cobbles and coarse pebbles; slightly effervescent; 45 percent pebbles, 20 percent cobbles and trace stones; slightly alkaline (pH 7.8); gradual wavy boundary.

Bk2--32 to 60 inches; brown (10YR 5/3) extremely cobbly loam, brown (10YR 4/3) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine and few medium roots; many very fine irregular pores; many hard pendants of carbonates and many coats of soft powdery lime on underside of rock fragments; strongly effervescent; 30 percent pebbles, 50 percent cobbles and trace stones; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 1172.
Legal description: about 750 feet west and 100 feet north of the southeast corner of section 12, T. 43 N., R. 118 W., Wyoming
Latitude: 43 degrees, 41 minutes, 48 seconds, north
Longitude: 111 degrees, 56 minutes, 31 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 0 to 5 inches
Mollic epipedon thickness: 16 to 40 inches
Depth to carbonates: 10 to 25 inches
Depth to calcic horizon: 16 to 40 inches
Calcium carbonate equivalent in the mineralogy control section: greater than 40 percent in the less than 20 mm fraction

A horizons
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 10 to 18 percent

Rock fragment content: 15 to 60 percent
Pebbles: 10 to 40 percent
Cobbles: 0 to 20 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: less than 5 percent in the 2 mm fraction
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bk1 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 3 moist
Chroma: 3 dry or moist
Texture: loam or silt loam
Clay content: 10 to 18 percent
Rock fragment content: 40 to 70 percent
Pebbles: 30 to 60 percent
Cobbles: 0 to 30 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 2 to 15 percent in the less than 2 mm fraction
Effervescence: slightly effervescent or strongly effervescent
Reaction: slightly alkaline (pH 7.4 to 7.8)

Bk2 horizon
Hue: 7.5YR or 10YR
Value: 5, 6 or 7 dry; 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 4 to 16 percent
Rock fragment content: 60 to 90 percent
Pebbles: 30 to 70 percent
Cobbles: 5 to 50 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 15 to 40 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

ABLA/THOC Jumpstart
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/THOC Koffgo
- Soils lack carbonates.

ABLA/THOC Nearl
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/THOC Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Thalictrum occidentale* p.a. on Koffgo soils. It is on south facing mountain sideslopes in the mid portion of the forested zone.

Environmental Setting

Ecological Unit: 1316
Landform: mountains
Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash
Slope: 40 to 70 percent
Elevation: 7200 to 9800 feet
Average annual precipitation: 30 to 32 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Thalictrum occidentale* p.a.

Present Vegetation

- *Abies lasiocarpa/Thalictrum occidentale* p.a.
- The *Ligusticum filicinum-Delphinium occidentale* c.t. and the *Agastache urticifolia-Viguiera multiflora* c.t. are common in avalanche chutes.

Succession

Early seral conditions, as a result of fire or avalanches, support few trees. *Pinus albicaulis* may establish from seed caches. An open shrub layer of *Ribes montigenum* may develop if seeds were present prior to disturbance. The prominent herbaceous layer is codominated by graminoids and forbs. Species diversity is high. *Bromus* and *Poa* species, *Agastache urticifolia*, *Aster engelmannii*, *Claytonia lanceolata*, *Helianthella uniflora*, *Lupinus argenteus* and *Senecio crassulus* may be present.

Mid seral conditions support an open canopy of *Pinus albicaulis*. *Abies lasiocarpa* or *Picea engelmannii* may establish in tree shadows. The sparse shrub layer includes *Ribes montigenum* and *Sorbus scopulina*. The herbaceous layer in tree shadows has low cover and is codominated by relatively shade tolerant graminoids and forbs. *Poa compressa*, *Arnica cordifolia*, *Aster engelmannii*, *Claytonia lanceolata*, *Lupinus argenteus* and *Senecio crassulus* may be present. Tree interspaces are similar to early seral conditions.

Late seral to near PNC conditions support an open canopy or dispersed islands and ribbons of *Abies lasiocarpa*. *Pinus contorta* and *Pinus albicaulis* may be present. The shrub and herbaceous layers are depauperate in tree shadows. *Ribes montigenum*, *Aster engelmannii*, *Claytonia lanceolata* and *Thalictrum occidentale* may be present. Tree interspaces are similar to early seral conditions.

Discussion

Pinus albicaulis is slow growing and moderately shade tolerant. Distribution of *Pinus albicaulis*, and migration of the forest communities across the landscape, is strongly influenced by seed cache locations of the Clark's nutcracker (*Nucifraga columbiana*). *Pinus albicaulis* provides shade and protection for *Abies lasiocarpa* establishment.

Abies lasiocarpa has a spire-like shape, well suited for snow habitats. The branches are tough, short and densely packed together. The lower boughs of the tree often root as they lay on the moist duff-covered ground. The rooted branches produce young leaders that result in vegetative reproduction called layering. As several branches layer, a circle of young trees is formed around the tree. A hollow center is left in the circle or cluster when the mother tree dies and rots away.

Climatic conditions of this ecological type influence community composition and development. Defoliation by windblown snow limits new tree establishment and expansion of existing tree ribbons and islands. The light colored soils of this ecological type also influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 525.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Abies lasiocarpa/Thalictrum occidentale* p.a. on a 55 percent slope with south aspect at 9480 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1/2 to 0 inches; discontinuous forest litter of leaves, needles and twigs; trace cobbles and stones; abrupt broken boundary.

A--0 to 2 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 and slightly plastic; many very fine roots; many very fine irregular pores; 30 percent pebbles, trace cobbles and stones; moderately acid (pH 5.8); abrupt smooth boundary.

Bw1--2 to 7 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, common fine, medium and coarse roots; many very fine tubular pores; 40 percent pebbles, 10 percent cobbles and trace stones; moderately acid (pH 5.8); clear smooth boundary.

Bw2--7 to 24 inches; yellowish brown (10YR 5/4) extremely gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine roots, few fine and common medium roots; common very fine tubular pores; 55 percent pebbles, 15 percent cobbles and trace stones; moderately acid (pH 5.8); diffuse wavy boundary.

BC--24 to 45 inches; light yellowish brown (10YR 6/4) extremely cobbly sandy loam, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; many very fine irregular pores; 25 percent pebbles, 40 percent cobbles and 10 percent stones; moderately acid (pH 5.8); diffuse wavy boundary.

C--45 to 60 inches; fragmental material; single grain; loose, nonsticky and nonplastic; common very fine and few fine roots hanging in pores; many coarse irregular pores; coats of light yellowish brown (10YR 6/4) sandy loam on upperside of rock fragments, yellowish brown (10YR 5/4) moist; 5 percent pebbles, 70 percent cobbles, 20 percent stones and boulders; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1316.
Legal description: about 1450 feet north and 2400 feet east of the southwest corner of section 3, T. 45 N., R. 117W., Wyoming
Latitude: 43 degrees, 53 minutes, 21 seconds, north
Longitude: 110 degrees, 53 minutes, 08 seconds, west

Range In Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 2 to 14 inches
Depth to fragmental material: 40 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 30 percent
Cobbles: 0 to 10 percent
Stones or boulders: 0 to 5 percent
Base saturation: 30 to 60 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)
Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 7 to 14 percent
Rock fragment content: 35 to 90 percent
Pebbles: 20 to 55 percent

Cobbles: 10 to 30 percent
Stones or boulders: 0 to 30 percent
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 10 to 30 percent
Cobbles: 0 to 60 percent
Stones: 10 to 70 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Koffgo
- This ecological type occurs at lower elevations on warmer positions.
- In the plant association, *Calamagrostis rubescens* is well represented.

ABLA/SPBE2 Koffgo
- This ecological type occurs on drier positions.
- In the plant association, *Spiraea betulifolia* is well represented.

ABLA/THOC Jumpstart
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/THOC Katpa
- Soils have carbonates.

ABLA/THOC Nearl
- Soils are clayey and have less than 35 percent rock fragments.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is well represented.

ABLA/THOC Nearl Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Thalictrum occidentale* p.a. on Nearl soils. It is on foothills and mountains in both the warm and cool portions of the forested zone.

Environmental Setting

Ecological Unit: 1140 and 1209
Landform: foothills and mountains
Parent material: local alluvium derived from mixed sources over residuum from shale
Slope: 4 to 20 percent
Elevation: 5700 to 8000 feet
Average annual precipitation: 24 to 35 inches
Average annual air temperature: 33 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Thalictrum occidentale* p.a.

Present Vegetation

- *Abies lasiocarpa/Thalictrum occidentale* p.a.
- *Populus tremuloides/Wyethia amplexicaulis* c.t.
- *Populus tremuloides-Abies lasiocarpa*/Tall Forb c.t.
- Communities that have a tree canopy of *Pseudotsuga menziesii* or *Populus tremuloides* with an herbaceous layer dominated by one or more of the following: *Thalictrum occidentale, Osmorhiza occidentalis, Aster engelmannii, Arnica cordifolia, Balsamorhiza macrophylla*, or *Geranium viscosissimum*.
- Communities dominated by *Populus tremuloides* that have widely dispersed seedling through medium *Pseudotsuga menziesii, Pinus contorta* or *Abies lasiocarpa*.

Succession

Early seral conditions, as a result of logging or fire, support few residual trees. *Populus tremuloides* root suckers and *Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. The shrub layer has low cover and may include *Lonicera utahensis, Ribes lacustre* and *Symphoricarpos oreophilus*. The prominent herbaceous layer is codominated by graminoids and forbs. *Bromus carinatus, Calamagrostis rubescens, Elymus glaucus, Melica bulbosa, Achillea millefolium, Arnica cordifolia, Aster engelmannii, Balsamorhiza macrophylla, Geranium viscosissimum, Lupinus argenteus, Potentilla glandulosa, Wyethia amplexicaulis, Wyethia helianthoides* and *Hackelia* species may be present.

Mid seral conditions support an open canopy codominated by *Pinus contorta, Populus tremuloides* and *Pseudotsuga menziesii. Abies lasiocarpa* and *Picea engelmannii* establish in tree shadows. Shrubs have low cover, moderate diversity and are dominated by *Symphoricarpos oreophilus*. The diverse herbaceous layer has high cover and is dominated by forbs. *Arnica cordifolia, Aster engelmannii, Balsamorhiza macrophylla, Geranium viscosissimum, Lupinus argenteus, Osmorhiza occidentalis* and *Thalictrum occidentale* are common.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. *Picea engelmannii* may be present. Shrubs are sparse. Relatively shade tolerant forbs dominate the herbaceous layer and include *Arnica cordifolia, Osmorhiza chilensis, Osmorhiza occidentalis* and *Thalictrum occidentale*.

Discussion

Pinus contorta and *Populus tremuloides* are pioneer species in tree canopy development. *Populus tremuloides* roots can sprout following years of dormancy under a closed conifer canopy. *Pinus contorta* seedlings commonly establish in frost pockets, bare mineral soil and under full sun. The fast growth of *Pinus contorta* and *Populus tremuloides* ameliorate site conditions and enhance the establishment of *Picea engelmannii* and *Pseudotsuga menziesii*.

Picea engelmannii and *Pseudotsuga menziesii* establish in bare mineral soil on shaded microsites. *Picea engelmannii* seedlings tolerate colder and more moist site conditions. *Abies lasiocarpa* may establish in the shade of *Pseudotsuga menziesii* or *Picea engelmannii*.

Abies lasiocarpa, considered a relatively short lived species, has rapid root growth and the ability to establish in forest litter. *Abies lasiocarpa* has a

competitive advantage over *Picea engelmannii* by having faster growth rates, higher seed production and greater shade tolerance.

Wyethia amplexicaulis is a relatively shade intolerant, highly competitive forb that reproduces vegetatively and from seed. Root stalks and crowns sprout following disturbance. Once established, *Wyethia amplexicaulis* may be relatively persistent in tree interspaces.

The clayey soils of this ecological type influence community composition and development. The lower subsoil and substratum layers have a high capacity to shrink and swell. These layers bulge in the spring, when the soil is nearly saturated with water, and subside throughout the summer and into the autumn as the soil dries. Large saucer-shaped segments of soil may rotate, or slip, tearing tree and shrub roots. Many trees have an irregular growth form as a result of soil movement. Abstract tilting, multiple bends or irregular dieback is common.

The species constancy and cover documentation for vegetation is on page 526.

Soils

Name: Nearl series
Taxonomic class: Fine, smectitic Vertic Cryoborolls

Typical Pedon Description

Nearl, supporting the *Abies lasiocarpa/Thalictrum occidentalis* p.a. on a rolling 15 percent slope with south aspect at 6915 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of needles and leaves; abrupt broken boundary.

A1--0 to 4 inches; dark grayish brown (10YR 4/2) loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to moderate very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many very fine irregular pores; 5 percent pebbles, trace cobbles and stones; slightly acid (pH 6.2); abrupt wavy boundary.

A2--4 to 10 inches; dark grayish brown (10YR 4/2) clay loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; hard, friable, sticky and plastic; common very fine and fine roots, few medium and coarse roots; many very fine and few fine irregular pores; 5 percent pebbles, trace cobbles and stones; slightly acid (pH 6.2); abrupt irregular boundary.

Bw1--10 to 21 inches; light yellowish brown (10YR 6/4) cobbly clay loam, yellowish brown (10YR 5/4) moist; moderate medium prismatic structure parting to strong fine subangular blocky; hard, firm, sticky and plastic; few very fine, fine, medium and coarse roots; common very fine tubular pores; many distinct uncoated silt grains on ped faces; 10 percent pebbles, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.2); clear wavy boundary.

Bw2--21 to 39 inches; yellowish brown (10YR 5/4) clay, brown (10YR 4/3) moist; moderate coarse prismatic structure parting to moderate coarse subangular blocky; very hard, very firm, sticky and very plastic; few very fine roots; common very fine and few fine tubular pores; very few 1/16 inch wide vertical desiccation cracks; common fine distinct, dark brown (7.5YR 3/2), soft Fe/Mn accumulations in matrix, dark brown (7.5YR 3/2) moist; common fine distinct, brownish yellow (10YR 6/6), soft Fe accumulations in matrix, yellowish brown (10YR 5/6) moist; few fine distinct, very dark gray (2.5Y 3/0), hard Fe/Mn concretions in matrix, very dark gray (2.5Y 3/0) moist; many fine distinct, light gray (2.5Y 7/2), clay depletions on ped faces and lining fine pores, grayish brown (2.5Y 5/2) moist; few fine prominent, gray (5Y 6/1), Fe depletions lining fine pores, gray (5Y 5/1) moist; 10 percent pebbles, trace cobbles and stones; slightly acid (pH 6.1); gradual wavy boundary.

Bss--39 to 60 inches; light yellowish brown (2.5Y 6/4) clay, light olive brown (2.5Y 5/4) moist; weak coarse subangular blocky structure; very hard, very firm, sticky and very plastic; few very fine roots; common very fine tubular pores; very few 1/8 to 1/4 inch wide vertical desiccation cracks; few distinct slickensides; common coarse distinct, grayish brown (2.5Y 5/2), Fe depletions in matrix, dark grayish brown (2.5Y 4/2) moist; common fine distinct, light gray and very pale brown (10YR 7-8/2), clay depletions lining pores, grayish brown (10YR 5/2) moist; few fine prominent, dark brown (7.5YR 3/2), soft Fe/Mn accumulations lining pores, dark brown (7.5YR 3/2) moist; few fine prominent, brownish yellow (10YR 6/6), soft Fe accumulations adjacent to pores, yellowish brown (10YR 5/6) moist; few fine prominent, very dark gray (2.5Y 3/0), hard Fe/Mn concretions in matrix, very dark gray (2.5Y 3/0) moist; 10 percent pebbles, trace cobbles and stones; slightly acid (pH 6.2).

Typical Pedon Location

Located in ecological unit 1140.
Legal description: about 2220 feet west and 1400 feet north of the southeast corner of section 32, T. 14 N., R. 40 E., Idaho
Latitude: 44 degrees, 29 minutes, 03 seconds, north
Longitude: 111 degrees, 46 minutes, 05 seconds, west

Range in characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: moderately well drained
Water table, depth: 12 to 30 inches
Water table, kind: perched
Water table, duration: June to July
Mollic epipedon thickness: 10 to 16 inches
Depth to Bw2 horizon: 12 to 30 inches
Clay content in the particle-size control section: average 35 to 45 percent

A horizons
Hue: 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam, silt loam or clay loam
Clay content: 18 to 35 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw1 horizon
Hue: 7.5YR or 10YR
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: clay loam or silty clay loam
Clay content: 27 to 40 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 25 percent
Cobbles: 0 to 30 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw2 and Bss horizons
Hue: 5YR, 7.5YR, 10YR, 2.5Y or 5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silty clay, silty clay loam or clay
Clay content: 35 to 50 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Cracks: very few or few subsurface-initiated reversible cracks
Redoximorphic features:
Kind - soft Fe or Fe/Mn accumulations, hard Fe/Mn concretions, clay depletions, or Fe/Mn depletions
Abundance - few or common
Size - fine to coarse
Contrast - distinct or prominent
Reaction: moderately acid to slightly alkaline (pH 5.6 to 7.8)

Related Types, Mosaics and Ecotones

ABLA/THOC Jumpstart
- Soils have a dark colored surface layer less than 10 inches thick.

ABLA/THOC Katpa
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/THOC Koffgo
- Soils are loamy and have greater than 35 percent rock fragments.

ABLA/VAGL,PAMY Huckridge Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase on Huckridge soils. It is on rolling to hilly dissected tablelands and foothills in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1112, 1224, 1307 and 1646
Landform: dissected tablelands and foothills
Parent material: local alluvium derived from loess and volcanic ash
Slope: 4 to 35 percent
Elevation: 5300 to 8000 feet
Average annual precipitation: 22 to 28 inches
Average annual air temperature: 36 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase

Present Vegetation

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase
- *Pinus contorta/Vaccinium globulare* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta/Symphoricarpos albus* community
- *Pseudotsuga menziesii/Symphoricarpos albus* community
- *Pseudotsuga menziesii/Vaccinium globulare* community
- *Pseudotsuga menziesii/Spiraea betulifolia* community
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- Communities that have a shrub layer of *Symphoricarpos albus* or *Spiraea betulifolia* with an herbaceous layer dominated by *Carex geyeri, Calamagrostis rubescens* or non-native grasses.
- Herbaceous communities dominated by *Calamagrostis rubescens, Carex geyeri* or non-native grasses.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* seedlings may establish from seed. The sparse shrub layer may include *Amelanchier alnifolia*, *Lonicera utahensis*, *Symphoricarpos albus*, *Spiraea betulifolia* or *Pachistima myrsinites*. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Arnica cordifolia*, *Epilobium angustifolium*, *Geranium viscosissimum* and *Lupinus argenteus* are common.

Mid seral conditions support a canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii*. *Abies lasiocarpa* or *Picea engelmannii* may establish in tree shadows. The prominent shrub layer is dominated by *Spiraea betulifolia*, *Symphoricarpos albus* or *Vaccinium globulare*. *Lonicera utahensis*, *Pachistima myrsinites* or *Vaccinium scoparium* may be present. The herbaceous layer includes *Calamagrostis rubescens* and *Carex geyeri*. *Arnica cordifolia*, *Geranium viscosissimum* and *Lupinus argenteus* are common. *Osmorhiza chilensis* and *Thalictrum occidentale* may be present.

Late seral conditions support a closed *Abies lasiocarpa* canopy. *Picea engelmannii* may be present. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare*. *Pachistima myrsinites* and *Vaccinium scoparium* are present. The sparse herbaceous layer is dominated by *Calamagrostis rubescens*.

Discussion

The *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase is suggested as PNC. This suggestion is speculative because early seral conditions prevail as a result of extensive timber harvest.

Openings in the tree canopy, as a result of natural disturbance or timber harvest, affect *Vaccinium globulare* and *Vaccinium scoparium*. The shrubs lose vigor and die when the tree canopy is removed, and regenerate as the canopy closes.

Vaccinium globulare is of low to medium stature and reproduces vegetatively or by seed. Rhizome sprouting typically occurs in response to light to moderate fires or removal of the apical meristem. The shrub provides important browse and cover for wildlife throughout most of the year.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight.

The light colored, loamy soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content. The thick E horizons have low strength when moist. As a result of weak anchoring, trees are susceptible to windthrow during late spring.

The species constancy and cover documentation for vegetation is on page 528.

Soils

Name: Huckridge series
Taxonomic class: Fine-silty, mixed, superactive Vitrandic Paleboralfs

Typical Pedon Description

Huckridge, supporting a community dominated by *Carex geyeri* on a 9 percent slope with north aspect at 6510 feet elevation. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 5 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine vesicular pores; moderately acid (pH 6.0); clear smooth boundary.

E--5 to 22 inches; very pale brown (10YR 7/3) silt loam, brown (10YR 5/3) moist; moderate very coarse subangular blocky structure parting to weak fine subangular blocky; slightly hard, very friable, nonsticky and nonplastic; common very fine roots; common very fine tubular pores; slightly acid (pH 6.2); gradual smooth boundary.

E/B--22 to 27 inches; 90 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, and 10 percent brown (10YR 5/3) very fine veins and lamellae of B material, brown (10YR 4/3) moist, that mix to a silt loam; moderate very coarse subangular blocky structure parting to moderate fine subangular blocky; hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores, few fine and medium tubular pores; slightly acid (pH 6.2); gradual wavy boundary.

Bt/E--27 to 48 inches; 85 percent yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 4/4) moist, and 15 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, that mix to a silt loam; strong coarse subangular blocky structure parting to moderate medium prismatic; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine tubular pores, few medium tubular pores; many faint clay films on ped faces and lining pores of prisms; slightly acid (pH 6.2); gradual wavy boundary.

Bt--48 to 59 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure parting to moderate medium prismatic; hard, friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine tubular pores, few medium tubular pores; few distinct clay films on ped faces, common faint clay films on ped faces and lining pores; many uncoated silt grains on ped faces; slightly acid (pH 6.2); gradual wavy boundary.

BC--59 to 70 inches; very pale brown (10YR 7/4) silt loam, yellowish brown (10YR 5/4) moist; moderate medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine roots; many very fine and fine tubular pores; common uncoated silt grains on ped faces; slightly acid (pH 6.2).

Typical Pedon Location

Located in ecological unit 1307.
Legal description: about 1200 feet north and 300 feet west of the southeast corner of section 26, T. 8 N., R. 45 E., Idaho
Latitude: 43 degrees, 59 minutes, 12 seconds, north
Longitude: 111 degrees, 06 minutes, 05 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 1/2 to 2 inches on lightly disturbed pedons, absent on pedons recently scarified
Ap or A (when present) thickness: 2 to 7 inches
Depth to argillic horizon: 24 to 40 inches
Depth to BC horizon: 50 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

Ap or A (when present) horizon
Hue: 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 4 to 9 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Base saturation: 30 to 50 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E horizon
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2 or 3 dry and moist
Texture: silt loam or silt
Clay content: 4 to 15 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Base saturation: 30 to 80 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E/B horizon
Hue: 10YR
Value:
E portion - 6 or 7 dry, 4 or 5 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry or moist
Texture: silt loam
Clay content: 4 to 15 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Base saturation: 30 to 80 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: 85 to 95 percent E material and 5 to 15 percent B material (by volume)

Bt/E horizon
Hue: 10YR
Value:
B portion - 5 or 6 dry, 4 or 5 moist
E portion - 7 or 8 dry, 4 or 5 moist
Chroma:
B portion - 3 or 4 dry or moist
E portion - 2 or 3 dry or moist
Texture: silt loam
Clay content: 15 to 24 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Base saturation: 30 to 80 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: 50 to 85 percent B material and 15 to 50 percent E material (by volume)

Bt horizon
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam or silty clay loam
Clay content: 20 to 30 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Base saturation: 50 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

BC horizon
Hue: 10YR

Value: 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam
Clay content: 15 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent

Base saturation: 50 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

ABLA/VAGL,PAMY Koffgo

- Soils have greater than 35 percent rock fragments and lack an argillic horizon.

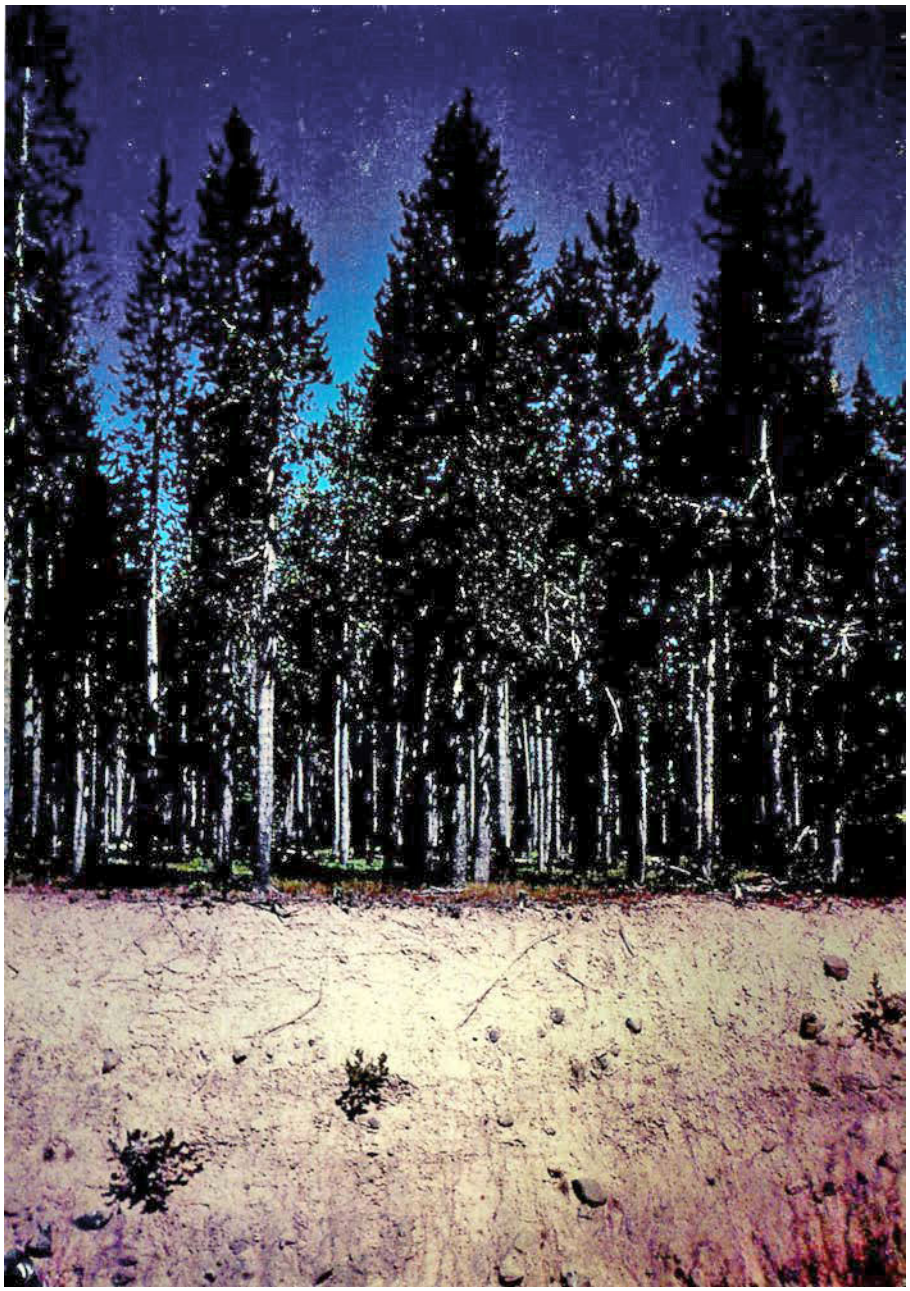


Photo 6. The lodgepole pine/grouse whortleberry c.t. on Oleo soils in the ABLA/VASC Oleo Ecological Type.

ABLA/VAGL,PAMY Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase on Koffgo soils. It is on dissected tablelands, foothills and mountains in both the warm and mid portions of the forested zone.

Environmental Setting

Ecological Unit: 1224, 1315, 1316, 1593, 1595 and 1646

Landform: dissected tablelands, foothills and mountains

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks, loess and volcanic ash

Slope: 10 to 70 percent

Elevation: 5300 to 9800 feet

Average annual precipitation: 24 to 32 inches

Average annual air temperature: 34 to 38 degrees F

Soil temperature regime: cryic

Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase

Present Vegetation

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase
- *Pinus contorta/Vaccinium globulare* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Symphoricarpos albus c.t.*
- *Pseudotsuga menziesii/Symphoricarpos albus* community
- *Pseudotsuga menziesii/Vaccinium globulare* community
- *Pseudotsuga menziesii/Spiraea betulifolia* community
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- Herbaceous communities dominated *Carex geyeri* or *Calamagrostis rubescens.*
- Shrub communities dominated by *Sorbus scopulina* or *Vaccinium globulare* are common in avalanche chutes.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The sparse shrub layer may include *Amelanchier alnifolia*, *Lonicera utahensis*, *Symphoricarpos albus*, *Spiraea betulifolia* or *Pachistima myrsinites.* The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri. Arnica cordifolia*, *Epilobium angustifolium*, *Geranium viscosissimum* and *Lupinus argenteus* are common.

Mid seral conditions support a canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii. Abies lasiocarpa* or *Picea engelmannii* may establish in tree shadows. The prominent shrub layer is dominated by *Spiraea betulifolia*, *Symphoricarpos albus* or *Vaccinium globulare. Lonicera utahensis*, *Pachistima myrsinites* or *Vaccinium scoparium* may be present. The herbaceous layer includes *Calamagrostis rubescens* and *Carex geyeri. Arnica cordifolia*, *Geranium viscosissimum* and *Lupinus argenteus* are common. *Osmorhiza chilensis* and *Thalictrum occidentale* may be present.

Late seral conditions support a closed *Abies lasiocarpa* canopy. *Picea engelmannii* may be present. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare. Pachistima myrsinites* and *Vaccinium scoparium* are present. The sparse herbaceous layer is dominated by *Calamagrostis rubescens.*

Discussion

Openings in the tree canopy, as a result of natural disturbance or timber harvest, affect *Vaccinium globulare* and *Vaccinium scoparium.* The shrubs lose vigor and die when the tree canopy is removed, and regenerate as the canopy closes.

Vaccinium globulare is of low to medium stature and reproduces vegetatively or by seed. Rhizome sprouting typically occurs in response to light to moderate fires or removal of the apical meristem. The shrub provides important browse and cover for wildlife throughout most of the year.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allow the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though annual seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 530.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Abies lasiocarpa/Vaccinium globulare* p.a., *Pachistima myrsinites* phase on a 12 percent slope with west aspect at 7120 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A--0 to 7 inches; grayish brown (10YR 5/2) gravelly silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots, common fine and medium roots, few coarse roots; few very fine tubular pores, many very fine irregular pores; 20 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

Bw1--7 to 16 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky: slightly hard, very friable, nonsticky and slightly plastic; many very fine and common fine roots, few medium and coarse roots; common very fine and fine tubular pores; 25 percent pebbles, 5 percent cobbles and trace stones; moderately acid (pH 5.8); clear wavy boundary.

Bw2--16 to 28 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few medium and coarse roots; common very fine and fine tubular pores; common distinct, light brown (7.5YR 6/4), clay films on underside of rock fragments, brown (7.5YR 4-5/4) moist; 30 percent pebbles, 30 percent cobbles and 10 percent stones; moderately acid (pH 6.0); diffuse wavy boundary.

BC--28 to 55 inches; light gray (10YR 7/2) extremely cobbly sandy loam, pale brown (10YR 6/3) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine tubular pores; common distinct, light brown (7.5YR 6/4), clay films on underside of rock fragments, brown (7.5YR 5/4) moist; many fine (less than 1/8 inch) caps of silt on upperside of rock fragments; 20 percent pebbles, 35 percent cobbles, 20 percent stones and boulders; moderately acid (pH 6.0); diffuse wavy boundary.

C--55 to 60 inches; fragmental material; single grain; loose; few very fine roots; many fine irregular pores, few medium and coarse irregular pores; caps of light gray (10YR 7/2) sandy loam on upperside of rock fragments, pale brown (10YR 6/3) moist; 20 percent pebbles, 55 percent cobbles, 20 percent stones and boulders; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1595.
Legal description: about 1900 feet west and 600 feet south of the northeast corner of section 16, T. 46 N., R. 118 E., Wyoming
Latitude: 43 degrees, 57 minutes, 20 seconds, north

Longitude: 111 degrees, 01 minutes, 20 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 2 to 14 inches
Depth to fragmental material: 40 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 25 percent
Cobbles: 0 to 5 percent
Stones or boulders: 0 to 5 percent
Base saturation: 30 to 60 percent
Reaction - strongly acid or moderately acid (pH 5.1 to 6.0)
Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizons
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam, silt loam or sandy loam
Clay content: 4 to 12 percent
Rock fragment content: 15 to 90 percent
Pebbles: 15 to 35 percent
Cobbles: 5 to 55 percent
Stones or boulders: 0 to 20 percent
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 4 to 8 percent
Rock fragment content: 45 to 90 percent
Pebbles: 5 to 30 percent
Cobbles: 30 to 55 percent
Stones or boulders: 5 to 20 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Koffgo
- This ecological type occurs on drier positions.
- In the plant association, *Vaccinium globulare* is poorly represented.

ABLA/SPBE2 Koffgo
- This ecological type occurs on drier positions.
- In the plant association, *Spiraea betulifolia* is well represented.

ABLA/THOC Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Thalictrum occidentale* is well represented.

ABLA/VAGL,PAMY Huckridge
- Soils have an argillic horizon and less than 15 percent rock fragments.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Pachistima myrsinites* is absent.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is abundant.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium globulare* is poorly represented.

ABLA/VAGL,VAGL Flatstone Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase on Flatstone soils. It is on rolling slopes of dissected tablelands and caldera floors in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1720
Landform: dissected tablelands and caldera floors
Parent material: local alluvium and residuum derived from loess, volcanic ash and rhyolitic tuff
Slope: 4 to 15 percent
Elevation: 5900 to 7000 feet
Average annual precipitation: 25 to 35 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase

Present Vegetation

- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- *Pseudotsuga menziesii/Vaccinium globulare* community
- Communities that have a tree canopy of *Pinus contorta* with an herbaceous layer dominated by *Bromus* sp. or *Poa* sp.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The sparse shrub layer includes *Lonicera utahensis* or *Spiraea betulifolia*. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Arnica cordifolia*, *Epilobium angustifolium*, *Fragaria virginiana* or *Lupinus argenteus* may be present.

Mid seral conditions support a canopy of *Pinus contorta* and *Pseudotsuga menziesii*. *Abies lasiocarpa* may establish in tree shadows. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare*. *Lonicera utahensis*, *Spiraea betulifolia* or *Vaccinium scoparium* may be present. *Calamagrostis rubescens* or *Carex geyeri* dominate the prominent herbaceous layer. Forbs have high species diversity and may include *Arnica cordifolia*, *Epilobium angustifolium*, *Pedicularis racemosa*, *Pyrola secunda* or *Thalictrum occidentale*.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. The shrub layer has moderate to high cover and is dominated by *Vaccinium globulare*. *Lonicera utahensis*, *Spiraea betulifolia* or *Vaccinium scoparium* may be present. The herbaceous layer has moderate cover and moderate species diversity. *Calamagrostis rubescens*, *Carex geyeri* and *Arnica cordifolia* are dominant.

Discussion

Openings in the tree canopy, as a result of natural disturbance or timber harvest, affect *Vaccinium globulare* and *Vaccinium scoparium*. The shrubs lose vigor and die when the tree canopy is removed, and regenerate as the canopy closes.

Vaccinium globulare is of low to medium stature and reproduces vegetatively or by seed. Rhizome sprouting typically occurs in response to light to moderate fires or removal of the apical meristem. The shrub provides important browse and cover for wildlife throughout most of the year.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds

may be the primary source of plant establishment on severely burned areas.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 531.

Soils

Name: Flatstone series
Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Typical Pedon Description

Flatstone, supporting the *Pinus contorta/Calamagrostis rubescens* c.t. on a convex 12 percent slope with south aspect at 6370 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of slightly decomposed needles, twigs and cones; abrupt smooth boundary.

A--0 to 5 inches; grayish brown (10YR 5/2) silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few medium roots; many fine irregular pores; 10 percent pebbles; moderately acid (pH 5.6); clear smooth boundary.

E1--5 to 13 inches; pale brown (10YR 6/3) gravelly silt loam, dark brown (10YR 4/2) moist; moderate fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots, few medium roots; common very fine irregular pores, few fine tubular pores; 20 percent pebbles and 5 percent cobbles; moderately acid (pH 5.6); clear wavy boundary.

E2--13 to 34 inches; light gray (10YR 7/2) extremely stony silt loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; soft, friable, nonsticky and nonplastic; common very fine and fine roots, few medium roots; few very fine irregular pores, few fine tubular pores; 10 percent pebbles, 30 percent cobbles and 40 percent stones; moderately acid (pH 5.6); gradual wavy boundary.

E/B--34 to 44 inches; 60 percent light gray (10YR 7/2) E material, dark grayish brown (10YR 4/2) moist, and 40 percent pale brown (10YR 6/3) B material, dark yellowish brown (10YR 4/4) moist, that mix to an extremely cobbly loam; weak coarse subangular blocky structure; soft, friable, slightly sticky and slightly plastic; common very fine and fine roots; common very fine tubular pores; 30 percent pebbles, 40 percent cobbles and 10 percent stones; moderately acid (pH 5.6); clear wavy boundary.

2Bt/E--44 to 54 inches; 70 percent pale brown (10YR 6/3) B material, dark yellowish brown (10YR 4/4) moist, and 30 percent light gray (10YR 7/1) E material, dark grayish brown (10YR 4/2) moist, that mix to a cobbly loam; moderate coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, firm, sticky and plastic; few fine roots; common fine tubular pores; common fine distinct, dark yellowish brown (10YR 4/6) moist, clay films on ped faces; 10 percent pebbles, 10 percent cobbles and 5 percent stones; moderately acid (pH 5.8); clear wavy boundary.

2Bt--54 to 67 inches; pale brown (10YR 6/3) cobbly clay loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, firm, sticky and plastic; few fine roots; common fine tubular pores; common fine faint, dark yellowish brown (10YR 4/4) moist, clay films on ped faces; 10 percent pebbles, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1720.
Legal description: about 500 feet south and 2000 feet east of the northwest corner of section 9, T.13 N., R. 43 E., Idaho
Latitude: 44 degrees, 28 minutes, 10 seconds, north
Longitude: 111 degrees, 23 minutes, 10 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Depth to argillic horizon: 40 to 50 inches
Rock fragment content in the particle-size control section: average 35 to 80 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 14 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles: 0 percent
Stones: 0 percent
Base saturation: 30 to 50 percent
Reaction: moderately acid (pH 5.6 to 6.0)

E1 horizon
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 14 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 20 percent
Cobbles: 5 to 15 percent
Stones: 0 to 5 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid (pH 5.6 to 6.0)

E2 horizon
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 10 to 14 percent
Rock fragment content: 35 to 80 percent
Pebbles: 5 to 30 percent
Cobbles: 15 to 40 percent
Stones: 10 to 40 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid (pH 5.6 to 6.0)

E/B horizon
Hue: 10YR
Value:
E portion - 6 or 7 dry; 4, 5 or 6 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion- 1, 2 or 3 dry or moist
B portion - 2, 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 10 to 14 percent
Rock fragment content: 35 to 80 percent
Pebbles: 5 to 30 percent
Cobbles: 15 to 40 percent
Stones: 10 to 40 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid (pH 5.6 to 6.0)
Other: 50 to 85 percent E material and 15 to 50 percent B material

2Bt/E horizon
Hue: 10YR
Value:
B portion - 5 or 6 dry, 4 or 5 moist
E portion - 6 or 7 dry; 4, 5 or 6 moist
Chroma:
B portion - 2, 3 or 4 dry or moist
E portion - 1, 2 or 3 dry or moist
Texture: loam or clay loam
Clay content: 14 to 30 percent
Rock fragment content: 15 to 35 percent
Pebbles: 0 to 15 percent
Cobbles: 10 to 20 percent
Stones: 0 to 10 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent B material and 15 to 50 percent E material

2Bt horizon
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or clay loam
Clay content: 14 to 30 percent
Rock fragment content: 15 to 35 percent
Pebbles: 0 to 15 percent
Cobbles: 10 to 20 percent
Stones: 0 to 10 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/VAGL,VAGL Koffgo
- Soils lack an argillic horizon.

ABLA/VAGL,VAGL Winegar
- Soils have less than 35 percent rock fragments and are 20 to 40 inches deep to dense basal till.

ABLA/VAGL,VAGL Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase on Koffgo soils. It is on north facing sideslopes of dissected tablelands, foothills, mountains, plateaus and escarpments of plateaus in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1575 and 1594

Landform: dissected tablelands, foothills, mountains, plateaus and escarpments of plateaus

Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash

Slope: 8 to 60 percent

Elevation: 6200 to 7800 feet

Average annual precipitation: 24 to 32 inches

Average annual air temperature: 34 to 38 degrees F

Soil temperature regime: cryic

Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase

Present Vegetation

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase
- *Pinus contorta/Vaccinium globulare* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pseudotsuga menziesii/Vaccinium globulare* community
- Communities that have a shrub layer of *Ceanothus velutinus* with an herbaceous layer dominated by *Carex geyeri.*
- Herbaceous communities dominated by *Carex geyeri.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. The sparse shrub layer is dominated by *Ceanothus velutinus. Lonicera utahensis, Sorbus scopulina* or *Spiraea betulifolia* may be present. The prominent herbaceous layer is dominated by *Carex geyeri* and *Calamagrostis rubescens.*

Mid seral conditions support a canopy of *Pinus contorta* and *Pseudotsuga menziesii. Abies lasiocarpa* may establish in tree shadows. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare. Lonicera utahensis, Sorbus scopulina, Spiraea betulifolia* or *Vaccinium scoparium* may be present. *Calamagrostis rubescens* or *Carex geyeri* dominate the prominent herbaceous layer. Forbs have high species diversity and may include *Arnica cordifolia, Epilobium angustifolium, Pedicularis racemosa, Pyrola secunda* or *Thalictrum occidentale.*

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. The shrub layer has moderate to high cover and is dominated by *Vaccinium globulare. Lonicera utahensis, Sorbus scopulina, Spiraea betulifolia* or *Vaccinium scoparium* may be present. The herbaceous layer has low cover and is dominated by *Calamagrostis rubescens, Carex geyeri* and *Arnica cordifolia.*

Discussion

Openings in the tree canopy, as a result of natural disturbance or timber harvest, affect the undergrowth. *Vaccinium globulare* and *Vaccinium scoparium* lose vigor and die when the tree canopy is removed. *Ceanothus velutinus* may establish from soil-stored seed in these openings. As the canopy closes, *Vaccinium globulare* and *Vaccinium scoparium* regenerate and *Ceanothus velutinus* becomes decadent.

Vaccinium globulare is of low to medium stature and reproduces vegetatively or by seed. Rhizome sprouting typically occurs in response to light to moderate fires or removal of the apical meristem. The shrub provides important browse and cover for wildlife throughout most of the year.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management

treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 532.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase on a 40 percent slope with north aspect at 6850 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of needles, cones, and twigs; abrupt smooth boundary.

A--0 to 4 inches; grayish brown (10YR 5/2) gravelly loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, common fine, medium, and coarse roots; many very fine irregular pores; 30 percent pebbles, trace cobbles and stones; moderately acid (pH 5.6); clear smooth boundary.

Bw1--4 to 17 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine roots, few fine, medium and coarse roots; common very fine tubular pores; 40 percent pebbles, 10 percent cobbles and trace stones; moderately acid (pH 5.8); gradual wavy boundary.

Bw2--17 to 27 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine, fine, medium and coarse roots; common very fine tubular pores; 50 percent pebbles, 15 percent cobbles and 5 percent stones; moderately acid (pH 5.8); gradual wavy boundary.

BC--27 to 41 inches; very pale brown (10YR 7/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine irregular pores; 30 percent pebbles, 30 percent cobbles and 10 percent stones; moderately acid (pH 6.0); diffuse wavy boundary.

C--41 to 60 inches; fragmental material; single grain; loose; few very fine and fine roots; many coarse irregular voids; many coats of silt and sand grains on upperside of rock fragments; 45 percent pebbles, 45 percent cobbles and 10 percent stones.

Typical Pedon Location

Located in ecological unit 1594.
Legal description: about 2100 feet east and 2400 feet south of the northwest corner of section 20, T. 12 N., R. 42 E., Idaho
Latitude: 44 degrees, 21 minutes, 17 seconds, north
Longitude: 111 degrees, 31 minutes, 40 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 2 to 14 inches
Depth to fragmental material: 40 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 30 percent
Cobbles: 0 to 10 percent
Stones or boulders: 0 to 5 percent
Base saturation: 30 to 60 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizons
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 7 to 14 percent
Rock fragment content: 35 to 90 percent
Pebbles: 20 to 55 percent
Cobbles: 10 to 30 percent
Stones or boulders: 0 to 30 percent
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 10 to 30 percent
Cobbles: 0 to 60 percent
Stones or boulders: 10 to 70 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Vaccinium globulare* is poorly represented.

ABLA/SPBE2 Koffgo
- This ecological type occurs on drier positions.
- In the plant association, *Vaccinium globulare* is poorly represented.

ABLA/THOC Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Thalictrum occidentale* is well represented.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Pachistima myrsinites* is present.

ABLA/VAGL,VAGL Flatstone
- Soils have an argillic horizon.

ABLA/VAGL,VAGL Winegar
- Soils have less than 35 percent rock fragments and are 20 to 40 inches deep to dense basal till.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is abundant.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium scoparium* is well represented.

ABLA/VAGL,VAGL Winegar Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase on Winegar soils. It is on dissected tablelands in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1516
Landform: dissected tablelands
Parent material: local alluvium derived from volcanic ash, loess and glacial till
Slope: 4 to 15 percent
Elevation: 6200 to 6700 feet
Average annual precipitation: 30 to 40 inches
Average annual air temperature: 35 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium globulare* phase

Present Vegetation

- *Pinus contorta/Vaccinium globulare* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pseudotsuga menziesii/Vaccinium globulare* community
- Communities that have a shrub layer of *Ceanothus velutinus* or *Lonicera utahensis* with an herbaceous layer dominated by *Calamagrostis rubescens* or *Carex geyeri.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The sparse shrub layer may include *Ceanothus velutinus* or *Lonicera utahensis.* The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri. Lupinus argenteus* is present.

Mid seral conditions support an open canopy of *Pinus contorta. Abies lasiocarpa* may establish in tree shadows. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare.* Other common shrubs include *Lonicera utahensis, Shepherdia canadensis, Vaccinium caespitosum* and *Vaccinium scoparium. Calamagrostis rubescens* or *Carex geyeri* dominate the prominent herbaceous layer.

Late seral and near PNC conditions support an *Abies lasiocarpa* canopy. The shrub layer has moderate to high cover and is dominated by *Vaccinium globulare. Lonicera utahensis, Shepherdia canadensis, Vaccinium caespitosum* or *Vaccinium scoparium* may be present. The herbaceous layer has moderate cover and moderate species diversity. *Calamagrostis rubescens, Carex geyeri* and *Arnica cordifolia* are dominant.

Discussion

Openings in the tree canopy, as a result of natural disturbance or timber harvest, affect *Vaccinium globulare* and *Vaccinium scoparium.* The shrubs lose vigor and die when the tree canopy is removed, and regenerate as the canopy closes.

Vaccinium globulare is of low to medium stature and reproduces vegetatively or by seed. Rhizome sprouting typically occurs in response to light to moderate fires or removal of the apical meristem. The shrub provides important browse and cover for wildlife throughout most of the year.

Vaccinium caespitosum is a low growing rhizomatous shrub that reproduces by seed or sprouting. It has a fairly shallow regenerative structure and can be damaged by high intensity fires or severe soil scarification. The berries are an important food source for birds and mammals; the browse is relatively unpalatable. Low intensity fires may favor *Vaccinium caespitosum* by reducing competition, increasing nutrient availability and increasing the light source by opening the canopy over the low shrubs.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a

dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

The ashy soils of this ecological type influence community composition and development. The surface and subsoil layers have low strength when moist. Root restricting dense basal till is at depths of 20 to 40 inches. As a result of weak anchoring, trees are susceptible to windthrow during late spring. The soil binds phosphate, limiting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency.

The species constancy and cover documentation for vegetation is on page 534.

Soils

Name: Winegar series
Taxonomic class: Ashy, amorphic Typic Vitricryands

Typical Pedon Description

Winegar, supporting the *Pseudotsuga menziesii/Vaccinium globulare* community on a rolling 7 percent slope with east aspect at 6250 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter; abrupt smooth boundary.

A--0 to 4 inches; dark yellowish brown (10YR 4/4) gravelly silt loam, dark brown (10YR 3/3) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, common medium and few fine roots; many very fine irregular pores; 15 percent pebbles, trace cobbles, stones and boulders; moderately acid (pH 5.6); abrupt smooth boundary.

Bw1--4 to 14 inches; dark yellowish brown (10YR 4/4) silt loam, dark yellowish brown (10YR 3/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; 10 percent pebbles, trace cobbles, stones and boulders; moderately acid (pH 5.8); gradual smooth boundary.

Bw2--14 to 26 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 3/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; 10 percent pebbles, trace cobbles, stones and boulders; moderately acid (pH 6.0); abrupt irregular boundary.

BC--26 to 38 inches; light olive brown (2.5Y 5/4) very gravelly sandy loam, olive brown (2.5Y 4/4) moist; massive; soft, very friable; nonsticky and slightly plastic; many very fine and few fine roots; few very fine tubular pores; 50 percent gray (10YR 5/1) cobble-size fragments of dense basal till, dark grayish brown (10YR 4/2) moist; 25 percent pebbles, 10 percent cobbles, trace stones and boulders; slightly acid (pH 6.4); clear irregular boundary.

Cd--38 to 60 inches; gray (10YR 5/1) dense basal till that crushes to a very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm and brittle, nonsticky and nonplastic; few very fine roots following the weathering rind; many very fine and few fine irregular pores; common fine (less than 1/4 inch), dark yellowish brown (10YR 4/4), weathering rind around coarse pebbles, cobbles, stones and boulders; 25 percent pebbles, 10 percent cobbles, trace stones and boulders; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1516.
Legal description: about 2800 feet north and 1200 feet east of the southwest corner of section 12., T. 9 N., R. 46 E., Idaho
Latitude: 44 degrees, 07 minutes, 18 seconds, north
Longitude: 111 degrees, 05 minutes, 21 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: dense basal till (Cd horizon)
Drainage class: moderately well drained
Ochric epipedon thickness: 2 to 8 inches
Thickness of andic soil properties: 20 to 40 inches
Rock fragment content in the particle-size control section: average 15 to 35 percent
Base saturation: 10 to 40 percent

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam
Rock fragment content: 15 to 25 percent
Pebbles: 15 to 20 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 20 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.0 to 1.25 grams per cubic centimeter
Ammonium oxalate extractable AL plus 1/2 Fe: 2.0 to 4.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Bw horizons
Hue: 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3 or 4 moist
Chroma: 4 or 6 dry or moist
Texture: loam or silt loam
Rock fragment content: 5 to 30 percent
Pebbles: 5 to 25 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 20 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.0 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 2.0 to 4.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

BC horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 4 or 6 dry or moist
Texture: loam or sandy loam
Rock fragment content: 35 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Soft dense basal till fragments: 15 to 85 percent
Volcanic glass content: less than 10 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.3 to 1.5 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 1.0 to 3.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 25 to 60 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: Horizon is discontinuous in some pedons.

Cd horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 1 or 2 dry or moist
Texture: sandy loam or loamy sand
Rock fragment content: 25 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Bulk density: 1.8 to 2.1 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/VAGL,VAGL Flatstone
- Soils have greater than 35 percent rock fragments and are greater than 60 inches deep.

ABLA/VAGL,VAGL Koffgo
- Soils have greater than 35 percent rock fragments and are greater than 60 inches deep.

ABLA/VASC,PIAL Winegar
- This ecological type occurs on cooler positions.
- In the plant association, *Pinus albicaulis* is a significant part of the tree layer; *Vaccinium globulare* is absent from the undergrowth.

ABLA/VAGL,VASC Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium scoparium* phase on Koffgo soils. It is on foothills in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1600
Landform: foothills
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Slope: 4 to 25 percent
Elevation: 6500 to 8000 feet
Average annual precipitation: 40 to 44 inches
Average annual air temperature: 34 to 35 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium scoparium* phase

Present Vegetation

- *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium scoparium* phase
- *Pinus contorta/Vaccinium globulare* c.t.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* seedlings may establish from seed. The sparse shrub layer may include *Lonicera utahensis*, *Shepherdia canadensis*, *Vaccinium globulare* or *Vaccinium scoparium*. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* and includes *Carex geyeri* and *Carex rossii*. Forbs are sparse.

Mid seral conditions support a closed canopy dominated by *Pinus contorta*. Other common trees include *Abies lasiocarpa*, *Picea engelmannii*, *Pinus albicaulis* and *Pseudotsuga menziesii*. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare* and *Vaccinium scoparium*. *Lonicera utahensis*, *Shepherdia canadensis* and *Spiraea betulifolia* are common. The herbaceous layer has low cover and is dominated by *Calamagrostis rubescens* and *Carex geyeri*. Forbs are sparse.

Late seral and near PNC conditions support a canopy dominated by *Abies lasiocarpa*. *Picea engelmannii* and *Pinus albicaulis* may be present. The shrub layer has low to moderate cover and is dominated by *Vaccinium globulare* or *Vaccinium scoparium*. Other shrubs and herbaceous species are sparse.

Discussion

Vaccinium globulare is of low to medium stature and reproduces vegetatively or by seed. Rhizome sprouting typically occurs in response to light to moderate fires or removal of the apical meristem. The shrub provides important browse and cover for wildlife throughout most of the year.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 535.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Abies lasiocarpa/Vaccinium globulare* p.a., *Vaccinium scoparium* phase on a 22

percent slope with north aspect at 7360 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, cones, and twigs; abrupt smooth boundary.

A--0 to 4 inches; brown (10YR 5/2) gravelly loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; 25 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

Bw1--4 to 20 inches; light yellowish brown (10YR 6/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, fine, medium and coarse roots; common very fine tubular pores; 25 percent pebbles and 10 percent cobbles; moderately acid (pH 6.0); clear wavy boundary.

Bw2--20 to 29 inches; light yellowish brown (10YR 6/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots; common very fine tubular pores; 45 percent pebbles, 10 percent cobbles and trace stones; moderately acid (pH 5.9); clear wavy boundary.

BC--29 to 45 inches; light gray (2.5Y 7/2) extremely cobbly sandy loam, dark grayish brown (2.5Y 4/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; 30 percent pebbles, 30 percent cobbles and 10 percent stones; slightly acid (pH 6.2); diffuse wavy boundary.

C--45 to 60 inches; fragmental material; single grain; loose; few very fine and fine roots; many coarse irregular voids; many coats of silt and sand grains on upperside of rock fragments; 45 percent pebbles, 45 percent cobbles and 10 percent stones.

Typical Pedon Location

Located in ecological unit 1600.

Legal description: about 50 feet west and 1700 feet south of the northeast corner of section 14, T. 48 N., R. 117 W., Wyoming

Latitude: 44 degrees, 07 minutes, 34 seconds, north

Longitude: 110 degrees, 51 minutes, 14 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

Ochric epipedon thickness: 2 to 14 inches

Depth to fragmental material: 40 to greater than 60 inches

Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction

Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent

Phosphate retention: 20 to 50 percent

A horizon

Hue: 10YR

Value: 4, 5 or 6 dry; 2, 3 or 4 moist

Chroma: 1, 2 or 3 dry or moist

Texture: loam

Clay content: 7 to 16 percent

Rock fragment content: 15 to 35 percent

Pebbles: 15 to 30 percent

Cobbles: 0 to 10 percent

Stones or boulders: 0 to 5 percent

Base saturation: 30 to 60 percent

Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizons

Hue: 10YR

Value: 6 or 7 dry, 4 or 5 moist

Chroma: 2, 3 or 4 dry or moist

Texture: loam or sandy loam

Clay content: 7 to 14 percent

Rock fragment content: 35 to 90 percent

Pebbles: 20 to 55 percent

Cobbles: 10 to 30 percent

Stones or boulders: 0 to 30 percent

Base saturation: 50 to 80 percent

Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon

Hue: 10YR or 2.5Y

Value: 6 or 7 dry; 4, 5 or 6 moist

Chroma: 1, 2, 3 or 4 dry or moist

Texture: sandy loam

Clay content: 5 to 12 percent

Rock fragment content: 60 to 90 percent

Pebbles: 10 to 30 percent
Cobbles: 0 to 60 percent
Stones or boulders: 10 to 70 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Vaccinium globulare* is poorly represented.

ABLA/SPBE2 Koffgo
- This ecological type occurs on drier positions.
- In the plant association, *Spiraea betulifolia* is well represented.

ABLA/THOC Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Thalictrum occidentale* is well represented.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Pachistima myrsinites* is present.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Vaccinium scoparium* is poorly represented.

ABLA/VASC,CARU Koffgo
- This ecological type occurs on cooler positions.
- In the plant association, *Vaccinium globulare* is poorly represented.

ABLA/VASC Oleo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase or *Calamagrostis rubescens* phase on Oleo soils (Photo 6). It is on undulating to rolling plateaus in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1573
Landform: plateaus
Parent material: local alluvium derived from loess and tephra
Slope: 2 to 15 percent
Elevation: 6800 to 8200 feet
Average annual precipitation: 30 to 60 inches
Average annual air temperature: 32 to 36 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase or *Calamagrostis rubescens* phase

Present Vegetation

- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- Herbaceous communities dominated by *Carex geyeri.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The sparse shrub layer is dominated by *Spiraea betulifolia. Lonicera utahensis* or *Vaccinium scoparium* may be present. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri.* Forbs are sparse.

Mid seral conditions support a closed tree canopy dominated by *Pinus contorta. Abies lasiocarpa* seedlings and saplings are common. Widely dispersed *Pinus albicaulis* may be present. The shrub layer has low to moderate cover and is dominated by *Vaccinium scoparium. Lonicera utahensis* and *Spiraea betulifolia* may be present. *Calamagrostis rubescens* or *Carex geyeri* dominate the herbaceous layer.

Late seral and near PNC conditions support an *Abies lasiocarpa* canopy. *Pinus albicaulis* may be present. The shrub layer has low cover, low species diversity and is dominated by *Vaccinium scoparium. Lonicera utahensis* is the only other common shrub. The herbaceous layer is prominent in shrub interspaces and is dominated by *Carex geyeri.*

Discussion

Recurring fire and logging keep many areas in *Pinus contorta* dominated stands. Although *Abies lasiocarpa* is the indicated PNC species, stands dominated by *Abies lasiocarpa* seldom occur.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy.

Calamagrostis rubescens is a long lived graminoid. Reproduction from seeds or rhizomes allow the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fire.

Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

The ashy soils of this ecological type influence community composition and development. The soil binds phosphate, restricting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency.

The species constancy and cover documentation for vegetation is on page 536.

Soils

Name: Oleo series
Taxonomic class: Ashy, glassy Alfic Vitricryands

Typical Pedon Description

Oleo, supporting the *Pinus contorta/Vaccinium scoparium* c.t. on an undulating 5 percent slope with southwest aspect at 7850 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A1--0 to 2 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak coarse platy structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots, few coarse roots; many very fine irregular pores; trace pebbles, cobbles and stones; moderately acid (pH 6.0); abrupt smooth boundary.

A2--2 to 10 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak very fine granular; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots, few coarse and medium roots; many very fine irregular pores; trace pebbles, cobbles and stones; strongly acid (pH 5.5); clear smooth boundary.

B/E--10 to 28 inches; 70 percent light yellowish brown (10YR 6/4) B material, dark yellowish brown (10YR 4/4) moist, and 30 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, in a fine to medium (less than 1/2 inch) irregular matrix that mixes to a silt loam; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; 5 percent pebbles, trace cobbles and stones; moderately acid (pH 5.7); clear wavy boundary.

Bt1--28 to 43 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; strong coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; common distinct clay films on ped faces and lining pores; many distinct uncoated silt grains on ped faces; 15 percent pebbles, trace cobbles and stones; moderately acid (pH 5.8); clear wavy boundary.

Bt2--43 to 60 inches; pale brown (10YR 6/3) very cobbly silt loam, brown (10YR 4/3) moist; strong coarse subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine roots; common very fine tubular pores; common distinct clay films on ped faces and lining pores; many distinct uncoated silt grains on ped faces; 10 percent pebbles, 20 percent cobbles and 15 percent stones; moderately acid (pH 5.8).

Typical Pedon Location

Located in ecological unit 1573.
Legal description: about 2600 feet west and 800 feet south of the northeast corner of section 19, T. 14 N., R. 45 E., Idaho
Latitude: 44 degrees, 31 minutes, 43 seconds, north
Longitude: 111 degrees, 11 minutes, 03 seconds, west

Range in Characteristics

Profile:
Depth class: very deep (greater than 60 inches)
Drainage: well drained
O horizon thickness: 1/2 to 2 inches
Umbric epipedon thickness: 10 to 25 inches
Thickness of andic soil properties: 28 to 40 inches
Volcanic glass content in the mineralogy control section: average 30 to 70 percent in the 0.02 to 2.0 mm fraction.

A horizons
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Rock fragment content: 0 to 20 percent
Pebbles: 0 to 20 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Volcanic glass content: 30 to 75 percent in the 0.02 to 2.0 mm fraction

Bulk density: 1.25 to 1.65 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15-bar water retention: 5 to 12 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

B/E horizon
Hue: 10YR
Value:
B portion - 5 or 6 dry, 4 or 5 moist
E portion - 6 or 7 dry, 5 or 6 moist
Chroma:
B portion - 3 or 4 dry or moist
E portion - 2 or 3 dry or moist
Texture: silt loam or loam
Rock fragment content: 5 to 35 percent
Pebbles: 5 to 30 percent
Cobbles: 0 to 15 percent
Stones or boulders: 0 to 15 percent
Volcanic glass content: 30 to 75 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.5 to 1.7 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15-bar water retention: 5 to 12 percent on air-dried samples
Phosphate retention: 35 to 70 percent
Base saturation: 30 to 60 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)
Other: 50 to 85 percent B material and 15 to 50 percent E material (by volume)

Bt horizons
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam or silt loam
Rock fragment content: 5 to 65 percent
Pebbles: 5 to 30 percent
Cobbles: 0 to 20 percent
Stones or boulders: 0 to 15 percent
Volcanic glass content: 15 to 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.5 to 1.7 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Phosphate retention: 15 to 50 percent
Base saturation: 50 to 80 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Related Types, Mosaics and Ecotones

ABLA/VASC,CARU Bradco
- Soils are 20 to 40 inches deep to dense basal till.

ABLA/VASC,CARU Koffgo
- Soils have a dark colored surface layer less than 10 inches thick.

ABLA/VASC,CARU Rhylow
- Soils have greater than 35 percent rock fragments.

ABLA/VASC,VASC Castan
- Soils have greater than 35 percent rock fragments.

ABLA/VASC,VASC Dashiki
- Soils have a dark colored surface layer less than 10 inches thick and lack an argillic horizon.

ABLA/VASC,CARU Bradco Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase on Bradco soils. It is on dissected tablelands in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1516
Landform: dissected tablelands
Parent material: local alluvium derived from volcanic ash, loess and glacial till
Slope: 4 to 15 percent
Elevation: 6200 to 6700 feet
Average annual precipitation: 30 to 40 inches
Average annual air temperature: 35 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.
- Herbaceous communities dominated by *Carex geyeri* or *Calamagrostis rubescens.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The shrub layer has low cover and is dominated by *Spiraea betulifolia*. Other shrubs present may include *Lonicera utahensis*, *Salix scouleriana*, *Shepherdia canadensis*, or *Symphoricarpos albus*. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. Forbs may include *Epilobium angustifolium*, *Geranium viscosissimum* and *Lupinus* species.

Mid seral conditions support a tree canopy dominated by *Pinus contorta. Abies lasiocarpa* seedlings and saplings may be present. The shrub layer has low cover and is dominated by *Vaccinium scoparium. Lonicera utahensis* or *Spiraea betulifolia* may be present. *Calamagrostis rubescens* or *Carex geyeri* dominate the herbaceous layer.

Late seral and near PNC conditions support an *Abies lasiocarpa* canopy. The shrub layer has low cover and is dominated by *Vaccinium scoparium.* Other shrubs are scarce. The herbaceous layer is prominent in shrub interspaces and is codominated by *Calamagrostis rubescens* and *Carex geyeri.* The forb component has low diversity and cover.

Discussion

Recurring fire and logging keep many areas in *Pinus contorta* dominated stands. Although *Abies lasiocarpa* is the indicated PNC species, stands dominated by *Abies lasiocarpa* seldom occur.

Openings in the tree canopy, as a result of natural disturbance or timber harvest, affect the undergrowth. *Vaccinium scoparium* dies out of the shrub layer when the tree canopy is removed and regenerates as the canopy closes.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fire. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy.

The ashy soils of this ecological type influence community composition and development. The surface and subsoil layers have low strength when moist. Roots are restricted by dense basal till at depths of 20 to 40 inches. As a result of weak anchoring, trees are susceptible to windthrow during late spring. The soil binds phosphate, limiting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency.

The species constancy and cover documentation for vegetation is on page 537.

Soils

Name: Bradco series
Taxonomic class: Ashy, amorphic Humic Vitricryands

Typical Pedon Description

Bradco, supporting the *Carex geyeri* community on a rolling 11 percent slope with southeast aspect at 6575 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; root mat; abrupt broken boundary.

A1--0 to 10 inches; dark brown (10YR 4/3) fine sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few medium roots; many very fine irregular pores; 10 percent pebbles, trace cobbles and stones; moderately acid (pH 5.8); clear smooth boundary.

A2--10 to 18 inches; brown (10YR 5/3) gravelly fine sandy loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine tubular pores, many very fine irregular pores; 15 percent pebbles, trace cobbles and stones; slightly acid (pH 6.1); gradual wavy boundary.

Bw--18 to 29 inches; yellowish brown (10YR 5/4) gravelly sandy loam, dark yellowish brown (10YR 3/4) moist; weak coarse subangular blocky structure parting to moderate medium subangular blocky; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; few very fine and fine tubular pores; 20 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.2); abrupt irregular boundary.

BC--29 to 36 inches; brownish yellow (10YR 6/6) gravelly sandy loam, dark yellowish brown (10YR 4/4) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; common very fine tubular pores; 80 percent light brownish gray (2.5Y 6/2) channer-size fragments of dense basal till, very dark grayish brown (2.5Y 3/2) moist; 25 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.2); clear irregular boundary.

Cd--36 to 60 inches; light brownish gray (2.5Y 6/2) dense basal till that crushes to a gravelly loamy sand, very dark grayish brown (2.5Y 3/2) moist; massive; very hard, firm, nonsticky and nonplastic; many very fine and fine irregular pores; 25 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.1).

Typical Pedon Location

Located in ecological unit 1516.
Legal description: about 600 feet west and 1500 feet north of the southeast corner of section 22., T. 10 N., R. 45 E., Idaho
Latitude: 44 degrees, 10 minutes, 33 seconds, north
Longitude: 111 degrees, 06 minutes, 57 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: dense basal till (Cd horizon)
Drainage class: well drained
Umbric epipedon thickness: 12 to 20 inches
Thickness of andic soil properties: 20 to 40 inches
Rock fragment content in the particle-size control section: average 15 to 35 percent
Base saturation: 10 to 40 percent

A horizons
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist
Texture: loam or fine sandy loam
Rock fragment content: 5 to 30 percent
Pebbles: 5 to 20 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 20 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.0 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 2.0 to 4.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Bw horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: loam, fine sandy loam or sandy loam
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 25 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 20 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.1 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 2.0 to 4.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

BC horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 4 or 6 dry or moist
Texture: loam, fine sandy loam or sandy loam
Rock fragment content: 25 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Soft dense basal till fragments: 15 to 85 percent
Volcanic glass content: less than 10 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.3 to 1.5 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 1.0 to 3.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: Horizon is discontinuous in some pedons.

Cd horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 0, 1, or 2 dry or moist
Texture: sandy loam or loamy sand
Rock fragment content: 25 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Bulk density: 1.8 to 2.1 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/VASC Oleo
- Soils are greater than 60 inches deep.

ABLA/VASC,CARU Koffgo
- Soils have greater than 35 percent rock fragments and are greater than 60 inches deep.

ABLA/VASC,CARU Rhylow
- Soils have greater than 35 percent rock fragments and are greater than 60 inches deep.

ABLA/VASC,CARU Koffgo Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase on Koffgo soils. It is on undulating to rolling slopes of dissected tablelands and caldera floors in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1700, 1720 and 1730
Landform: dissected tablelands and caldera floors
Parent material: local alluvium, colluvium or residuum derived from igneous rocks, loess and volcanic ash
Slope: 2 to 30 percent
Elevation: 5900 to 7000 feet
Average annual precipitation: 22 to 32 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Spiraea betulifolia* c.t.
- *Pseudotsuga menziesii/Calamagrostis rubescens* community
- *Pseudotsuga menziesii/Vaccinium scoparium* community
- Communities that have a tree canopy of *Pinus contorta* with an herbaceous layer dominated by *Bromus* sp. or *Poa* sp.
- Herbaceous communities dominated by *Carex geyeri, Calamagrostis rubescens*, or non-native grasses.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The shrub layer has low cover and is dominated by *Spiraea betulifolia*. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Arnica cordifolia* is the most common species in the sparse forb component.

Mid seral conditions support a tree canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii*. *Abies lasiocarpa* seedlings and saplings may be present. The shrub layer is dominated by dispersed colonies of *Spiraea betulifolia* or *Vaccinium scoparium*. An herbaceous layer is prominent in shrub interspaces. This layer is codominated by *Calamagrostis rubescens* and *Carex* species. The forb component has moderate diversity and low cover.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. Residual *Pseudotsuga menziesii* may be present. The shrub layer has low cover and is dominated by widely dispersed colonies of *Spiraea betulifolia* and *Vaccinium scoparium*. The shrub interspaces have moderate diversity, low cover and are dominated by *Calamagrostis rubescens* or *Carex* species.

Discussion

Recurring fire and logging keep many areas in *Pinus contorta* dominated stands. Although *Abies lasiocarpa* is the indicated PNC species, stands dominated by *Abies lasiocarpa* seldom occur.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight.

Spiraea betulifolia is a moderately shade tolerant, rhizomatous shrub that is highly resistant to fire. Root crowns and rhizomes commonly sprout within one growing season following fire or scarification.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a

dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fire. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens up the canopy.

The light colored soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content.

The species constancy and cover documentation for vegetation is on page 538.

Soils

Name: Koffgo series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryochrepts

Typical Pedon Description

Koffgo, supporting the *Pinus contorta/Vaccinium scoparium* c.t. on a 6 percent convex ridge at 6360 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, cones, and twigs; abrupt smooth boundary.

A--0 to 4 inches; grayish brown (10YR 5/2) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak medium granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many very fine irregular pores; 5 percent pebbles; moderately acid (pH 5.6); clear broken boundary.

Bw1--4 to 12 inches; light gray (10YR 7/2) gravelly silt loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; common very fine, fine, medium and coarse roots; common very fine irregular pores; 20 percent pebbles and 5 percent cobbles; moderately acid (pH 5.8); clear smooth boundary.

Bw2--12 to 18 inches; light brownish gray (10YR 6/2) gravelly silt loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; few very fine, fine, medium and coarse roots; common very fine irregular pores; 25 percent pebbles and 5 percent cobbles; moderately acid (pH 5.8); clear smooth boundary.

BC--18 to 50 inches; light gray (10YR 7/1) extremely cobbly sandy loam, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; common very fine and fine roots, few medium and coarse roots; few distinct, brown (10YR 5/3), clay films on underside of rock fragments, dark brown (7.5YR 4/3) moist; 20 percent pebbles, 40 percent cobbles and flagstones, 20 percent stones; moderately acid (pH 6.0); diffuse wavy boundary.

C--50 to 60 inches; fragmental material; single grain; loose; few very fine and fine roots in fractures of flagstones and hanging in pores; many coarse irregular voids; few distinct, brown (10YR 5/3), clay films on underside of rock fragments; common fine (less than 1/8 inch) caps of silt on upperside of rock fragments; 20 percent pebbles, 70 percent cobbles and flagstones, 10 percent stones.

Typical Pedon Location

Located in ecological unit 1700.
Legal description: about 1000 feet north and 2000 feet west of the southeast corner of section 11, T. 13 N., R. 43 E., Idaho
Latitude: 44 degrees, 27 minutes, 40 seconds, north
Longitude: 111 degrees, 20 minutes, 35 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 2 to 14 inches
Depth to fragmental material: 40 to greater than 60 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction

Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 16 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles or flagstones: 0 to 5 percent
Stones or boulders: 0 to 5 percent
Base saturation: 30 to 60 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)
Other: A horizons that have mollic colors are less than 10 inches thick.

Bw horizons
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 8 to 12 percent
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 35 percent
Cobbles or flagstones: 5 to 20 percent
Stones or boulders: 0 to 5 percent
Base saturation: 50 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 4 to 8 percent
Rock fragment content: 45 to 90 percent
Pebbles: 5 to 30 percent
Cobbles or flagstones: 30 to 55 percent
Stones or boulders: 5 to 20 percent
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

ABLA/ACGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Vaccinium scoparium* is poorly represented.

ABLA/SPBE2 Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Vaccinium scoparium* is poorly represented.

ABLA/THOC Koffgo
- This ecological type occurs on warmer and drier positions.
- In the plant association, *Thalictrum occidentale* is well represented.

ABLA/VAGL,PAMY Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Vaccinium globulare* is well represented; *Pachistima myrsinites* is present.

ABLA/VAGL,VAGL Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VAGL,VASC Koffgo
- This ecological type occurs on warmer positions.
- In the plant association, *Vaccinium globulare* is well represented.

ABLA/VASC Oleo
- Soils have a dark colored surface layer greater than 10 inches thick.

ABLA/VASC,CARU Bradco
- Soils have less than 35 percent rock fragments and are 20 to 40 inches deep to dense basal till.

ABLA/VASC,CARU Rhylow
- Soils have a dark colored surface layer greater than 10 inches thick.

ABLA/VASC,CARU Rhylow Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase on Rhylow soils. It is on hilly slopes of dissected tablelands in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1585
Landform: dissected tablelands
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Slope: 15 to 35 percent
Elevation: 6600 to 7900 feet
Average annual precipitation: 25 to 35 inches
Average annual air temperature: 33 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- Herbaceous communities dominated by *Carex geyeri* or *Calamagrostis rubescens.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The shrub layer has low cover and is dominated by *Spiraea betulifolia. Lonicera utahensis* or *Vaccinium scoparium* may be present. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri. Epilobium angustifolium* is the most common species in the sparse forb component.

Mid seral conditions support a tree canopy dominated by *Pinus contorta. Abies lasiocarpa* seedlings and saplings may be present. The shrub layer has low or moderate cover and is dominated by *Vaccinium scoparium. Lonicera utahensis* or *Spiraea betulifolia* may be present. *Calamagrostis rubescens* or *Carex geyeri* dominate the herbaceous layer.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. The shrub layer has low or moderate cover and is dominated by *Vaccinium scoparium.* Other shrubs are sparse. The herbaceous layer has low to moderate cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri.* The forb component has low diversity and cover.

Discussion

Recurring fire and logging keep many areas in *Pinus contorta* dominated stands. Although *Abies lasiocarpa* is the indicated PNC species, stands dominated by *Abies lasiocarpa* seldom occur.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight. The shrub loses vigor and dies when the tree canopy is removed, and regenerates as the canopy closes.

Spiraea betulifolia is a moderately shade tolerant, rhizomatous shrub that is highly resistant to fire. Root crowns and rhizomes commonly sprout within one growing season following fire or scarification.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fire. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens up the canopy.

The species constancy and cover documentation for vegetation is on page 539.

Soils

Name: Rhylow series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Typical Pedon Description

Rhylow, supporting the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Calamagrostis rubescens* phase on a 25 percent slope with east aspect at 6880 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1/2 to 0 inches; forest litter of needles and leaves; abrupt broken boundary.

A1--0 to 4 inches; brown (10YR 4/3) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots, few medium and coarse roots; many very fine irregular pores; 15 percent pebbles; moderately acid (pH 5.8); clear smooth boundary.

A2--4 to 14 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots, few medium and coarse roots; many very fine irregular pores; 20 percent pebbles; slightly acid (pH 6.2); clear wavy boundary.

Bw--14 to 32 inches; yellowish brown (10YR 5/4) gravelly loam, dark yellowish brown (10YR 3/4) moist; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; soft, very friable, nonsticky and slightly plastic; common very fine roots, few fine, medium and coarse roots; many very fine tubular pores; 30 percent pebbles; moderately acid (pH 6.0); gradual wavy boundary.

BC--32 to 50 inches; light yellowish brown (10YR 6/4) extremely cobbly sandy loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine roots, few fine, medium and coarse roots; many very fine tubular pores; 20 percent pebbles, 40 percent cobbles, 10 percent stones and boulders; moderately acid (pH 5.9); diffuse wavy boundary.

C--50 to 65 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine tubular pores; 15 percent pebbles, 45 percent cobbles, 25 percent stones and boulders; moderately acid (pH 5.9).

Typical Pedon Location

Located in ecological unit 1585.
Legal description: about 2200 feet west and 2400 feet south of the northeast corner of section 5, T. 10 N., R. 45 E., Idaho
Latitude: 44 degrees, 13 minutes, 27 seconds, north
Longitude: 111 degrees, 09 minutes, 40 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Umbric epipedon thickness: 10 to 20 inches
Rock fragment content in the particle-size control section: average 35 to 60 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 15 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Base saturation: 25 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bw horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 18 percent
Rock fragment content: 20 to 60 percent
Pebbles: 20 to 50 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Base saturation: 25 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 40 to 80 percent
Pebbles: 10 to 30 percent
Cobbles: 30 to 60 percent
Stones: 0 to 15 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

C horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam
Clay content: 4 to 8 percent
Rock fragment content: 80 to 90 percent
Pebbles: 5 to 30 percent
Cobbles: 40 to 60 percent
Stones: 25 to 55 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/ACGL Rhylow
- This ecological type occurs on warmer positions.
- In the plant association, *Acer glabrum* or *Sorbus scopulina* is well represented.

ABLA/CARU,CARU Rhylow
- This ecological type occurs on warmer positions.
- In the plant association, *Vaccinium scoparium* is poorly represented.

ABLA/VASC Oleo
- Soils have less than 35 percent rock fragments.

ABLA/VASC,CARU Bradco
- Soils have less than 35 percent rock fragments and are 20 to 40 inches deep to dense basal till.

ABLA/VASC,CARU Koffgo
- Soils have a dark colored surface layer less than 10 inches thick.

ABLA/VASC,PIAL Winegar Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Pinus albicaulis* phase on Winegar soils. It is in cirques in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1414
Landform: cirques
Parent material: local alluvium derived from volcanic ash, loess and glacial till
Slope: 4 to 15 percent
Elevation: 9000 to 9900 feet
Average annual precipitation: 40 to 45 inches
Average annual air temperature: 32 to 34 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Pinus albicaulis* phase

Present Vegetation

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Pinus albicaulis* phase
- Communities that have an open forest canopy of *Abies lasiocarpa* and *Pinus albicaulis* over a dispersed herbaceous layer of one or more of the following: *Juncus drummondii, Luzula glabrata* var. *hitchcockii, Arnica latifolia, Castilleja rhexifolia, Hieracium gracile, Ranunculus eschscholtzii* and *Sibbaldia procumbens.*

Succession

Early seral conditions, as a result of severe ground disturbance, fire or disease, support few residual trees. Widely dispersed *Pinus albicaulis* may establish from seed caches. *Vaccinium scoparium* is the only component in the sparse shrub layer. The herbaceous layer has low cover and includes *Juncus drummondii* and *Sibbaldia procumbens.*

Mid seral conditions support an open tree canopy dominated by *Pinus albicaulis. Abies lasiocarpa* and *Picea engelmannii* may establish in tree shadows. The shrub layer consists of dispersed *Vaccinium scoparium* colonies. The herbaceous layer is depauperate in tree shadows or shrub patches. Tree and shrub interspaces have high diversity, low cover and are dominated by *Juncus drummondii* and *Sibbaldia procumbens.*

Late seral and near PNC conditions support an open canopy or dispersed islands and stringers of *Abies lasiocarpa. Pinus albicaulis* or *Picea engelmannii* may be present. *Vaccinium scoparium* colonies are present in the otherwise depauperate undergrowth. Tree interspaces are similar to early or mid seral conditions.

Discussion

Individual tree islands or stringers may burn from lightning strikes. Tree interspaces seldom burn because of the sparse cover and moist conditions.

Pinus albicaulis is a slow growing, moderately shade tolerant, long lived tree. *Pinus albicaulis* distribution is strongly influenced by the seed cache locations of the Clark's nutcracker (*Nucifraga columbiana*). *Pinus albicaulis* provides shade and protection for *Abies lasiocarpa* establishment.

Abies lasiocarpa has a spire-like shape, well suited for snow habitats. The branches are tough, short and densely packed together. The lower boughs of the tree often root as they lay on the moist duff-covered ground. The rooted branches produce young leaders that result in vegetative reproduction called layering. As several branches layer, a circle of young trees is formed around the tree. A hollow center is left in the circle or cluster when the mother tree dies and rots away.

Ecology of the herbaceous species is not widely known. One of the common herbs, *Juncus drummondii*, is a strongly tufted perennial that regenerates from matted rootstocks or fibrous roots. It is unclear whether the seeds produced are viable and germinate adequately for reproduction.

The ashy soils of this ecological type influence community composition and development. The surface and subsoil layers have low strength when moist. Root restricting dense basal till is at depths of 20 to 40 inches. As a result of weak anchoring, trees are susceptible to windthrow during late spring. The soil binds phosphate, limiting the availability of this

major nutrient for plant use. Overall plant development is limited by phosphate deficiency.

The species constancy and cover documentation for vegetation is on page 540.

Soils

Name: Winegar series
Taxonomic class: Ashy, amorphic Typic Vitricryands

Typical Pedon Description

Winegar, supporting the *Abies lasiocarpa/Juncus drummondii* community on a 15 percent slope with northeast aspect at 9440 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 4 inches; brown (10YR 5/3) gravelly silt loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; 20 percent pebbles, trace cobbles and stones; strongly acid (pH 5.4); abrupt smooth boundary.

Bw1--4 to 10 inches; yellowish brown (10YR 5/4) loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; 10 percent pebbles, trace cobbles and stones; strongly acid (pH 5.5); clear smooth boundary.

Bw2--10 to 25 inches; light yellowish brown (10YR 6/4) loam, strong brown (10YR 4/6) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine tubular pores; 10 percent pebbles, trace cobbles and stones; moderately acid (pH 5.6); abrupt irregular boundary.

BC--25 to 35 inches; light yellowish brown (10YR 6/4) very gravelly sandy loam; brown (10YR 4/4) moist; massive; soft, very friable, nonsticky and slightly plastic; few very fine roots; common very fine tubular pores; 50 percent gray (10YR 5/1) channer-size fragments of dense basal till, brown (10YR 4/2) moist; 30 percent pebbles, 5 percent cobbles and trace stones; strongly acid (pH 5.5); clear irregular boundary.

Cd--35 to 60 inches; gray (10YR 5/1) dense basal till that crushes to a very gravelly sandy loam, dark grayish brown (10YR 4/2) moist; massive; hard, firm and brittle, nonsticky and nonplastic; few very fine roots following the weathering rind; many very fine and few fine irregular pores; common fine (less than 1/4 inch), dark yellowish brown (10YR 4/4-6), weathering rind around coarse pebbles, cobbles and stones; 30 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1414.
Legal description: about 700 feet south and 100 feet west of the northeast corner of section 15, T. 43 N., R. 117 W., Wyoming
Latitude: 43 degrees, 41 minutes, 43 seconds, north
Longitude: 110 degrees, 51 minutes, 44 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: dense basal till (Cd horizon)
Drainage class: moderately well drained
Ochric epipedon thickness: 2 to 8 inches
Thickness of andic soil properties: 20 to 40 inches
Rock fragment content in the particle-size control section: average 15 to 35 percent
Base saturation: 10 to 40 percent

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam
Rock fragment content: 15 to 25 percent
Pebbles: 15 to 20 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 20 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.0 to 1.25 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 2.0 to 4.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Bw horizons
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 4 or 6 dry or moist
Texture: loam or silt loam

Rock fragment content: 5 to 30 percent
Pebbles: 5 to 25 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 20 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.0 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 2.0 to 4.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 50 to 85 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

BC horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 4 or 6 dry or moist
Texture: loam or sandy loam
Rock fragment content: 35 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Soft dense basal till fragments: 15 to 85 percent
Volcanic glass content: less than 10 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.3 to 1.5 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 1.0 to 3.0 percent
15 bar water retention: 4 to 10 percent on air-dried samples
Phosphate retention: 25 to 60 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: Horizon is discontinuous in some pedons

Cd horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 1 or 2 dry or moist
Texture: sandy loam or loamy sand
Rock fragment content: 25 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Bulk density: 1.8 to 2.1 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/VAGL,VAGL Winegar

- This ecological type occurs at lower elevations on warmer positions.
- In the plant association, *Pseudotsuga menziesii* is a significant part of the tree layer; *Vaccinium globulare* is well represented in the undergrowth.

ABLA/VASC,VASC Castan Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase on Castan soils. It is on north facing escarpments of plateaus in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1225
Landform: escarpments of plateaus
Parent material: local alluvium, colluvium or residuum derived from tephra and loess
Slope: 30 to 50 percent
Elevation: 6500 to 8000 feet
Average annual precipitation: 30 to 60 inches
Average annual air temperature: 30 to 37 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase

Present Vegetation

- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta* dominated communities that have widely dispersed *Abies lasiocarpa.*

Succession

Early seral conditions, as a result of fire, support few trees. *Pinus contorta* may establish from seed. The shrub layer has low cover and moderate species diversity. Common shrubs include *Ribes viscosissimum* and *Amelanchier alnifolia*. The prominent herbaceous layer is dominated by *Carex geyeri*. Forbs are sparse.

Mid seral conditions support a closed tree canopy dominated by *Pinus contorta*. Widely dispersed *Abies lasiocarpa*, *Pinus albicaulis* and *Pseudotsuga menziesii* are present. The shrub layer has moderate cover and is dominated by colonies of *Vaccinium scoparium. Amelanchier alnifolia*, *Lonicera utahensis*, *Ribes viscosissimum*, *Spiraea betulifolia*, or *Vaccinium globulare* may be present. The herbaceous layer has low species diversity and low or moderate cover. *Carex geyeri* is conspicuous. Forbs are sparse.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. Widely dispersed *Pinus albicaulis* may be present. The shrub layer has low cover and the herbaceous layer is depauperate. *Vaccinium scoparium* and *Carex geyeri* are present.

Discussion

Recurring fire and logging keep many areas in *Pinus contorta* dominated stands. Although *Abies lasiocarpa* is the indicated PNC species, stands dominated by *Abies lasiocarpa* seldom occur.

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight. The shrub loses vigor and dies when the tree canopy is removed, and regenerates as the canopy closes.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though annual seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy. *Carex geyeri* develops a dense sod that provides watershed protection.

The volcanic soils of this ecological type influence community composition and development. The soil binds phosphate, limiting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency. Volcanic glass shards are abundant throughout the soil. These shards may impede root and soil fauna development.

The species constancy and cover documentation for vegetation is on page 541.

Soils

Name: Castan series

Taxonomic class: Ashy-skeletal, glassy Humic Vitricryands

Typical Pedon Description

Castan, supporting the *Pinus contorta/Vaccinium globulare* c.t. on a concave 30 percent slope with north aspect at 6840 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A1--0 to 11 inches; brown (10YR 5/3) cobbly silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to moderate fine granular; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots, few medium and coarse roots; many very fine irregular pores; 10 percent pebbles, 10 percent cobbles, trace stones and boulders; moderately acid (pH 5.6); clear smooth boundary.

A2--11 to 16 inches; brown (10YR 5/3) cobbly loam, dark brown (10YR 3/3) moist; moderate fine and medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots, few medium and coarse roots; many very fine tubular pores; 10 percent pebbles, 10 percent cobbles, trace stones and boulders; moderately acid (pH 5.6); clear wavy boundary.

B/E--16 to 30 inches; 80 percent light yellowish brown (10YR 6/4) B material, dark yellowish brown (10YR 4/4) moist, and 20 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, in a fine (less than 1/4 inch) irregular matrix that mixes to a very gravelly sandy loam; moderate medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine roots, few fine, medium and coarse roots; many very fine tubular pores; 40 percent pebbles, 10 percent cobbles, trace stones and boulders; moderately acid (pH 6.0); clear smooth boundary.

E/B--30 to 38 inches; 80 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, and 20 percent light yellowish brown (10YR 6/4) B material, dark yellowish brown (10YR 4/4) moist, in a medium (1/4 to 1/2 inch) irregular matrix that mixes to an extremely gravelly sandy loam; weak medium subangular blocky structure parting to weak fine granular; slightly hard, very friable, nonsticky and nonplastic; common very fine roots, few fine and medium roots; many very fine irregular pores; 50 percent pebbles, 10 percent cobbles, trace stones and boulders; moderately acid (pH 6.0); clear smooth boundary.

B/E'--38 to 49 inches; 50 percent pale brown (10YR 6/3) B material, brown (10YR 4/3) moist, and 50 percent very pale brown (10YR 8/2) E material, light brownish gray (10YR 6/2) moist, in a coarse (greater than 1/2 inch) irregular matrix that mixes to an extremely gravelly sandy loam; weak fine subangular blocky structure (B portion) and weak fine granular structure (E portion); slightly hard (B portion) and soft (E portion), very friable, nonsticky and nonplastic; few very fine roots; many very fine tubular pores (B portion) and many very fine irregular pores (E portion); 50 percent pebbles, 10 percent cobbles, trace stones and boulders; slightly acid (pH 6.2); clear smooth boundary.

BC--49 to 60 inches; pale brown (10YR 6/3) extremely gravelly loamy sand, brown (10YR 4/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine irregular pores; continuous very pale brown (10YR 8/2) caps of uncoated silt grains on cobbles, stones and boulders, light brownish gray (10YR 6/2) moist; 65 percent pebbles, 10 percent cobbles, trace stones and boulders; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1225.

Legal description: about 600 feet west and 50 feet south of the northeast corner of section 14, T. 14 N., R. 44 E., Idaho

Latitude: 44 degrees, 32 minutes, 43 seconds, north

Longitude: 111 degrees, 13 minutes, 53 seconds, west

Range in characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

O horizon thickness: 0 to 2 inches

Umbric epipedon thickness: 10 to 16 inches

Thickness of andic soil properties: 15 to 30 inches

Depth to BC horizon: 30 to 50 inches

A horizons

Hue: 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist

Texture: silt loam, loam or sandy loam

Rock fragment content: 15 to 35 percent

Pebbles: 5 to 25 percent
Cobbles: 5 to 20 percent
Stones: 0 to 10 percent
Volcanic glass content: 30 to 75 percent in the 0.02 to 2.0 mm fraction
Bulk density: 0.90 to 1.30 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

B/E, E/B or B/E' horizons
Hue: 10YR
Value:
B portion - 6 or 7 dry, 4 or 5 moist
E portion - 7 or 8 dry, 5 or 6 moist
Chroma:
B portion - 3 or 4 dry or moist
E portion - 2 or 3 dry or moist
Texture: silt loam, sandy loam or loam
Rock fragment content: 35 to 65 percent
Pebbles: 25 to 50 percent
Cobbles: 5 to 20 percent
Stones or boulders: 0 to 20 percent
Volcanic glass content: 30 to 75 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.2 to 1.0 percent
Phosphate retention: 35 to 70 percent
Base saturation: 30 to 60 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 15 to 85 percent B or E material (by volume)

BC horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 6 or 7 dry, 4 to 6 moist
Chroma: 2 or 3 dry or moist
Texture: loamy sand or loamy coarse sand
Rock fragment content: 60 to 80 percent
Pebbles: 30 to 65 percent
Cobbles: 5 to 30 percent
Stones or boulders: 0 to 20 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Phosphate retention: 35 to 60 percent
Base saturation: 50 to 80 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

ABLA/VASC Oleo
- Soils have less than 35 percent rock fragments.

ABLA/VASC,VASC Dashiki
- Soils have less than 35 percent rock fragments.

ABLA/VASC,VASC Dashiki Ecological Type

Summary

This ecological type is named for the occurrence of the *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase on Dashiki soils. It is on undulating to rolling plateaus in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1570
Landform: plateaus
Parent material: local alluvium derived from loess and tephra over tephra
Slope: 2 to 12 percent
Elevation: 7200 to 8300 feet
Average annual precipitation: 35 to 65 inches
Average annual air temperature: 32 to 34 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase

Present Vegetation

- *Abies lasiocarpa/Vaccinium scoparium* p.a., *Vaccinium scoparium* phase
- *Pinus contorta/Vaccinium scoparium* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- Herbaceous communities dominated by *Carex geyeri.*

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed. The shrub layer has low cover and is dominated by *Vaccinium scoparium.* The prominent herbaceous layer is dominated by *Calamagrostis rubescens* and *Carex geyeri.* Forbs are sparse.

Mid seral conditions support a closed tree canopy dominated by *Pinus contorta. Abies lasiocarpa* seedlings and saplings are common. Widely dispersed *Pinus albicaulis* may be present. *Vaccinium scoparium* has moderate cover and dominates the shrub layer. The herbaceous layer has very low species diversity and depauperate or low cover. *Carex geyeri* may be conspicuous.

Late seral and near PNC conditions support a closed *Abies lasiocarpa* canopy. Widely dispersed *Pinus albicaulis* may be present. The shrub layer has low cover and the herbaceous layer is depauperate. *Vaccinium scoparium* and *Carex geyeri* are present.

Discussion

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight. The shrub loses vigor and dies when the tree canopy is removed, and regenerates as the canopy closes.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though annual seed production is low, seeds stored in the soil for several decades may germinate following a disturbance that opens the canopy. *Carex geyeri* develops a dense sod that provides watershed protection.

The ashy soils of this ecological type influence community composition and development. A high aluminum saturation in the soil retards root growth. The soil binds phosphate, restricting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency.

The species constancy and cover documentation for vegetation is on page 542.

Soils

Name: Dashiki series
Taxonomic class: Ashy, glassy Typic Vitricryands

Typical Pedon Description

Dashiki, supporting the *Pinus contorta/Vaccinium scoparium* c.t. on an undulating 4 percent slope with

a north aspect at 7820 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A1--0 to 3 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; trace pebbles and cobbles; strongly acid (pH 5.5); abrupt smooth boundary.

A2--3 to 9 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots, common coarse and medium roots; many very fine irregular pores; 5 percent pebbles and trace cobbles; moderately acid (pH 5.7); gradual smooth boundary.

Bw--9 to 31 inches; light yellowish brown (10YR 6/4) gravelly silt loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots; many very fine tubular and few fine tubular pores; 15 percent pebbles and trace cobbles; moderately acid (pH 5.9); clear wavy boundary.

2BC--31 to 37 inches; light brownish gray (10YR 6/2) gravelly loamy coarse sand, grayish brown (10YR 5/2) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; many fine irregular pores; 30 percent pebbles, trace cobbles and stones; slightly acid (pH 6.5); clear broken boundary.

2C--37 to 75 inches; variegated stratified gravelly coarse sand to extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; many fine and medium irregular pores; 20 to 80 percent pebbles, 10 percent cobbles and trace stones; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1570.

Legal description: about 600 feet east and 200 feet north of the southwest corner of section 33, T. 12 N., R. 45 E., Idaho

Latitude: 44 degrees, 19 minutes, 12 seconds, north

Longitude: 111 degrees, 08 minutes, 36 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

O horizon thickness: 1/2 to 2 inches

Ochric epipedon thickness: 3 to 10 inches

Thickness of andic soil properties: 28 to 35 inches

Depth to 2C horizon: 30 to 40 inches

Base saturation: less than 20 percent

A horizons

Hue: 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 , 3 or 4 dry or moist

Texture: silt loam

Rock fragment content: 0 to 15 percent

Pebbles: 0 to 10 percent

Cobbles: 0 to 5 percent

Stones: 0 to 5 percent

Volcanic glass content: 30 to 75 percent in the 0.02 to 2.0 mm fraction

Bulk density: 0.9 to 1.1 grams per cubic centimeter

Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent

15-bar water retention: 4 to 10 percent on air-dried samples

Phosphate retention: 40 to 70 percent

Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Bw horizon

Hue: 10YR

Value: 3 or 4 moist, 5 or 6 dry

Chroma: 3, 4 or 6 dry or moist

Texture: loam or silt loam

Rock fragment content: 5 to 35 percent

Pebbles: 5 to 30 percent

Cobbles: 0 to 5 percent

Stones or boulders: 0 to 5 percent

Volcanic glass content: 30 to 75 percent in the 0.02 to 2.0 mm fraction

Bulk density: 1.1 to 1.3 grams per cubic centimeter

Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent

15-bar water retention: 4 to 10 percent on air-dried samples

Phosphate retention: 40 to 70 percent

Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

2BC horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 2 or 3 dry or moist
Texture: loamy coarse sand
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 50 percent
Cobbles: 0 to 5 percent
Stones or boulders: 0 to 5 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Phosphate retention: 35 to 60 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

2C horizon
Color: variegated
Texture: stratified gravelly coarse sand to extremely gravelly coarse sand
Rock fragment content: 15 to 90 percent
Pebbles: 10 to 90 percent
Cobbles: 0 to 10 percent
Stones or boulders: 0 to 5 percent
Volcanic glass content: greater than 85 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

ABLA/VASC Oleo
- Soils have a dark colored surface layer greater than 10 inches thick and have an argillic horizon.

ABLA/VASC,VASC Castan
- Soils have greater than 35 percent rock fragments.

Alpine Graminoid Fritz Ecological Type

Summary

This ecological type is named for the occurrence of the alpine graminoid communities on Fritz soils. It is on windswept mountain summits in the alpine zone.

Environmental Setting

Ecological Unit: 1130
Landform: mountains
Parent material: local alluvium and residuum derived from loess and limestone
Slope: 4 to 30 percent
Elevation: 8400 to 11,000 feet
Average annual precipitation: 16 to 22 inches
Average annual air temperature: 37 to 43 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- alpine graminoid communities

Present Vegetation

- Herbaceous communities dominated by short (less than 5 inches), sod-forming graminoids. Species include: *Carex rupestris, Carex elynoides, Poa rupicola, Poa cusickii* or *Festuca idahoensis.*

Succession

Early seral conditions, as a result of severe ground disturbance, support a depauperate herbaceous community. A sparse shrub layer may develop if *Ribes montigenum* establishes from soil-stored seed or *Artemisia frigida* sprouts from roots. The herbaceous layer has low cover and is codominated by graminoids and forbs. *Festuca idahoensis*, *Poa sandbergii*, *Antennaria microphylla*, *Taraxacum officinale* or *Trifolium* species may be present. Early seral conditions may persist for prolonged periods as a result of the short growing season and harsh climatic conditions.

Mid seral conditions support a depauperate shrub layer that includes *Artemisia frigida* or *Ribes montigenum*. The herbaceous layer has low or moderate cover, high species diversity and is dominated by graminoids. *Carex elynoides*, *Carex rupestris*, *Festuca idahoensis*, *Poa cusickii* or *Poa rupicola* may be present.

Late seral conditions support few residual shrubs. *Artemisia frigida* or *Ribes montigenum* may be present. The herbaceous layer has high cover and is dominated by graminoids. *Agropyron spicatum*, *Carex elynoides*, *Festuca idahoensis*, *Festuca ovina*, *Poa cusickii*, *Poa rupicola* or *Poa sandbergii* may be present. Forbs have low individual cover and high species diversity. Common forbs include *Achillea millefolium*, *Agoseris glauca*, *Arenaria nuttallii*, *Erigeron compositus*, *Frasera speciosa*, *Ivesia gordonii*, *Oxytropis sericea*, *Pedicularis parryi*, *Potentilla diversifolia*, *Potentilla ovina*, *Saxifraga rhomboidea* or *Sedum lanceolatum.*

Discussion

The windswept mountain summits of this ecological type influence community composition and development. A portion of the winter snowfall is removed by wind before the snow melts and becomes available for plant use. In the absence of a protective snow cover, winds desiccate the herbaceous layer and dry the soil. The soil is dry for significant periods in late summer and autumn as a result of ineffective winter snowfall, desiccation by wind and infrequent summer rains.

The species constancy and cover documentation for vegetation is on page 543.

Soils

Name: Fritz series
Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Typical Pedon Description

Fritz, supporting an alpine graminoid community on a 20 percent slope with northwest aspect at 9880 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, black (10YR 2/1) moist; weak coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; common hard pendants of carbonates on underside of rock fragments; slightly effervescent; 25 percent pebbles

and 5 percent cobbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

A2--3 to 12 inches; brown (10YR 5/3) very gravelly silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; common hard pendants of carbonates and few hard pendants of silica on underside of rock fragments; strongly effervescent; 40 percent pebbles and 5 percent cobbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

Bkq--12 to 60 inches; light yellowish brown (10YR 6/4) extremely gravelly loam, yellowish brown (10YR 5/4) moist; massive; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine and few fine tubular pores; many hard pendants of carbonates and common hard pendants of silica on underside of rock fragments; many very fine threads and seams of soft powdery lime in matrix; violently effervescent; 45 percent pebbles and 20 percent cobbles; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 1130
Legal description: about 1150 feet north and 1200 feet west of the southeast corner of section 12, T. 12 N., R. 29 E., Idaho
Latitude: 44 degrees, 22 minutes, 58 seconds, north
Longitude: 112 degrees, 56 minutes, 18 seconds, west

Range in characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 8 to 15 inches
Depth to calcic horizon: 0 to 15 inches
Calcium carbonate equivalent in the mineralogy control section: greater than 40 percent in the less than 20 mm fraction

A1 horizon
Hue: 10YR or 2.5Y
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 15 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 15 to 45 percent in the less than 2 mm fraction
Effervescence: slightly effervescent or strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

A2 horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam, silt loam or sandy loam
Clay content: 7 to 18 percent
Rock fragment content: 40 to 70 percent
Pebbles: 40 to 65 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 25 to 60 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq horizon
Hue: 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 8 to 18 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 75 percent
Cobbles: 5 to 30 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 40 to 80 percent in the less than 2 mm fraction
Effervescence: violently effervescent or strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

PIFL2/LEKI2 Fritz
- This ecological type occurs at lower elevations on warmer positions.
- In the plant association, a *Pinus flexilis* canopy is present; *Leucopoa kingii* is well represented in the undergrowth.

PSME/BERE,SYOR2 Fritz
- This ecological type occurs at lower elevations on warmer positions.
- In the plant association, a *Pseudotsuga menziesii* canopy is present; *Berberis repens* is well represented in the undergrowth.

ARARA/FEID Mountainboy Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia arbuscula* ssp. *arbuscula/Festuca idahoensis* p.a. on Mountainboy soils. It is on windswept fan remnants in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1131
Landform: fan remnants
Parent material: alluvium derived from limestone and loess
Slope: 2 to 8 percent
Elevation: 7350 to 7700 feet
Average annual precipitation: 12 to 14 inches
Average annual air temperature: 37 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia arbuscula* ssp. *arbuscula/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia arbuscula* ssp. *arbuscula/Festuca idahoensis* p.a.
- Communities that have a shrub layer of *Artemisia arbuscula* ssp. *arbuscula* with an herbaceous layer dominated by *Poa secunda*, *Agropyron spicatum* or *Koeleria nitida.*

Succession

Early seral conditions result from high intensity fire or severe ground disturbance. *Artemisia arbuscula* ssp. *arbuscula* may establish from wind dispersed seed. The herbaceous layer has low cover and is dominated by annuals, biennials or short lived perennials. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 5 to 10 years.

Mid seral conditions support an open to closed shrub layer dominated by *Artemisia arbuscula* ssp. *arbuscula*. The herbaceous layer has low or moderate cover and is dominated by graminoids. *Agropyron spicatum*, *Festuca idahoensis*, *Koeleria nitida*, or *Poa* species may be present. *Haplopappus stenophyllus* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia arbuscula* ssp. *arbuscula*. The herbaceous layer has low to moderate cover and is dominated by *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 30 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Agropyron spicatum is a drought resistant, perennial bunchgrass that reproduces from seed. The seeds have low viability. First year seedlings are slow growing and easily outcompeted by more aggressive graminoids or forbs.

Festuca idahoensis is a fire sensitive, perennial bunchgrass that reproduces by seed. Although seed production is high, germination rates are low. The root crowns may be severely damaged by summer and fall fire as a result of prolonged smoldering in the dense tuft of leaves and culms.

The shallow, windswept soils of this ecological type influence community composition and development. Roots are restricted by a thin, cemented pan at depths of 15 to 20 inches. The soil has a low capacity to supply water for plant use as a result of the shallow rooting zone, desiccation by wind and infrequent summer rains.

The species constancy and cover documentation for vegetation is on page 545.

Soils

Name: Mountainboy series
Taxonomic class: Loamy-skeletal, carbonatic, shallow Duric Cryoborolls

Typical Pedon Description

Mountainboy, supporting the *Artemisia arbuscula* ssp. *arbuscula/Agropyron spicatum* community on a 2 percent slope with east aspect at 7150 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 6 inches; brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium and coarse roots; many very fine and fine irregular pores; coats of soft powdery lime on underside of rock fragments; strongly effervescent; 20 percent pebbles; slightly alkaline (pH 7.8); clear smooth boundary.

AB--6 to 11 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine and coarse roots, few medium roots; many very fine and fine irregular pores; coats of soft powdery lime on underside of rock fragments; strongly effervescent; 25 percent pebbles; moderately alkaline (pH 8.1); clear wavy boundary.

Bk--11 to 16 inches; light gray (10YR 7/2) very gravelly loam, pale brown (10YR 6/3) moist; weak fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and coarse roots; common very fine and fine irregular pores; coats of soft powdery lime on underside of rock fragments; violently effervescent; 40 percent pebbles; moderately alkaline (pH 8.4); abrupt wavy boundary.

2Bkq--16 to 19 inches; light gray (10YR 7/2) weakly cemented extremely gravelly coarse sandy loam, light yellowish brown (10YR 6/4) moist; massive; hard, firm, nonsticky and nonplastic; few very fine roots; common fine and medium irregular pores; 60 percent of horizon is weakly cemented by carbonates and silica, 40 percent is non- cemented; violently effervescent; 65 percent pebbles and 5 percent cobbles; very strongly alkaline (pH 9.1); abrupt wavy boundary.

2Bkqm--19 to 20 inches; light gray (10YR 7/2) strongly cemented duripan, light yellowish brown (10YR 6/4) moist; root mat on top of pan; abrupt wavy boundary.

2Bkq' --20 to 60 inches; variegated extremely gravelly loamy coarse sand; single grain; loose, nonsticky and nonplastic; many fine and medium irregular pores; hard pendants of carbonate and silica on underside of rock fragments; violently effervescent; 80 percent pebbles and 5 percent cobbles; very strongly alkaline (pH 9.1).

Typical Pedon Location

Located in Custer-Lemhi Area Soil Survey.

Legal description: about 1900 feet east and 500 feet south of the northwest corner of section 5, T. 11 N., R. 28 E., Idaho

Latitude: 44 degrees, 19 minutes, 13 seconds, north

Longitude: 113 degrees, 08 minutes, 53 seconds, west

Range in Characteristics

Profile

Depth class: shallow (15 to 20 inches)

Restrictive feature: thin cemented pan (2Bkqm horizon)

Drainage class: well drained

Mollic epipedon thickness: 8 to 13 inches

Thickness of duripan: 1/4 to 2 inches

Clay content the in particle-size control section: average 10 to 18 percent

Rock fragment content in the particle-size control section: average 35 to 65 percent

Calcium carbonate equivalent in the mineralogy control section: average 55 to 65 percent in the less than 20 mm fraction

A horizon

Hue: 10YR

Value: 4 or 5 dry, 2 or 3 moist

Chroma: 2 or 3 dry or moist

Texture: silt loam

Clay content: 10 to 15 percent

Rock fragment content: 15 to 30 percent

Pebbles: 15 to 30 percent

Cobbles: 0 percent

Stones: 0 percent

Salinity: 0 to 2 mmhos/cm

Sodium absorption ration: 0 to 1 percent

Calcium carbonate equivalent: 35 to 60 percent in the less than 2 mm fraction

Effervescence: strongly effervescent

Reaction: slightly alkaline (pH 7.4 to 7.8)

AB and Bk horizons

Hue: 10YR

Value: 5, 6 or 7 dry; 3, 4, 5 or 6 moist

Chroma: 2 or 3 dry or moist

Texture: silt loam or loam

Clay content: 10 to 20 percent

Rock fragment content: 15 to 45 percent

Pebbles: 15 to 45 percent

Cobbles: 0 to 5 percent
Stones: 0 percent
Salinity: 0 to 2 mmhos/cm
Sodium absorption ratio: 0 to 5 percent
Calcium carbonate equivalent: 35 to 70 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

2Bkq horizon
Hue: 10YR
Value: 6 or 7 dry or moist
Chroma: 2, 3 or 4 dry or moist
Texture: coarse sandy loam
Clay content: 3 to 5 percent
Rock fragment content: 70 to 90 percent
Pebbles: 65 to 80 percent
Cobbles: 5 to 10 percent
Stones: 0 percent
Salinity: 0 to 2 mmhos/cm
Sodium absorption ratio: 1 to 5 percent
Calcium carbonate equivalent: 70 to 80 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: strongly alkaline or very strongly alkaline (pH 8.5 to 11.0)

2Bkq' horizon
Color: variegated
Texture: coarse sandy loam or loamy coarse sand
Clay content: 5 to 10 percent
Rock fragment content: 70 to 90 percent
Pebbles: 65 to 80 percent
Cobbles: 5 to 10 percent
Stones: 0 percent
Salinity: 0 to 4 mmhos/cm
Sodium absorption ratio: 6 to 10 percent
Calcium carbonate equivalent: 70 to 80 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: strongly alkaline or very strongly alkaline (pH 8.5 to 11.0)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ARNO4/AGSP Simeroi Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia nova/Agropyron spicatum* p.a. on Simeroi soils. It is on fan remnants and south facing foothill sideslopes in the warm, dry portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1125 and 1126
Landform: fan remnants and foothills
Parent material: colluvium or local alluvium derived from limestone and loess
Slope: 4 to 60 percent
Elevation: 5500 to 8800 feet
Average annual precipitation: 10 to 11 inches
Average annual air temperature: 38 to 40 degrees F
Soil temperature regime: frigid
Soil moisture regime: aridic

Vegetation

Potential Natural Community

- *Artemisia nova/Agropyron spicatum* p.a.

Present Vegetation

- *Artemisia nova/Agropyron spicatum* p.a.
- Communities that have an open, tall shrub layer of *Cercocarpus ledifolius* var. *intercedens* over an herbaceous layer dominated by *Agropyron spicatum*.
- Shrub communities dominated by a closed layer of *Cercocarpus ledifolius* var. *intercedens* over a depauperate herbaceous layer.

Succession

Early seral conditions, as a result of fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Cercocarpus ledifolius* var. *intercedens*, *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens*. *Poa sandbergii*, annuals, biennials, or short lived perennials may dominate the conspicuous herbaceous layer.

Mid seral conditions support a shrub layer with variable cover dominated by *Artemisia nova* or *Cercocarpus ledifolius* var. *intercedens*. *Chrysothamnus viscidiflorus* or *Tetradymia canescens* are present. The herbaceous layer has low or moderate cover and is dominated by *Agropyron spicatum* or *Poa sandbergii*. *Castilleja angustifolia*, *Crepis* species, *Haplopappus stenophyllus* or *Phlox hoodii* may be conspicuous in the diverse forb component.

Late seral conditions support an open shrub layer dominated by *Artemisia nova*. The herbaceous layer is depauperate or has low cover. *Agropyron spicatum* and forbs are conspicuous.

Discussion

Fire is rare on this ecological type because fuel is sparse. Most fires cause regression from late seral to early seral communities.

Cercocarpus ledifolius var. *intercedens* is a long lived shrub that reproduces from seed. Seed production may be sporadic or cyclic. Germination requirements and conditions for seedling establishment are not well understood.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia nova is a low growing shrub that reproduces from wind dispersed seed. Abundant seed is produced every year. Bare mineral soil is needed for successful seed germination.

Agropyron spicatum is a drought resistant, perennial bunchgrass that reproduces from seed. The seeds have low viability. First year seedlings are slow growing and easily outcompeted by more aggressive graminoids or forbs.

The species constancy and cover documentation for vegetation is on page 546.

Soils

Name: Simeroi series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Xeric Haplocalcids

Typical Pedon Description

Simeroi, supporting the *Artemisia nova/Agropyron spicatum* p.a. on a 60 percent slope with a south aspect at 6800 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; brown (10YR 5/3) very gravelly silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; few hard pendants of carbonates and common coats of soft powdery lime on underside of rock fragments; strongly effervescent; 35 percent pebbles, 5 percent cobbles and trace stones; moderately alkaline (pH 8.0); abrupt smooth boundary.

A2--3 to 10 inches; pale brown (10YR 6/3) very gravelly silt loam, brown (10YR 4/3) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; many hard pendants of carbonates and continuous coats of soft powdery lime on underside of rock fragments; violently effervescent; 35 percent pebbles, 10 percent cobbles and trace stones; moderately alkaline (pH 8.2); abrupt smooth boundary.

Bk--10 to 24 inches; very pale brown (10YR 8/3) extremely gravelly sandy loam, light yellowish brown (10YR 6/4) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine irregular pores; continuous coats of soft powdery lime on rock fragments; many fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 40 percent pebbles, 15 percent cobbles and 5 percent stones; moderately alkaline (pH 8.2); gradual smooth boundary.

Bkq--24 to 60 inches; very pale brown (10YR 7/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine irregular pores; common coats of soft powdery lime and few hard pendants of silica on underside of rock fragments; common fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 40 percent pebbles, 15 percent cobbles and 5 percent stones; moderately alkaline (pH 8.2).

Typical Pedon Location

Located in ecological unit 1126.
Legal description: about 1000 feet north and 1000 feet east of the southwest corner of section 21, T. 9 N., R. 32 E., Idaho
Latitude: 44 degrees, 05 minutes, 25 seconds, north
Longitude: 111 degrees, 42 minutes, 35 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 5 to 10 inches
Calcium carbonate equivalent in the mineralogy control section: 40 to 70 percent in the less than 20 mm fraction

A horizons
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 18 percent
Rock fragment content: 35 to 80 percent
Pebbles: 30 to 65 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 5 to 70 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk or Bkq horizons
Hue; 10YR or 2.5Y
Value: 6, 7 or 8 dry; 4, 5 or 6 moist

Chroma: 2 or 3 dry, 3 or 4 moist
Texture: loam or sandy loam
Clay content: 4 to 15 percent
Rock fragment content: 40 to 85 percent
Pebbles: 40 to 80 percent
Cobbles: 0 to 15 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 40 to 70 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Related Types, Mosaics and Ecotones

ARTRW8/ARARA Simeroi

- This ecological type occurs on slightly cooler positions.
- In the plant association, *Artemisia tridentata* ssp. *wyomingensis* or *Artemisia arbuscula* ssp. *arbuscula* dominates the shrub layer.

ARTRP4/ARART Trude Mosaic

Summary

This mosaic is named for a blending of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. and *Artemisia arbuscula* ssp. *thermopola/Festuca idahoensis* p.a. on Trude soils. It is on droughty outwash plains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1400 and 1401
Landform: outwash plains
Parent material: mixed alluvium
Slope: 0 to 4 percent
Elevation: 6100 to 6400 feet
Average annual precipitation: 24 to 32 inches
Average annual air temperature: 36 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

A mosaic of:

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia arbuscula* ssp. *thermopola/Festuca idahoensis* p.a.

Present Vegetation

A mosaic of:

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia arbuscula* ssp. *thermopola/Festuca idahoensis* p.a.
- Communities that have a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia arbuscula* ssp. *thermopola* with an herbaceous layer dominated by *Agropyron spicatum,* other native and non-native grasses, *Eriogonum heracleoides,* or *Antennaria* sp.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support an open shrub layer dominated by *Chrysothamnus viscidiflorus*. *Agropyron spicatum*, *Lupinus* species, annuals, biennials, or short lived perennials may dominate the conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support an open shrub layer codominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* and *Artemisia arbuscula* ssp. *thermopola*. The species occur as individual 1/10 to 1/4 acre patches. *Chrysothamnus viscidiflorus* or *Purshia tridentata* may be present. The herbaceous layer has moderate cover and is codominated by graminoids and forbs. *Festuca idahoensis*, *Stipa occidentalis*, *Koeleria nitida*, *Eriogonum heracleoides*, *Eriogonum umbellatum*, or *Lupinus argenteus* may be conspicuous.

Late seral conditions support an open shrub layer dominated by patches of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* and *Artemisia arbuscula* ssp. *thermopola*. *Purshia tridentata* may be present. The herbaceous layer has low to moderate cover and is dominated by *Festuca idahoensis* or *Koeleria nitida*. Forbs have low diversity.

Discussion

Frequent, low intensity fires favor mid seral conditions. High intensity fires cause regression from late seral communities to earlier seral conditions.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Lupinus species have deep tap roots and can survive disturbance associated with scarification or fire. They regenerate by root sprouting and germination of buried seed. Increased sunlight and decreased competition allow the forbs to increase cover in the early successional stages. *Lupinus* species have a significant role in the fertility of this mosaic. The forbs

generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The sandy soils of this mosaic influence community composition and development. The soils have loamy surface and subsoil layers, 20 to 25 inches thick, over a sandy substratum. These layers retain little moisture following snowmelt and allow moisture from summer rains to percolate deep into the substratum. Soil moisture conditions are adequate for the establishment of deep rooted shrubs and are too droughty for forested or mesic forb communities.

The species constancy and cover documentation for vegetation is on page 547.

Soils

Name: Trude series
Taxonomic class: Sandy-skeletal, mixed Dystric Cryochrepts

Typical Pedon Description

Trude, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community on a 1 percent slope at 6290 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 8 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular and few fine tubular pores; 20 percent pebbles; moderately acid (pH 6.0); clear smooth boundary.

Bw--8 to 21 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots, few medium roots; few fine irregular pores; 30 percent pebbles; moderately acid (pH 6.0); gradual wavy boundary.

2C--21 to 60 inches; variegated stratified coarse sand to extremely gravelly coarse sand; single grain; loose; few very fine and fine roots; many coarse irregular pores; few medium prominent bands of soft Fe accumulations; 50 percent pebbles after mixing; slightly acid (pH 6.2).

Typical Pedon Location

Located in ecological unit 1400.

Legal description: about 2000 feet north and 1000 feet west of the southeast corner of section 1, T. 12 N., R. 43 E., Idaho
Latitude: 44 degrees, 23 minutes, 40 seconds, north
Longitude: 111 degrees, 19 minutes, 05 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 4 to 8 inches
Depth to 2C horizon: 20 to 25 inches
Rock fragment content in the particle-size control section: average 35 to 60 percent
Base saturation: 30 to 60 percent

A horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 2 or 3 moist
Chroma: 3 or 4 dry or moist
Texture: sandy loam
Clay content: 6 to 14 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bw horizon
Hue: 10YR
Value: 5 or 6 dry; 2, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: loam or coarse sandy loam
Clay content: 6 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 35 percent
Cobbles: 0 to 10 percent
Stones: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

2C horizon
Color: variegated
Texture: stratified coarse sand through extremely gravelly coarse sand
Clay content: 0 to 6 percent
Rock fragment content: 35 to 90 percent after mixing
Pebbles: 35 to 80 percent after mixing
Cobbles: 0 to 10 percent

Stones: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ARTRP4/FEID Cryoborolls Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Cryoboroll soils. It is on fan remnants and foothills in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1313
Landform: fan remnants and foothills
Parent material: colluvium or local alluvium derived from igneous rocks and loess
Slope: 8 to 35 percent
Elevation: 6200 to 7600 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 35 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Communities that have an open shrub layer of *Tetradymia canescens* with an herbaceous layer of *Agropyron spicatum.*

Comment: *Artemisia tridentata* ssp. *wyomingensis* is present in most areas.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens. Poa* species, *Lupinus* species, annuals, biennials, or short lived perennials may dominate a conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support a dispersed to open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora. Artemisia tridentata* ssp. *wyomingensis*, *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus*, *Symphoricarpos oreophilus* or *Tetradymia canescens* may be present. *Agropyron spicatum*, *Festuca idahoensis* and other graminoids dominate a prominent, highly diverse herbaceous layer. Species of *Antennaria*, *Astragalus*, *Eriogonum*, *Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora. Artemisia tridentata* ssp. *wyomingensis* or *Symphoricarpos oreophilus* may be present. The herbaceous layer has low to moderate cover and is dominated by *Agropyron spicatum* or *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires cause regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species are prominent forb components in early and mid seral conditions. Their nitrogen-fixing properties have a significant role in soil fertility.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 553.

Soils

Name: Cryoborolls family
Taxonomic class: Loamy-skeletal, mixed, superactive Typic Cryoborolls

Typical Pedon Description

Cryoborolls, supporting the *Artemisia tridentata* ssp. var. *pauciflora/Festuca Idahoensis* p.a. on a 20 percent slope with northeast aspect at 6940 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 7 inches; dark grayish brown (10YR 4/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak very coarse subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine and medium roots; many very fine irregular pores; 25 percent pebbles, trace flagstones and stones; slightly alkaline (pH 7.4); abrupt smooth boundary.

A2--7 to 15 inches; brown (7.5YR 4/2) gravelly silt loam, dark brown (7.5YR 3/2) moist; weak coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots, few fine and medium roots; many very fine and few fine tubular pores; 20 percent pebbles, 5 percent flagstones and trace stones; slightly alkaline (pH 7.4); clear smooth boundary.

Bw1--15 to 27 inches; brown (10YR 5/3) very flaggy silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; many very fine tubular pores; 20 percent pebbles, 20 percent flagstones and 5 percent stones; slightly alkaline (pH 7.4); clear wavy boundary.

Bw2--27 to 38 inches; pale brown (10YR 6/3) extremely flaggy loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, few medium and coarse roots; many very fine tubular pores; 20 percent pebbles, 45 percent flagstones and 10 percent stones; slightly alkaline (pH 7.4); abrupt wavy boundary.

Bk1--38 to 53 inches; very pale brown (10YR 8/2 mixed) extremely flaggy loam, pale brown (10YR 6/3 mixed) moist; massive; hard, friable, nonsticky and slightly plastic; few very fine and medium roots; common very fine tubular pores; continuous coats of soft powdery lime, many hard pendants of carbonates and few hard pendants of silica on underside of rock fragments; many fine through coarse (less than 3/4 inch) masses of soft powdery lime in matrix and lining pores; violently effervescent; 20 percent pebbles, 45 percent flagstones and 10 percent stones; moderately alkaline (pH 8.4); diffuse wavy boundary.

Bk2--53 to 60 inches; pale yellow (2.5Y 7/3) very flaggy sandy loam, olive brown (2.5Y 4/3) moist; massive; slightly hard, friable, nonsticky and nonplastic; many very fine and few fine tubular pores; common fine (less than 1/8 inch) masses of soft powdery lime lining pores; violently effervescent; 25 percent pebbles, 15 percent flagstones and trace stones; moderately alkaline (pH 8.4).

Typical Pedon Location

Located in ecological unit 1313.
Legal description: about 50 feet west and 1250 feet north of the southeast corner of section 8, T. 10 N., R. 32 E., Idaho
Latitude: 44 degrees, 12 minutes, 29 seconds, north
Longitude: 112 degrees, 41 minutes, 47 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 7 to 16 inches
Depth to carbonates and calcic horizon: 20 to 40 inches

A horizons
Hue: 7.5YR or 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 25 percent
Flagstones: 0 to 10 percent
Stones: 0 to 5 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bw horizons
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 15 to 18 percent
Rock fragment content: 35 to 80 percent
Pebbles: 15 to 40 percent
Flagstones: 15 to 45 percent
Stones: 0 to 10 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bk1 horizon
Hue: 10YR or 2.5Y
Value, mixed: 7 or 8 dry, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 7 to 16 percent
Rock fragment content: 60 to 90 percent
Pebbles: 15 to 30 percent
Flagstones: 40 to 50 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 5 to 40 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Bk2 horizon
Hue: 10YR or 2.5Y
Value, mixed: 6 or 7 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 2 to 10 percent
Rock fragment content: 35 to 90 percent
Pebbles: 15 to 40 percent
Flagstones: 10 to 45 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 5 to 20 percent in the less than 2 mm fraction
Effervescence: strongly or violently effervescent
Reaction: slightly or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

ARTRP4/FEID Monida
- Soils have an argillic horizon and less than 35 percent rock fragments.

ARTRP4/FEID Quirt
- Soils are clayey and have less than 35 percent rock fragments.

ARTRP4/FEID Raynoldson
- Soils have dark colored surface layers that are greater than 16 inches thick.

ARTRP4/FEID Zeale
- Soils have carbonates in the surface layer.

ARTRP4/FEID Zeebar
- Soils lack carbonates.

ARTRP4/FEID Monida Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Monida soils. It is on fan remnants, foothills, mountains and moraines in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1128, 1133 and 1145
Landform: fan remnants, foothills, moraines and mountains
Parent material: local alluvium or colluvium derived from calcareous siltstone, sandstone and loess
Slope: 4 to 40 percent
Elevation: 6000 to 9600 feet
Average annual precipitation: 14 to 19 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Communities that have an open shrub layer of *Tetradymia canescens* with an herbaceous layer dominated by *Festuca idahoensis* or *Agropyron spicatum*.
- Herbaceous communities dominated by *Festuca idahoensis*.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens*. *Poa sandbergii*, *Lupinus* species, annuals, biennials, or short lived perennials may dominate a conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support a dispersed to open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens* may be present. *Agropyron spicatum*, *Festuca idahoensis* and other graminoids dominate a prominent, highly diverse herbaceous layer. Species of *Antennaria*, *Astragalus*, *Eriogonum*, *Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. The low to moderate cover in the herbaceous layer is dominated by *Agropyron spicatum* or *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species, prominent components in early and mid seral conditions, have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 549.

Soils

Name: Monida series

Taxonomic class: Fine-loamy, mixed, superactive Argic Cryoborolls

Typical Pedon Description

Monida, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 17 percent slope with south aspect at 6625 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 2 inches; very dark grayish brown (10YR 3/2) silt loam, very dark brown (10YR 2/2) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; slightly alkaline (pH 7.4); abrupt smooth boundary.

A2--2 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate very coarse subangular blocky structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few fine and medium tubular pores; slightly alkaline (pH 7.6); clear smooth boundary.

Bt1--7 to 12 inches; grayish brown (2.5Y 5/2) silty clay loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse subangular blocky structure parting to moderate fine subangular blocky; hard, firm, slightly sticky and plastic; few very fine and common fine roots; few fine and medium tubular pores; many distinct, very dark brown (10YR 2/2) moist, clay films on ped faces and lining pores; slightly alkaline (pH 7.6); clear smooth boundary.

Bt2--12 to 27 inches; light olive brown (2.5Y 5/3) clay loam, olive brown (2.5Y 4/3) moist; strong medium prismatic structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and plastic; few very fine and common fine roots, few medium roots; common fine tubular pores; many distinct, dark grayish brown (10YR 4/2) moist, clay films on ped faces and lining pores; slightly alkaline (pH 7.6); gradual smooth boundary.

Btk--27 to 38 inches; pale yellow (2.5Y 7/3) loam, light olive brown (2.5Y 5/3) moist; weak coarse prismatic structure parting to moderate coarse subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many fine tubular pores; common distinct, olive brown (2.5Y 4/3) moist, clay films on ped faces and lining pores; common filaments and few fine (less than 5 mm) masses of soft powdery lime in matrix; strongly effervescent; moderately alkaline (pH 8.0); gradual smooth boundary.

Bk--38 to 60 inches; pale yellow (2.5Y 7/3) loam, light olive brown (2.5Y 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; many fine tubular pores; common filaments and few fine (less than 5 mm) masses of soft powdery lime in matrix; violently effervescent; moderately alkaline (pH 8.0); gradual smooth boundary.

Typical Pedon Location

Located in ecological unit 1145.

Legal description: about 2225 feet south and 450 feet west of the northeast corner of section 7, T. 13 N., R. 37 E., Idaho

Latitude: 44 degrees, 28 minutes, 08 seconds, north

Longitude: 112 degrees, 08 minutes, 33 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 7 to 16 inches
Depth to carbonates: 10 to 40 inches
Depth to calcic horizon: 15 to 50 inches

A horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bt horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry or moist
Texture: silty clay loam or clay loam
Clay content: 27 to 35 percent
Rock fragment content: 0 to 25 percent
Pebbles: 0 to 25 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Btk horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1, 2 or 3 dry; 2, 3 or 4 moist
Texture: loam or silt loam
Clay content: 18 to 27 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 5 to 15 percent in the less than 2 mm fraction
Effervescence: slightly effervescent or strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1, 2 or 3 dry; 2, 3 or 4 moist
Texture: loam or silt loam
Clay content: 12 to 18 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 15 to 40 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Related Types, Mosaics and Ecotones

ARTRP4/FEID Cryoborolls
- Soils have greater than 35 percent rock fragments and lack an argillic horizon.

ARTRP4/FEID Quirt
- Soils are clayey.

ARTRP4/FEID Raynoldson
- Soils have greater than 35 percent rock fragments and lack an argillic horizon.

ARTRP4/FEID Zeale
- Soils have greater than 35 percent rock fragments and lack an argillic horizon.

ARTRP4/FEID Zeebar
- Soils have greater than 35 percent rock fragments.

ARTRP4/FEID Quirt Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Quirt soils. It is on foothills in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1332 and 1333
Landform: foothills
Parent material: residuum derived from shale
Slope: 4 to 35 percent
Elevation: 5650 to 7600 feet
Average annual precipitation: 15 to 18 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support an open shrub layer dominated by *Artemisia tripartita*, *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens*. *Bromus tectorum*, *Lupinus* species, annuals, biennials, or short lived perennials may dominate the conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 to 15 years.

Mid seral conditions support an open shrub layer with high species diversity. *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* is dominant. *Amelanchier alnifolia*, *Artemisia tripartita*, *Berberis repens*, *Chrysothamnus viscidiflorus*, *Purshia tridentata*, *Rosa* species, *Symphoricarpos oreophilus* or *Tetradymia canescens* may be present. *Festuca idahoensis* or *Poa pratensis* dominate a prominent, highly diverse herbaceous layer. *Geum triflorum* or species of *Antennaria*, *Astragalus*, *Eriogonum*, *Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. *Amelanchier alnifolia*, *Berberis repens*, *Purshia tridentata*, *Rosa* species or *Symphoricarpos oreophilus* may be present. The herbaceous layer has low to moderate cover and is dominated by *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia tripartita sprouts from crowns and roots following defoliation or fire. Abundance and vigor of sprouting varies between populations.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or

shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species, prominent components in early and mid seral conditions, have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 551.

Soils

Name: Quirt series

Taxonomic class: Fine, mixed, superactive Argic Cryoborolls

Typical Pedon Description

Quirt, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 10 percent slope with northwest aspect at 6240 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots, common medium roots; many very fine and fine tubular pores, few medium tubular pores; trace pebbles; neutral (pH 6.8); clear smooth boundary.

Bt--7 to 18 inches; reddish brown (2.5YR 4/4) silty clay loam, dark reddish brown (2.5YR 3/4) moist; weak medium prismatic structure parting to strong medium and fine angular blocky; very hard, firm, sticky and plastic; many very fine and fine roots; few very fine, fine and medium tubular pores; few uncoated silt grains on ped faces; common faint clay films on ped faces and lining pores; 5 percent pebbles; neutral (pH 7.0); clear smooth boundary.

Btk1--18 to 28 inches; weak red (2.5YR 4/2) silty clay loam, dark reddish brown (2.5YR 3/4) moist; strong medium angular blocky structure; very hard, firm, sticky and plastic; common very fine and fine roots, few medium roots; few very fine, fine and medium tubular pores; many faint clay films on ped faces and lining pores; few veins and masses of soft powdery lime; strongly effervescent; 5 percent pebbles; slightly alkaline (pH 7.6); clear wavy boundary.

Btk2--28 to 39 inches; reddish brown (2.5YR 5/4) silty clay loam, reddish brown (2.5YR 4/4) moist; strong coarse prismatic structure; hard, firm, sticky and plastic; few very fine, fine and medium roots; few fine and medium tubular pores; many faint clay films on ped faces and lining pores; common fine veins and masses of soft powdery lime; violently effervescent; 5 percent pebbles; moderately alkaline (pH 7.9); clear wavy boundary.

Btk3--39 to 50 inches; reddish brown (2.5YR 5/4) silty clay loam, reddish brown (2.5YR 4/4) moist; moderate coarse prismatic structure; hard, firm, sticky and plastic; few very fine, fine and medium roots; common very fine tubular pores; common faint clay films on ped faces and lining pores; many fine veins and masses of soft powdery lime; violently effervescent; 5 percent pebbles and 15 percent channer-size fragments of soft shale; moderately alkaline (pH 7.9); gradual wavy boundary.

Bk--50 to 60 inches; reddish gray (5YR 5/2) clay loam, dark reddish gray (5YR 4/2) moist; weak very coarse prismatic structure parting to moderate medium subangular blocky; slightly hard, friable, slightly sticky and plastic; few fine roots; common very fine tubular pores; few veins and masses of soft powdery lime; strongly effervescent; 5 percent pebbles and 25 percent channer-size fragments of soft shale; slightly alkaline (pH 7.8).

Typical Pedon Location

Located in ecological unit 1333.

Legal description: about 2300 feet west and 1700 feet north of the southeast corner of section 4, T. 1 S., R. 42 E., Idaho

Latitude: 43 degrees, 21 minutes, 32 seconds, north

Longitude: 111 degrees, 32 minutes, 08 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 7 to 15 inches
Depth to carbonates: 15 to 30 inches
Depth to calcic horizon: 20 to 40 inches

A horizon
Hue: 10YR
Value: 4 or 5 dry, 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 15 to 27 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: neutral (pH 6.6 to 7.3)

Bt horizon
Hue: 2.5YR, 5YR, 7.5YR or 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: silty clay loam, silty clay or clay loam
Clay content: 35 to 45 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Btk1 horizon
Hue: 2.5YR, 5YR or 7.5YR
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3, 4, or 6 dry or moist
Texture: silty clay loam, silty clay or clay loam
Clay content: 35 to 50 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles: 0 percent
Stones: 0 percent
Calcium carbonate equivalent: 5 to 15 percent in the less than 2 mm fraction
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Btk2 and Btk3 horizons
Hue: 2.5YR, 5YR or 7.5YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silty clay loam or clay loam
Clay content: 30 to 40 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 percent
Stones: 0 percent
Soft shale fragments: 0 to 15 percent
Effervescence: violently effervescent
Calcium carbonate equivalent: 15 to 40 percent in the less than 2 mm fraction
Reaction: moderately alkaline (pH 7.9 to 8.4)

Bk horizon
Hue: 2.5YR, 5YR or 7.5YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 dry or moist
Texture: silty clay loam or clay loam
Clay content: 27 to 40 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 percent
Stones: 0 percent
Soft shale fragments: 15 to 60 percent
Effervescence: strongly effervescent or violently effervescent
Calcium carbonate equivalent: 5 to 25 percent in the less than 2 mm fraction
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Comment: The Bt, Btk and Bk horizons commonly field texture 5 to 10 percent lower in clay and 15 to 25 percent greater in sand due to sand-size fragments of soft shale.

Related Types, Mosaics and Ecotones

ARTRP4/FEID Cryoborolls
- Soils are loamy and have greater than 35 percent rock fragments.

ARTRP4/FEID Monida
- Soils are loamy.

ARTRP4/FEID Raynoldson
- Soils are loamy and have greater than 35 percent rock fragments.

ARTRP4/FEID Zeale
- Soils are loamy and have greater than 35 percent rock fragments.

ARTRP4/FEID Zeebar
- Soils are loamy and have greater than 35 percent rock fragments.

ARTRP4/FEID Raynoldson Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Raynoldson soils. It is on fan remnants and stream terraces in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1110
Landform: fan remnants and stream terraces
Parent material: mixed alluvium
Slope: 1 to 15 percent
Elevation: 5000 to 7400 feet
Average annual precipitation: 18 to 24 inches
Average annual air temperature: 34 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- Herbaceous communities dominated by non-native grasses.
- Shrub dominated communities that have widely dispersed seedling through medium *Juniperus scopulorum*.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus*, *Tetradymia canescens* or *Artemisia tripartita*. *Poa* species, *Lupinus* species, annuals, biennials, or short lived perennials may dominate a conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support a dispersed to open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia tripartita*. *Chrysothamnus viscidiflorus*, *Symphoricarpos oreophilus* or *Tetradymia canescens* may be present. *Festuca idahoensis* or *Poa pratensis* dominate a prominent, highly diverse herbaceous layer. Species of *Antennaria*, *Astragalus*, *Eriogonum*, *Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. *Berberis repens*, *Purshia tridentata* and *Symphoricarpos oreophilus* may be present. Widely dispersed *Juniperus scopulorum* may establish from seed cached by rodents or dispersed by birds. The herbaceous layer has low to moderate cover and is dominated by *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia tripartita sprouts from crowns and roots following defoliation or fire. Sprouting abundance and vigor varies between populations.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species, prominent components in early and mid seral conditions, have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 552.

Soils

Name: Raynoldson series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Pachic Cryoborolls

Typical Pedon Description

Raynoldson, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 10 percent slope with southeast aspect at 6700 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 4 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots; many very fine irregular pores; 15 percent pebbles and 2 percent stones; neutral (pH 6.6); clear smooth boundary.

A2--4 to 16 inches; brown (10YR 4/3) gravelly loam, dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 15 percent pebbles, 5 percent cobbles and 5 percent stones; neutral (pH 6.8); clear smooth boundary.

Bw--16 to 29 inches; brown (10YR 4/3) very gravelly loam, very dark brown (10YR 3/3) moist; weak medium and coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; 30 percent pebbles, 5 percent cobbles and 5 percent stones; neutral (pH 7.0); clear wavy boundary.

2Bk1--29 to 44 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine roots; common very fine tubular pores; many coats of soft powdery lime on underside of rock fragments; slightly effervescent; 45 percent pebbles, 15 percent cobbles and 10 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

2Bk2--44 to 60 inches; variegated extremely gravelly loamy sand; massive; loose, nonsticky and nonplastic; few very fine roots; many very fine and fine irregular pores; continuous coats of soft powdery lime on underside of rock fragments; strongly effervescent; 55 percent pebbles, 20 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0)

Typical Pedon Location

Located in ecological unit 1110.
Legal description: about 2100 feet east and 2300 feet north of the southwest corner of section 24, T. 16 N., R 43 E., Idaho.
Latitude: 44 degrees, 41 minutes, 48 seconds, north
Longitude: 111 degrees, 26 minutes, 55 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 16 to 30 inches
Depth to calcic horizon: 16 to 30 inches

A horizons
Hue: 7.5YR or 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 2 or 3 dry; 1, 2 or 3 moist
Texture: loam

Clay content: 8 to 12 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

Bw horizon
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 3 or 4 dry, 2 or 3 moist
Texture: loam
Clay content: 8 to 12 percent
Rock fragment content: 30 to 50 percent
Pebbles: 30 to 40 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

2Bk horizons
Hue: 10YR or variegated
Value: 6, 7 or 8 dry; 5, 6 or 7 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam or loamy sand
Clay content: 2 to 12 percent
Rock fragment content: 50 to 90 percent
Pebbles: 40 to 60 percent
Cobbles: 10 to 20 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 5 to 15 percent in the less than 2 mm fraction
Effervescence: slightly effervescent to violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

ARTRP4/FEID Cryoborolls
- Soils have a dark colored surface layer less than 16 inches thick.

ARTRP4/FEID Monida
- Soils have an argillic horizon and less than 35 percent rock fragments.

ARTRP4/FEID Quirt
- Soils are clayey and have less than 35 percent rock fragments.

ARTRP4/FEID Zeale
- Soils have a dark colored surface layer less than 16 inches thick.

ARTRP4/FEID Zeebar
- Soils have an argillic horizon and lack carbonates.

ARTRP4/FEID Zeale Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Zeale soils. It is on fan remnants, foothills and moraines in the cool, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1125 and 1128
Landform: fan remnants, foothills and moraines
Parent material: alluvium derived from limestone and loess
Slope: 4 to 20 percent
Elevation: 5500 to 8000 feet
Average annual precipitation: 11 to 16 inches
Average annual air temperature: 35 to 42 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Communities that have an open shrub layer of *Tetradymia canescens* with an herbaceous layer dominated by *Festuca idahoensis* or *Agropyron spicatum.*

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens. Poa sandbergii*, *Lupinus* species, annuals, biennials, or short lived perennials may dominate a conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support a dispersed to open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora. Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus*, *Symphoricarpos oreophilus* or *Tetradymia canescens* may be present. *Agropyron spicatum*, *Festuca idahoensis* and other graminoids dominate the prominent, highly diverse herbaceous layer. Species of *Antennaria*, *Astragalus*, *Eriogonum*, *Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora. Symphoricarpos oreophilus* may be present. The herbaceous layer has low to moderate cover and is dominated by *Agropyron spicatum* or *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly

established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species, prominent components in early and mid seral conditions, have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted shrubs, graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 553.

Soils

Name: Zeale series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Typical Pedon Description

Zeale, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 15 percent slope with north aspect at 7640 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 4 inches; very dark grayish brown (10YR 3/2) gravelly silt loam, black (10YR 2/1) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots, few medium roots; many very fine irregular pores; 15 percent pebbles; slightly alkaline (pH 7.6); abrupt smooth boundary.

A2--4 to 15 inches; dark grayish brown (10YR 4/2) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots, few medium roots; many very fine irregular pores; slightly effervescent; 30 percent pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

Bk1--15 to 22 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine tubular pores; many hard pendants of carbonates on underside of rock fragments; strongly effervescent; 35 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bk2--22 to 31 inches; very pale brown (10YR 7/3) very gravelly loam, light yellowish brown (10YR 6/4) moist; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; continuous coats of soft powdery lime on rock fragments; common fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 45 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.0); gradual smooth boundary.

Bk3--31 to 48 inches; light gray (10YR 7/2) very gravelly loam, pale brown (10YR 6/3) moist; moderate very fine angular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; continuous coats of soft powdery lime on rock fragments; common fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 45 percent pebbles and 10 percent cobbles; moderately alkaline (pH 8.0); diffuse smooth boundary.

Bk4--48 to 60 inches; light gray (10YR 7/2) extremely cobbly loam, light yellowish brown (10YR 6/4) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; many very fine tubular pores; continuous coats of soft powdery lime on rock fragments; many fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 30 percent pebbles, 35 percent cobbles and trace stones; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 1128.

Legal description: about 1900 feet east and 800 feet north of the southwest corner of section 35, T. 11 N., R. 12 E., Idaho

Latitude: 44 degrees, 13 minutes, 58 seconds, north

Longitude: 112 degrees, 47 minutes, 30 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 8 to 15 inches
Depth to calcic horizon: 8 to 15 inches

A horizons
Hue: 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry; 1, 2 or 3 moist
Texture: silt loam
Clay content: 15 to 20 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent after mixing the A horizons: 15 to 45 percent in the less than 2 mm fraction
Effervescence: noneffervescent to violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk or Bkq horizons (when present)
Hue: 7.5YR or 10YR
Value: 5, 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry or moist
Texture: loam or sandy loam
Clay content: 15 to 25 percent
Rock fragment content: 40 to 70 percent
Pebbles: 20 to 65 percent
Cobbles: 5 to 45 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 40 to 80 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Related Types, Mosaics and Ecotones

ARTRP4/FEID Cryoborolls
- Soils lack carbonates in the surface layer.

ARTRP4/FEID Monida
- Soils have an argillic horizon and less than 35 percent rock fragments.

ARTRP4/FEID Quirt
- Soils are clayey and have less than 35 percent rock fragments.

ARTRP4/FEID Raynoldson
- Soils have dark colored surface layers that are greater than 16 inches thick.

ARTRP4/FEID Zeebar
- Soils lack carbonates.

ARTRP4/FEID Zeebar Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Zeebar soils. It is on fan remnants and foothills in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1145, 1146 and 1147
Landform: fan remnants and foothills
Parent material: local alluvium or colluvium derived from quartzite conglomerate and loess
Slope: 4 to 50 percent
Elevation: 6000 to 9000 feet
Average annual precipitation: 16 to 18 inches
Average annual air temperature: 35 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens*. *Poa sandbergii*, *Lupinus* species, annuals, biennials, or short lived perennials may dominate a conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support a dispersed to open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus*, *Purshia tridentata*, *Symphoricarpos oreophilus* or *Tetradymia canescens* may be present. *Agropyron spicatum*, *Festuca idahoensis* and other graminoids dominate the prominent, highly diverse herbaceous layer. *Geum triflorum* or species of *Antennaria*, *Astragalus*, *Eriogonum*, *Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. *Purshia tridentata* or *Symphoricarpos oreophilus* may be present. The herbaceous layer has low to moderate cover and is dominated by *Agropyron spicatum* or *Festuca idahoensis*. Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub

cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species, prominent components in early and mid seral conditions, have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 555.

Soils

Name: Zeebar series
Taxonomic class: Loamy-skeletal, mixed, superactive Argic Cryoborolls

Typical Pedon Description

Zeebar, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a., on a 10 percent slope with east aspect at 6150 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 30 percent pebbles; neutral (pH 7.2); abrupt smooth boundary.

A2--3 to 13 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to strong fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; 20 percent pebbles and 5 percent cobbles; neutral (pH 7.2); gradual smooth boundary.

Bt1--13 to 27 inches; yellowish brown (10YR 5/4) very gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; moderate coarse subangular blocky structure parting to strong medium subangular blocky; hard, very friable, slightly sticky and slightly plastic; common very fine roots; many very fine tubular pores; few faint clay films lining pores and on rock fragments; 35 percent pebbles, 10 percent cobbles and trace stones; slightly acid (pH 6.4); gradual smooth boundary.

Bt2--27 to 49 inches; yellowish brown (10YR 5/4) extremely gravelly sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; hard, very friable, slightly sticky and slightly plastic; few fine roots; many very fine tubular pores; few faint clay films lining pores and on rock fragments; 60 percent pebbles, 10 percent cobbles and trace stones; neutral (pH 7.0); gradual smooth boundary.

C--49 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; slightly hard, very firm, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; 65 percent pebbles and 5 percent cobbles; neutral (pH 7.0).

Typical Pedon Location

Located in ecological unit 1146.
Legal description: about 1600 feet west and 900 feet south of the northeast corner of section 8, T. 12 N., R. 37 E., Idaho
Latitude: 44 degrees, 23 minutes, 13 seconds, north
Longitude: 112 degrees, 07 minutes, 03 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 10 to 16 inches
Depth to C horizon: 35 to 50 inches

A horizons
Hue: 10YR or 7.5YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 10 to 27 percent
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 50 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent

Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt horizons
Hue: 10YR
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy clay loam or clay loam
Clay content: 20 to 30 percent
Rock fragment content: 40 to 80 percent
Pebbles: 35 to 65 percent
Cobbles: 5 to 30 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

C horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 6 or 7 dry, 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam, sandy loam or sandy clay loam
Clay content: 15 to 25 percent
Rock fragment content: 45 to 90 percent
Pebbles: 40 to 75 percent
Cobbles: 5 to 30 percent
Stones: 0 to 5 percent
Reaction: slightly acid to slightly alkaline (pH 6.1 to 7.8)

Related Types, Mosaics and Ecotones

ARTRP4/FEID Cryoborolls
- Soils have carbonates and lack an argillic horizon.

ARTRP4/FEID Monida
- Soils have an argillic horizon and less than 35 percent rock fragments.

ARTRP4/FEID Quirt
- Soils are clayey and have less than 35 percent rock fragments.

ARTRP4/FEID Raynoldson
- Soils have carbonates and lack an argillic horizon.

ARTRP4/FEID Zeale
- Soils have carbonates and lack an argillic horizon.

ARTRP4/SYOR2/FEID Tetonia Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Symphoricarpos oreophilus/Festuca idahoensis* p.a. on Tetonia soils. It is on planar to hilly sideslopes of dissected tablelands and foothills in the cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1294, 1333 and 1505
Landform: dissected tablelands and foothills
Parent material: local alluvium derived from loess
Slope: 4 to 35 percent
Elevation: 5300 to 6700 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 37 to 41 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Symphoricarpos oreophilus/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Symphoricarpos oreophilus/Festuca idahoensis* p.a.
- Communities that have a shrub layer of *Artemisia tripartita* with an herbaceous layer dominated by *Bromus tectorum, Festuca idahoensis* or *Poa pratensis.*
- Herbaceous communities dominated by non-native grasses.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support an open shrub layer dominated by *Artemisia tripartita, Chrysothamnus nauseosus, Chrysothamnus viscidiflorus* or *Tetradymia canescens. Bromus tectorum, Lupinus* species, annuals, biennials, or short lived perennials may dominate a conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 to 15 years.

Mid seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia tripartita. Chrysothamnus nauseosus, Chrysothamnus viscidiflorus, Symphoricarpos oreophilus* or *Tetradymia canescens* may be present. The prominent, highly diverse herbaceous layer may be dominated by *Festuca idahoensis* or *Poa pratensis. Geum triflorum* or species of *Antennaria, Astragalus, Eriogonum, Lupinus* or *Phlox* may be conspicuous.

Late seral conditions support an open shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* and *Symphoricarpos oreophilus. Amelanchier alnifolia, Artemisia tripartita* or *Purshia tridentata* may be present. The herbaceous layer has low to moderate cover and is dominated by *Agropyron spicatum* or *Festuca idahoensis.* Forbs are conspicuous.

Discussion

The natural recurring fire frequency is 20 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, Chrysothamnus viscidiflorus and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first

12 years and slowly decrease as the shrub becomes decadent.

Artemisia tripartita sprouts from crowns and roots following defoliation or fire. Abundance and vigor of sprouting varies between populations.

Artemisia tridentata ssp. *vaseyana* var. *pauciflora*, with a life span of 30 to 40 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Succession in the herbaceous layer progresses more rapidly than in the shrub layer. The *Lupinus* species, prominent components in early and mid seral conditions, have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 557.

Soils

Name: Tetonia series
Taxonomic class: Coarse-silty, mixed, superactive Calcic Pachic Cryoborolls

Typical Pedon Description

Tetonia, supporting the *Artemisia tripartita/Poa pratensis* community on a 22 percent slope with north aspect at 5560 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 7 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium granular structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots; many very fine and common fine irregular pores; slightly alkaline (pH 7.5); abrupt smooth boundary.

A2--7 to 22 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure parting to moderate medium granular; slightly hard, very friable, nonsticky and slightly plastic; common very fine, fine and medium roots; common very fine and fine irregular pores; slightly alkaline (pH 7.6); clear smooth boundary.

Bw--22 to 27 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak medium prismatic structure parting to moderate medium subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots, common medium roots; common very fine and fine tubular pores; few coats of soft powdery lime lining pores; slightly effervescent; slightly alkaline (pH 7.8); clear smooth boundary.

Bk1--27 to 44 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; few very fine tubular pores; many coats of soft powdery lime on ped faces and lining pores; strongly effervescent; moderately alkaline (pH 8.0); clear smooth boundary.

Bk2--44 to 60 inches; light gray (10YR 7/2) silt loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; few very fine tubular pores; many coats of soft powdery lime on ped faces and lining pores; violently effervescent; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 1294.
Legal description: about 500 feet east and 1200 feet north of the southwest corner of section 20, T. 1 N., R. 44 E., Idaho
Latitude: 44 degrees, 23 minutes, 58 seconds, north
Longitude: 111 degrees, 18 minutes, 25 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 16 to 27 inches
Depth to calcic horizon: 16 to 27 inches

A horizons
Hue: 10YR

Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 13 to 17 percent
Rock fragment content: 0 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bw horizon
Hue: 10YR
Value: 5 dry, 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 18 percent
Rock fragment content: 0 percent
Calcium carbonate equivalent: 0 to 5 percent in the less than 2 mm fraction
Effervescence: noneffervescent or slightly effervescent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bk horizons
Hue: 10YR
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 18 percent
Rock fragment content: 0 percent
Calcium carbonate equivalent: 15 to 30 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ARTRT/AGSP Buist Ecological Type

Summary

This ecological type is named for the occurrence of the *Artemisia tridentata* ssp. *tridentata/Agropyron spicatum* p.a. on Buist soils. It is on warm south facing sideslopes of dissected tablelands in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1507
Landform: dissected tablelands
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 35 to 60 percent
Elevation: 5100 to 6500 feet
Average annual precipitation: 14 to 18 inches
Average annual air temperature: 38 to 43 degrees F
Soil temperature regime: frigid
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Artemisia tridentata* ssp. *tridentata/Agropyron spicatum* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *tridentata/Agropyron spicatum* p.a.
- Communities that have an open tree canopy of *Juniperus scopulorum* over an herbaceous layer dominated by *Agropyron spicatum.*

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed to open shrub layer dominated by *Chrysothamnus viscidiflorus* or *Tetradymia canescens. Bromus tectorum*, *Poa pratensis* and annual, biennial, or short lived perennial forbs may dominate the conspicuous herbaceous layer. In the absence of disturbance, early seral communities may be replaced by mid seral conditions within 10 years.

Mid seral conditions support a dispersed to open shrub layer dominated by *Artemisia tridentata* ssp. *tridentata. Chrysothamnus viscidiflorus*, *Purshia tridentata* or *Tetradymia canescens* may be present. The herbaceous layer has moderate to high cover and is dominated by *Agropyron spicatum*, *Bromus tectorum* or *Poa pratensis. Eriogonum heracleoides* may be conspicuous.

Late seral conditions support an open shrub layer codominated by *Artemisia tridentata* ssp. *tridentata* and *Purshia tridentata.* The herbaceous layer has low to moderate cover and is dominated by *Agropyron spicatum*, *Bromus tectorum* or *Poa pratensis.* Forbs are conspicuous.

Discussion

The natural recurring fire frequency of this ecological type is approximately 20 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires result in regression from late seral communities to earlier seral conditions.

Chrysothamnus viscidiflorus is a pioneer species in early seral stages. With a life span of 12 to 13 years, *Chrysothamnus viscidiflorus* produces a prolific number of viable seeds. The crown usually sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Artemisia tridentata ssp. *tridentata*, with a life span of 40 to 60 years, is commonly established from seed. Following low intensity fire or shrub management treatment, the species may be conspicuous in 4 to 6 years, form a prominent shrub cover within 8 to 12 years, and become a closed canopy in 20 to 25 years.

Purshia tridentata is a low to medium height shrub that reproduces from seed. Establishment after fire is primarily from seeds cached by rodents. Factors affecting seedling establishment are complex and varied. *Purshia tridentata* may have a significant role in the fertility of this ecological type. The shrub reportedly fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Agropyron spicatum is a drought resistant, perennial bunchgrass that reproduces from seed. The seeds have low viability. First year seedlings are slow growing and easily outcompeted by more aggressive, annual graminoids or forbs.

Bromus tectorum is an aggressive, non-native annual. Rapid growth, early maturity and vigorous

reproduction are characteristics that enable *Bromus tectorum* to outcompete many of the native grasses and forbs.

The soils of this ecological type influence community composition and development. Snowmelt and early spring rains are the primary recharge of the soil moisture reservoir. This recharge occurs prior to the growing season and percolates deep into the soil profile. The deep soil moisture and lack of significant rain during the growing season may favor the establishment of deep rooted shrubs rather than shallow rooted graminoids and forbs.

The species constancy and cover documentation for vegetation is on page 558.

Soils

Name: Buist series
Taxonomic class: Loamy-skeletal, mixed, superactive, frigid Calcic Haploxerolls

Typical Pedon Description

Buist, supporting the *Artemisia tridentata* ssp. *tridentata/Agropyron spicatum* p.a. on a 50 percent slope with south aspect at 5200 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 10 inches; brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; common very fine and fine irregular pores; 15 percent pebbles, 5 percent cobbles and trace stones; moderately alkaline (pH 7.9); clear smooth boundary.

Bk1--10 to 32 inches; light gray (10YR 7/2) very gravelly silt loam, brown (10YR 5/3) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; common hard pendants of carbonates and common coats of soft powdery lime on underside of rock fragments; strongly effervescent; 20 percent pebbles, 10 percent cobbles and 10 percent stones; moderately alkaline (pH 8.1); gradual wavy boundary.

Bk2--32 to 45 inches; light gray (10YR 7/2) very stony loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; common very fine and few fine tubular pores; many hard pendants of carbonates and continuous coats of soft powdery lime on underside of rock fragments; violently effervescent; 10 percent pebbles, 15 percent cobbles and 15 percent stones; moderately alkaline (pH 8.4); gradual wavy boundary.

Bk3--45 to 60 inches; light yellowish brown (10YR 6/4) very stony fine sandy loam, yellowish brown (10YR 5/4) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; continuous hard pendants of carbonates and coats of soft powdery lime on underside of rock fragments; violently effervescent; 10 percent pebbles, 15 percent cobbles and 15 percent stones; moderately alkaline (pH 8.4).

Typical Pedon Location

Located in mapping unit 1507.
Legal description: about 1400 feet south and 800 feet west of the northeast corner of section 12, T. 3 N., R. 41 E., Idaho.
Latitude: 43 degrees, 36 minutes, 25 seconds, north
Longitude: 111 degrees, 34 minutes, 07 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 8 to 19 inches
Depth to calcic horizon: 8 to 19 inches
Calcium carbonate equivalent in the mineralogy control section: average 15 to 40 percent in the less than 20 mm fraction

A horizon
Hue: 10YR
Value: 4 or 5 dry, 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 18 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 20 percent
Cobbles: 0 to 10 percent
Stones: 0 to 10 percent
Boulders: 0 to 5 percent
Calcium carbonate equivalent: 0 to 5 percent in the less than 2 mm fraction
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk1 horizon
Hue: 10YR
Value: 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 18 percent
Rock fragment content: 35 to 50 percent
Pebbles: 15 to 25 percent
Cobbles: 5 to 15 percent
Stones: 5 to 15 percent
Boulders: 0 to 10 percent
Calcium carbonate equivalent: 15 to 25 percent in the less than 2 mm fraction
Effervescence: strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk2 and Bk3 horizons
Hue: 10YR
Value: 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: loam or fine sandy loam
Clay content: 7 to 15 percent
Rock fragment content: 35 to 60 percent
Pebbles: 5 to 15 percent
Cobbles: 10 to 25 percent
Stones: 10 to 25 percent
Boulders: 0 to 10 percent
Calcium carbonate equivalent: 15 to 40 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

ARTRW8/ARARA Simeroi Mosaic

Summary

This mosaic is named for a blending of the *Artemisia tridentata* ssp. *wyomingensis/Agropyron spicatum* p.a. and *Artemisia arbuscula* ssp. *arbuscula/Agropyron spicatum* p.a. on Simeroi soils. It is on west facing fan remnants in areas that are transitional between the warm, dry and cool, moist portion of the shrub steppe zone.

Environmental Setting

Ecological Unit: 1127
Landform: fan remnants
Parent material: alluvium derived from limestone and loess
Slope: 4 to 20 percent
Elevation: 6300 to 7400 feet
Average annual precipitation: 10 to 11 inches
Average annual air temperature: 38 to 39 degrees F
Soil temperature regime: frigid
Soil moisture regime: aridic

Vegetation

Potential Natural Community

A mosaic of:

- *Artemisia tridentata* ssp. *wyomingensis/Agropyron spicatum* p.a.
- *Artemisia arbuscula* ssp. *arbuscula/Agropyron spicatum* p.a.

Present Vegetation:

A mosaic of:

- *Artemisia tridentata* ssp. *wyomingensis/Agropyron spicatum* p.a.
- *Artemisia arbuscula* ssp. *arbuscula/Agropyron spicatum* p.a.
- Communities that have a shrub layer of *Tetradymia canescens* or *Artemisia tripartita* with an herbaceous layer dominated by *Agropyron spicatum*.

Succession

Early seral conditions, as a result of high intensity fire or severe ground disturbance, support a dispersed shrub layer dominated by *Chrysothamnus nauseosus*, *Chrysothamnus viscidiflorus* or *Tetradymia canescens*. *Agropyron spicatum*, annuals, biennials or short lived perennials may dominate the conspicuous herbaceous layer.

Mid seral conditions support an open shrub layer codominated by *Artemisia arbuscula* ssp. *arbuscula* and *Artemisia tridentata* ssp. *wyomingensis*. The species occur as individual 1/10 to 1/4 acre patches. Widely dispersed patches of *Artemisia tripartita* are also present. The herbaceous layer has low to moderate cover and is dominated by *Agropyron spicatum* or *Poa sandbergii*. Forbs have moderate diversity. *Astragalus miser*, *Crepis* species, *Haplopappus stenophyllus* or *Phlox hoodii* may be conspicuous.

Late seral conditions support an open shrub layer codominated by patches of *Artemisia arbuscula* ssp. *arbuscula* and *Artemisia tridentata* ssp. *wyomingensis*. The herbaceous layer is depauperate or has low cover. *Agropyron spicatum* is conspicuous.

Discussion

The natural recurring fire frequency is 30 to 60 years. Frequent, low intensity fires favor mid seral conditions. High intensity fires cause regression from late seral communities to earlier seral conditions.

Chrysothamnus nauseosus, *Chrysothamnus viscidiflorus* and *Tetradymia canescens* are pioneer species in early seral stages. *Chrysothamnus nauseosus*, with a life span of about 10 years, is somewhat sensitive to competition by other perennials. Regeneration is from deep roots that sprout following low intensity fire or light disturbance. Reproduction from seed follows high intensity fire or severe ground disturbance. The large quantity of leaf litter produced creates mulch, reduces erosion and recycles nutrients to the soil surface.

Chrysothamnus viscidiflorus, with a life span of 12 to 13 years, produces a prolific number of viable seeds. The crown sprouts following fire or severe ground disturbance. Cover may remain low for 1 to 3 years, then rapidly increase as seedlings establish from windblown seed.

Tetradymia canescens, with a life span of about 20 years, is a multi-stem shrub that sprouts vigorously after fire. Cover may increase five-fold during the first 12 years and slowly decrease as the shrub becomes decadent.

Artemisia arbuscula ssp. *arbuscula* is a low growing shrub that reproduces from wind dispersed seed. Following disturbance, establishment is relatively slow and may require 2 to 10 years or more.

Artemisia tridentata ssp. *wyomingensis* is a medium height shrub that reproduces from windblown or soil-stored seed. Establishment may begin within a year if moisture conditions are favorable. At least 10 years may be necessary for *Artemisia tridentata* ssp. *wyomingensis* to dominate a site. Extensive roots allow the shrub to be highly competitive for available moisture.

Agropyron spicatum is a drought resistant, perennial bunchgrass that reproduces from seed. The seeds have low viability. First year seedlings are slow growing and easily outcompeted by more aggressive graminoids or forbs.

The species constancy and cover documentation for vegetation is on page 559.

Soils

Name: Simeroi series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Xeric Haplocalcids

Typical Pedon Description

Simeroi, supporting the *Artemisia arbuscula* ssp. *arbuscula/Agropyron spicatum* p.a. on an 8 percent slope with south aspect at 6650 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 2 inches; grayish brown (10YR 5/2) gravelly silt loam, dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; strongly effervescent; 20 percent pebbles; moderately alkaline (pH 8.2); abrupt smooth boundary.

A2--2 to 8 inches; brown (10YR 5/3) very gravelly loam, dark grayish brown (10YR 4/2) moist; moderate coarse subangular blocky structure parting to weak fine granular; slightly hard, very friable, nonsticky and slightly plastic; many very fine and common fine roots, few medium roots; many very fine irregular pores; continuous coats of soft powdery lime on underside of rock fragments; strongly effervescent; 40 percent pebbles; moderately alkaline (pH 8.2); clear smooth boundary.

Bk--8 to 14 inches; pale brown (10YR 6/3) very gravelly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; few very fine tubular pores; weak discontinuous (40 percent) cementation by carbonates, hard and firm; violently effervescent; 40 percent pebbles; moderately alkaline (pH 8.4); clear smooth boundary.

Bkq1--14 to 34 inches; light gray (10YR 7/2) extremely gravelly sandy loam, pale brown (10YR 6/3) moist; massive; very hard, very firm, nonsticky and nonplastic; few very fine tubular pores; continuous hard pendants of carbonates and silica on underside of rock fragments; violently effervescent; 70 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.4); gradual wavy boundary.

Bkq2--34 to 60 inches; very pale brown (10YR 8/2) extremely gravelly sandy loam, light grayish brown (10YR 6/2) moist; massive; very hard, very firm, nonsticky and nonplastic; common fine irregular pores; continuous hard pendants of carbonates and silica on underside of rock fragments; violently effervescent; 70 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.4).

Typical Pedon Location

Located in ecological unit 1127.
Legal description: about 500 feet north and 2300 feet west of the southeast corner of section 22, T. 11 N., R. 32 E., Idaho
Latitude: 44 degrees, 15 minutes, 38 seconds, north
Longitude: 112 degrees, 42 minutes, 00 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Ochric epipedon thickness: 5 to 10 inches
Calcium carbonate equivalent in the mineralogy control section: 40 to 70 percent in the less than 20 mm fraction

A horizons
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 18 percent
Rock fragment content: 15 to 80 percent

Pebbles: 15 to 65 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 5 to 70 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk or Bkq horizons
Hue: 10YR or 2.5Y
Value: 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 2 or 3 dry; 2, 3 or 4 moist
Texture: loam or sandy loam
Clay content: 4 to 15 percent
Rock fragment content: 40 to 85 percent
Pebbles: 40 to 80 percent
Cobbles: 0 to 15 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 40 to 70 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Related Types, Mosaics and Ecotones

ARNO4/AGSP Simeroi

- This ecological type occurs on slightly warmer positions.
- In the plant association, *Artemisia nova* dominates the shrub layer.

CALE4 Oxyaquic Cryochrepts Ecological Type

Summary

This ecological type is named for the occurrence of the *Caltha leptosepala* c.t. on Oxyaquic Cryochrept soils. It is on cirque floors in the cold, moist portion of the forested zone. This riparian ecological type occurs in draws, swales and drainageways that have a high water table during the early summer.

Environmental Setting

Ecological Unit: 1414
Landform: cirques
Parent material: alluvium derived from loess and glacial till
Slope: 4 to 15 percent
Elevation: 9000 to 9900 feet
Average annual precipitation: 40 to 50 inches
Average annual air temperature: 28 to 32 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Caltha leptosepala* c.t.

Present Vegetation

- *Caltha leptosepala* c.t.

Succession

Seral conditions and successional status are not clearly defined for this subalpine forb community. The herbaceous layer is dominated by *Caltha leptosepala*. Graminoids and other forbs have moderate diversity and low individual cover. *Carex rupestris*, *Juncus drummondii*, *Claytonia lanceolata*, *Ligusticum filicinum*, *Pedicularis groenlandica*, *Polygonum bistortoides* or *Ranunculus eschscholtzii* may be present. Seasonal development of the community begins as the snowline recedes in mid summer, exposing nearly saturated mineral soil. *Claytonia lanceolata* or *Ranunculus eschscholtzii* are the first forbs to emerge, followed by *Caltha leptosepala*. Other forbs and graminoids emerge as the water table recedes and soil temperatures increase. The community develops high ground cover at its seasonal maximum. Very little litter is produced.

Discussion

This community appears to be relatively persistent on the Targhee National Forest. The *Caltha leptosepala* c.t. may have successional relationships to communities dominated by *Deschampsia cespitosa* or *Carex scopulorum*, as recognized in Rocky Mountain National Park and in the Wind River Range of the Bridger Teton National Forest.

The somewhat poorly drained soils of this ecological type influence community composition and development. There is an apparent water table within 6 inches of the surface. The water table is fed by snowmelt and recedes as summer progresses. Soil temperatures remain very cold in the water saturated zone.

The species constancy and cover documentation for vegetation is on page 561.

Soils

Name: Oxyaquic Cryochrepts subgroup
Taxonomic class: Oxyaquic Cryochrepts

Typical Pedon Description

Oxyaquic Cryochrepts, supporting the *Caltha leptosepala* c.t. on a 12 percent slope with west aspect at 9460 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 5 inches; dark grayish brown (10YR 4/2) silt loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and few fine roots; many very fine irregular pores; trace pebbles; moderately acid (pH 5.8); clear wavy boundary.

Bw1--5 to 22 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; few fine faint, dark yellowish brown (10YR 4/6) moist, Fe accumulations in matrix; few 2.5 inches in diameter krotovina, dark grayish brown (10YR 4/2), dark brown (7.5YR 3/2) moist; moderate fine and medium granular structure, many medium irregular pores; trace pebbles; moderately acid (pH 5.6); gradual wavy boundary.

Bw2--22 to 38 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; weak very coarse prismatic structure parting to weak coarse subangular blocky; slightly hard, very friable, nonsticky and slightly plastic; common very fine and few fine roots; many very fine and few fine tubular pores; few fine faint, dark yellowish brown (10YR 4/6) moist, Fe accumulations in matrix; 5 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

2BC--38 to 60 inches; light yellowish brown (2.5Y 6/4) very gravelly sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine tubular pores; few fine faint, dark yellowish brown (10YR 4/6) moist, Fe accumulations in matrix; 40 percent pebbles; moderately acid (pH 5.8).

Typical Pedon Location

Located in ecological unit 1414.
Legal description: about 1950 feet south and 3000 feet east of the northwest corner of section 11, T. 43 N., R. 117 W., Wyoming
Latitude: 43 degrees, 42 minutes, 24 seconds, north
Longitude: 110 degrees, 51 minutes, 37 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat poorly drained
Water table, depth: 0 to 6 inches
Water table, kind: apparent
Water table, duration: July and August
Depth to redoximorphic features: 0 to 6 inches
Ochric epipedon thickness: 3 to 10 inches
Depth to 2BC horizon: 10 to greater than 60 inches
Base saturation: less than 60 percent

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 16 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Soft Fe accumulations:
  Abundance - absent to common
  Size - fine
  Contrast - faint or distinct
Reaction: strongly or moderately acid (pH 5.1 to 6.0)

Bw horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry; 3, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 7 to 18 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Soft Fe accumulations:
  Abundance - few or common
  Size - fine or medium
  Contrast - faint or distinct
Reaction: strongly or moderately acid (pH 5.1 to 6.0)

2BC horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 4 to 12 percent
Rock fragment content: 35 to 80 percent
Pebbles: 10 to 60 percent
Cobbles: 0 to 60 percent
Stones: 0 to 15 percent
Soft Fe accumulations:
  Abundance - few to many
  Size - fine to coarse
  Contrast - faint to prominent
Reaction: strongly or moderately acid (pH 5.1 to 6.0)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

Graminoid Chickreek Ecological Type

Summary

This ecological type is named for the occurrence of graminoid dominated communities on Chickreek soils. It is a riparian ecological type on moist outwash plains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 2020
Landform: outwash plains
Parent material: diatomaceous earth over mixed alluvium
Slope: 0 to 1 percent
Elevation: 6300 to 6600 feet
Average annual precipitation: 24 to 35 inches
Average annual air temperature: 36 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

- graminoid dominated communities

Present Vegetation

- *Deschampsia cespitosa* c.t.
- *Poa palustris* c.t.
- Herbaceous communities dominated by *Carex buxbaumii, Carex leporinella* or *Carex vesicaria.*

Succession

Seral conditions and successional status are not clearly defined for these diverse riparian communities.

Following severe ground disturbance, an herbaceous layer dominated by perennial graminoids establishes vegetatively or from seed. Both tufted and rhizomatous growth forms are common. The prominent graminoids are aggressive colonizers and may form a dense herbaceous layer within the first growing season. Forbs have moderate diversity and relatively low cover. *Pinus contorta* or *Salix* species may establish. Trees and shrubs rarely develop beyond the seedling stage.

Discussion

Conditions that favor community establishment are poorly understood and may hinge more on opportunism than competition. The various communities may reflect a subtle difference in ponding or water tables, or response to grazing or trampling.

In response to moderate disturbance, the following rhizomatous graminoids may increase: *Carex buxbaumii*, *Juncus balticus* and *Poa pratensis*. The following tufted graminoids may decrease: *Agrostis scabra*, *Carex microptera*, *Danthonia intermedia*, *Deschampsia cespitosa* and *Phleum alpinum*. *Potentilla gracilis* and *Taraxacum officinale* may increase in response to similar disturbance.

A layer of diatomaceous earth 20 to 40 inches thick influences community composition and development. Diatomaceous earth is a light colored soil material with loamy texture and several unique physical properties. This material has very slow permeability, is hard when dry, firm and slightly brittle when moist and resists being wet. Wet diatomaceous earth has low strength and puddles readily. Upon drying, this material forms a hard layer that restricts root development and water movement.

Roots commonly mat on top of the diatomaceous layer. Roots that do penetrate the layer grow between structural plates and are flattened excessively. The root restricting characteristic of diatomaceous earth may account for the high seedling mortality of trees and shrubs.

Vertical water movement within the soil is restricted by the diatomaceous layer. Water from snowmelt, rain and overland flows form an intermittent, perched water table. Ponding is common. The unique soil layer also acts as a cap for an artesian water table.

The species constancy and cover documentation for vegetation is on page 562.

Soils

Name: Chickreek series
Taxonomic class: Fine-silty over sandy or sandy-skeletal, mixed, superactive, nonacid Typic Cryaquents

Typical Pedon Description

Chickreek, supporting a community dominated by graminoids on a nearly level slope at 6380 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--0 to 1 inches; root mat, moss and litter; abrupt smooth boundary.

Oe1--1 to 3 inches; dark brown (10YR 4/3) mucky peat, very dark brown (10YR 2/2) moist and rubbed; slightly decomposed hemic material, 70 percent herbaceous fiber after rubbing; massive; moderately acid (pH 5.6); clear smooth boundary.

Oe2--3 to 6 inches; dark gray (10YR 4/1) mucky peat, black (10YR 2/1) moist and rubbed; moderately decomposed hemic material, 20 percent herbaceous fiber after rubbing; massive; moderately acid (pH 5.6); clear smooth boundary.

Ag--6 to 11 inches; gray (10YR 6/1) silt loam, very dark gray (10YR 3/1) moist; moderate thick platy structure; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; few very fine irregular and tubular pores; moderately acid (pH 5.8); gradual smooth boundary.

Cg1--11 to 26 inches; white (10YR 8/1) silt loam, light brownish gray (2.5Y 6/2) moist; moderate thick platy structure; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; few very fine irregular and tubular pores; many medium prominent, dark gray (5Y 4/1) moist, and few fine prominent, grayish green (5G 4/2) moist, Fe/Mn depletions; slightly acid (pH 6.2); clear smooth boundary.

Cg2--26 to 31 inches; white (10YR 8/1) silt loam, light brownish gray (2.5Y 6/2) moist; massive; hard, firm, slightly sticky and slightly plastic; common very fine and fine roots; few very fine irregular and tubular pores; many medium prominent, dark gray (5Y 4/1) moist, and few fine prominent, grayish green (5G 4/2) moist, Fe/Mn depletions; slightly acid (pH 6.2); clear smooth boundary.

2C1--31 to 52 inches; variegated gravelly sand; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine irregular pores; 30 percent pebbles; moderately acid (pH 5.8); gradual smooth boundary.

2C2--52 to 66 inches; variegated extremely gravelly sand; single grain; loose, nonsticky and nonplastic; few very fine roots; many fine irregular pores; 65 percent pebbles; moderately acid (pH 5.8).

Typical Pedon Location

Located in mapping unit 2020.
Legal description: about 1000 feet north and 1000 feet west of the southeast corner of section 31, T. 14 N., R. 44 E., Wyoming
Latitude: 44 degrees, 29 minutes, 30 seconds, north
Longitude: 111 degrees, 18 minutes, 05 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: poorly drained
Ponding depth: 6 to 0 inches
Water table, kind: perched
Water table, duration: year long
Thickness of O horizons: 1 to 8 inches
Ochric epipedon thickness: 5 to 13 inches
Depth to 2C horizons: 20 to 40 inches

Oe horizons
Hue: 10YR
Value: 4 or 5 dry, 2 moist
Chroma: 1, 2 or 3 dry or moist
Texture: mucky peat
Rock fragment content: 0 percent
Reaction: moderately acid to slightly alkaline (pH 5.6 to 7.8)

Ag horizon
Hue: 10YR
Value: 5, 6 or 7 dry; 3 or 4 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam or silty clay loam
Clay content: 25 to 35 percent
Rock fragment content: 0 percent
Reaction: moderately acid to slightly alkaline (pH 5.6 to 7.8)

Cg horizons
Hue: 10YR, 2.5Y or 5Y
Value: 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam or silty clay loam
Clay content: 25 to 35 percent
Rock fragment content: 0 percent
Fe/Mn depletions:

Abundance - few to many
Size - fine or medium
Contrast - distinct or prominent
Reaction: moderately acid to slightly alkaline (pH 5.6 to 7.8)

2C horizons
Color: variegated
Texture: sand to extremely gravelly sand
Clay content: 4 to 8 percent
Rock fragment content: 10 to 75 percent
Pebbles: 10 to 75 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: moderately acid to slightly alkaline (pH 5.6 to 7.8)

Related Types, Mosaics and Ecotones

Graminoid Cryaquolls
- Soils lack significant accumulations of diatomaceous earth.

Graminoid Cryaquolls Ecological Type

Summary

This ecological type is named for the occurrence of graminoid dominated communities on Cryaquoll soils. It is on a low relief caldera floor in the forested zone. This riparian ecological type occurs in closed basins that have ponding during the early summer.

Environmental Setting

Ecological Unit: 2000
Landform: caldera floor
Parent material: local alluvium derived from loess and volcanic ash
Slope: 0 to 2 percent
Elevation: 5900 to 6800 feet
Average annual precipitation: 20 to 28 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

- graminoid dominated communities

Present Vegetation

- *Deschampsia cespitosa* c.t.
- *Poa palustris* c.t.
- Herbaceous communities dominated by *Carex buxbaumii, Carex leporinella* or *Carex vesicaria.*

Succession

Seral conditions and successional status are not clearly defined for these diverse riparian communities.

Following severe ground disturbance, an herbaceous layer dominated by perennial graminoids establishes vegetatively or from seed. Both tufted and rhizomatous growth forms are common. The prominent graminoids are aggressive colonizers and may form a dense layer within the first growing season. Forbs have moderate diversity and relatively low cover.

Discussion

Conditions that favor community establishment are poorly understood and may hinge more on opportunism than competition. The various communities may reflect a subtle difference in ponding or water tables, or response to grazing or trampling.

In response to moderate disturbance, the following rhizomatous graminoids may increase: *Carex buxbaumii*, *Juncus balticus* and *Poa pratensis*. The following tufted graminoids may decrease: *Agrostis scabra*, *Carex microptera*, *Danthonia intermedia*, *Deschampsia cespitosa* and *Phleum alpinum*. *Potentilla gracilis* and *Taraxacum officinale* may increase in response to similar disturbance.

The species constancy and cover documentation for vegetation is on page 563.

Soils

Name: Cryaquolls great group
Taxonomic class: Cryaquolls

Typical Pedon Description

Cryaquolls, supporting the *Deschampsia cespitosa* c.t. on a 1 percent slope at 5980 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; moderate fine platy structure parting to moderate fine granular; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots; few very fine irregular and tubular pores; moderately acid (pH 6.0); abrupt smooth boundary.

A2--4 to 16 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; strong medium and coarse prismatic structure parting to strong coarse subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine, fine, medium and coarse tubular pores; common 1.5 to 3 inch krotovinas; common pockets of worm casts; many fine and medium prominent, dark reddish brown (5YR 3/4) moist, soft Fe accumulations; moderately acid (pH 6.0); clear smooth boundary.

E/B1--16 to 29 inches; 60 percent pale brown (10YR 6/3) E material, brown (10YR 4/3) moist, and 40 percent yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 3/4) moist, in a fine (less than 5 mm) irregular matrix that mixes to a silt loam; weak coarse subangular blocky structure; hard,

friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and fine tubular pores, few medium and coarse tubular pores; many medium and coarse distinct, dark brown (7.5YR 4/3) moist, and common fine prominent, yellowish red (5YR 4/6) moist, soft Fe accumulations; common fine prominent, black (10YR 2/1), hard Fe/Mn concretions; common 1.5 to 3 inch krotovinas; common pockets of worm casts; slightly acid (pH 6.1); clear wavy boundary.

E/B2--29 to 44 inches; 60 percent pale brown (10YR 6/3) E material, brown (10YR 4/3) moist, and 40 percent yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 3/4) moist, in a fine (less than 5 mm) irregular matrix that mixes to a silt loam; moderate coarse subangular blocky structure; very hard, friable, slightly sticky and slightly plastic; few very fine roots; common very fine and fine tubular pores, few medium and coarse tubular pores; many medium and coarse distinct, dark brown (7.5YR 4/3) moist, and common fine prominent, yellowish red (5YR 4/6) moist, soft Fe accumulations; slightly acid (pH 6.4); clear wavy boundary.

2Bt--44 to 60 inches; brown (7.5YR 5/4) cobbly silty clay, dark brown (7.5YR 4/3) moist; moderate coarse subangular blocky structure parting to moderate medium subangular blocky; very hard, firm, very sticky and very plastic; few very fine roots; common very fine and fine tubular pores; many pressure faces on ped faces; 10 percent pebbles, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 2000.
Legal description: about 2000 feet south and 2200 feet west of the northeast corner of section 8, T.10 N., R. 44 E., Idaho
Latitude: 44 degrees, 12 minutes, 32 seconds, north
Longitude: 111 degrees, 16 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: poorly drained
Ponding, depth: 6 to 0 inches
Water table, kind: apparent
Water table, duration: May to July
Depth to redoximorphic features: 0 to 6 inches
Mollic epipedon thickness: 10 to 20 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Depth to argillic horizon: 24 to greater than 60 inches
Base saturation: 50 to 100 percent
Other: Some pedons have a 1 to 8 inch thick Oe horizon, with a mucky peat texture, on the surface.

A1 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam
Clay content: 10 to 16 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

A2 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam
Clay content: 10 to 16 percent
Rock fragment content: 0 percent
Soft Fe accumulations:
  Abundance - common or many
  Size - fine or medium
  Contrast - distinct or prominent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

E/B horizons
Hue: 2.5Y, 7.5YR or 10YR
Value:
  E portion - 5 or 6 dry, 4 or 5 moist
  B portion - 5 or 6 dry, 3 or 4 moist
Chroma:
  E portion - 1, 2 or 3 dry or moist
  B portion - 3 or 4 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 5 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent

Redoximorphic features:
Kind - soft Fe accumulations or hard Fe/Mn concretions
Abundance - few to many
Size - fine to coarse
Contrast - distinct or prominent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent E material and 15 to 50 percent B material (by volume)

2Bt horizon
Hue: 7.5YR, 10YR, 2.5Y or 5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: silty clay, silty clay loam or clay loam
Clay content: 27 to 50 percent
Rock fragment content: 0 to 30 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 15 percent
Stones: 0 to 5 percent
Redoximorphic features:
Kind - soft Fe accumulations or hard Fe/Mn concretions
Abundance - absent to common
Size - fine to coarse
Contrast - distinct or prominent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

Graminoid Chickreek
- Soils have surface and subsoil layers dominated by diatomaceous earth.

PIEN Cryaquolls
- This ecological type occurs on stream terraces and overflow channels.
- In the plant association, *Picea engelmannii* is present.
- Soils have a substratum layer with greater than 35 percent rock fragments.

Salix/Graminoid Cryaquolls
- This ecological type occurs on stream terraces.
- In the plant association, *Salix* species are present.
- Soils have a substratum layer with greater than 35 percent rock fragments.

Salix/Graminoid Cryaquolls, poorly drained
- This ecological type occurs on stream terraces.
- In the plant association, *Salix* species are present.
- Soils have a substratum layer with greater than 35 percent rock fragments.

Low Alpine Forb Cryochrepts, loamy-skeletal Ecological Type

Summary

This ecological type is named for the occurrence of low alpine forb communities on Cryochrepts, loamy-skeletal soils. It is on mountains in the alpine zone.

Environmental Setting

Ecological Unit: 1280
Landform: mountains
Parent material: local alluvium or colluvium derived from limestone
Slope: 40 to 70 percent
Elevation: 8800 to 12,200 feet
Average annual precipitation: 25 to 35 inches
Average annual air temperature: 33 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Communities that have an open, low shrub and herbaceous layer dominated by one or more of the following: *Ribes montigenum, Chrysothamnus viscidiflorus, Trifolium haydenii, Delphinium glaucescens, Arenaria nuttallii, Ivesia gordonii, Carex rupestris, Poa secunda, Artemisia michauxiana, Physaria didymocarpa* var. *didymocarpa* or *Agastache cusickii.*

Succession

Seral conditions or successional status are not clearly defined for these depauperate alpine communities. Protected areas occasionally support widely scattered *Abies lasiocarpa* or *Pinus flexilis* seedlings. *Ribes montigenum* is the most common shrub. The herbaceous layer has high species diversity and is codominated by opportunistic graminoids and forbs. *Hordeum jubatum, Poa interior, Achillea millefolium, Arenaria nuttallii* and *Erigeron compositus* may be present.

Discussion

Community composition and species dominance varies with aspect. North facing slopes support communities with less drought tolerance and greater total cover than south facing slopes. Desiccation by nearly continuous wind, defoliation by windblown snow or sand, and snow avalanches limit tree development. Trees rarely reach maturity. Shrubs appear to establish on positions with a slight northeast or northwest facing aspect. They are less common on south facing aspects. Shrubs commonly have a short stature or prostrate growth form. The more effective snow cover and slight shading of the northerly positions may enhance shrub development by ameliorating the harsh winds and droughty soil conditions.

Ribes montigenum has a compact, ball-shaped growth form that packs with snow during the winter, sheltering the inner stems from harsh winds and windblown snow. Drifts of snow form on the downwind side of the shrub and enhance conditions for further establishment of other plants.

The short growing and reproductive season begins in July and ends in September. Air and soil temperatures may increase for a brief time during this snow-free period. Unpredictable ice storms, severe frost or periods of cold daytime air temperatures may interrupt the plant growth and reproductive cycles. Many of the supported graminoids and forbs have adapted to these harsh conditions by fast growth and early maturity.

The somewhat excessively drained soils of this ecological type influence community composition and development. The soil has a low capacity to supply water. Water quickly percolates through the rooting zone and becomes unavailable for plant use. Most of the moisture available for plant use is supplied by summer showers. As a result of shower frequency and intensity, the rooting zone may dry and recharge numerous times throughout the snow-free season.

The species constancy and cover documentation for vegetation is on page 564.

Soils

Name: Cryochrepts, loamy-skeletal subgroup
Taxonomic class: Typic Cryochrepts

Typical Pedon Description

Cryochrepts, loamy-skeletal supporting low alpine forb communities on a 62 percent slope with south aspect at 9600 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 2 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to weak medium granular; soft, very friable, nonsticky and nonplastic; few very fine roots; many fine vesicular pores; common hard pendants of carbonates and few pendants of silica on one side of rock fragments (no orientation); violently effervescent; 50 percent pebbles, 20 percent cobbles and trace stones; moderately alkaline (pH 8.0); abrupt wavy boundary.

A2--2 to 8 inches; brown (10YR 5/3) very gravelly fine sandy loam, brown (10YR 4/3) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine irregular pores; few hard pendants of carbonates and silica on underside of rock fragments; violently effervescent; 40 percent pebbles, 15 percent cobbles and trace stones; slightly alkaline (pH 7.8); abrupt smooth boundary.

Bkq1--8 to 19 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; common hard pendants of carbonates and few hard pendants of silica on underside of rock fragments; violently effervescent; 30 percent pebbles, 40 percent cobbles and trace stones; slightly alkaline (pH 7.8); gradual smooth boundary.

Bkq2--19 to 36 inches; pale brown (10YR 6/3) extremely cobbly fine sandy loam, brown (10YR 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; few very fine tubular pores; few hard pendants of carbonates and silica on underside of rock fragments; violently effervescent; 10 percent pebbles, 70 percent cobbles and 5 percent stones; slightly alkaline (pH 7.8); abrupt irregular boundary.

R--36 inches; fractured limestone bedrock.

Typical Pedon Location

Located in ecological unit 1280.
Legal description: about 2600 feet west and 2850 feet north of the southeast corner of section 6, T. 12 N., R. 32 E., Idaho
Latitude: 44 degrees, 18 minutes, 37 seconds, north
Longitude: 112 degrees, 44 minutes, 47 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep to very deep (20 to greater than 60 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: somewhat excessively drained
Ochric epipedon thickness: 2 to 9 inches

A1 horizon
Hue: 10YR or 2.5Y
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam
Clay content: 4 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 45 to 75 percent
Cobbles: 5 to 20 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 0 to 25 percent in the less than 2 mm fraction
Effervescence: noneffervescent to violently effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

A2 horizon
Hue: 10YR or 2.5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam, loam or fine sandy loam
Clay content: 4 to 15 percent
Rock fragment content: 35 to 70 percent
Pebbles: 20 to 55 percent
Cobbles: 5 to 20 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 0 to 60 percent in the less than 2 mm fraction
Effervescence: noneffervescent to violently effervescent

Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

Bkq, Bk (when present) or Bw (when present) horizons
Hue: 10YR, 2.5Y or 5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry; 1, 2, 3 or 4 moist
Texture: loam, sandy loam or fine sandy loam
Clay content: 2 to 15 percent
Rock fragment content: 60 to 90 percent
Pebbles: 5 to 70 percent
Cobbles: 10 to 75 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 0 to 70 percent in the less than 2 mm fraction
Effervescence: noneffervescent to violently effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

Related Types, Mosaics and Ecotones

Low Alpine Forb Oorang
- Soils have greater than 90 percent rock fragments.

PSME/BERE,SYOR2 Cryochrepts, fine
- This ecological type occurs at lower elevations, on warmer positions.
- In the plant association, a *Pseudotsuga menziesii* canopy is present.
- Soils are clayey and have less than 35 percent rock fragments.

Low Alpine Forb Oorang Ecological Type

Summary

This ecological type is named for the occurrence of low alpine forb communities on Oorang soils. It is on karst mountain summits and cirque floors in the alpine zone.

Environmental Setting

Ecological Unit: 1331
Landform: mountains and cirque floors
Parent material: residuum derived from limestone
Slope: 4 to 35 percent
Elevation: 8900 to 9800 feet
Average annual precipitation: 35 to 65 inches
Average annual air temperature: 28 to 32 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- low alpine forb communities

Present Vegetation

- Herbaceous communities dominated by an open layer of one or more of the following: *Ivesia gordonii, Ligusticum filicinum, Frasera speciosa, Arabis lemmonii, Senecio crassulus* or *Valeriana edulis.*

Succession

Seral conditions and successional status are not clearly defined for these alpine communities. *Abies lasiocarpa* or *Pinus flexilis* seedlings may establish. The herbaceous layer is depauperate, or has low cover and is codominated by graminoids and forbs. *Festuca ovina, Ivesia gordonii, Ligusticum filicinum* and *Lomatium cous* are most commonly represented.

Discussion

Harsh wind, a short growing and reproductive season, and the low capacity of the soil to supply water are limiting factors to plant development on this alpine ecological type. Desiccation by nearly continuous wind and defoliation by windblown snow limit tree and shrub development. Trees rarely reach maturity.

The short growing and reproductive season begins in July and ends in September. Air and soil temperatures may increase for a brief time during this snow-free period. Unpredictable ice storms, severe frost or periods of cold daytime air temperatures may interrupt the plant growth and reproductive cycles. Many of the graminoids and forbs have adapted to these harsh conditions by fast growth and early maturity.

The somewhat excessively drained soils of this ecological type influence community composition and development. The soil has a low capacity to supply water. Water quickly percolates through the rooting zone and becomes unavailable for plant use. Most of the moisture available for plant use is supplied by summer showers. As a result of shower frequency and intensity, the rooting zone may dry and recharge numerous times throughout the snow-free season.

The species constancy and cover documentation for vegetation is on page 566.

Soils

Name: Oorang series
Taxonomic class: Fragmental, carbonatic Typic Cryochrepts

Typical Pedon Description

Oorang, supporting the Low Alpine Forb community dominated by *Frasera speciosa* and *Valeriana edulis* on a 13 percent slope with northwest aspect at 9550 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 4 inches; olive brown (2.5Y 4/3) extremely gravelly silt loam, very dark grayish brown (2.5Y 3/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine irregular pores; slightly effervescent; 35 percent pebbles and 35 percent flagstones as surface pavement; 55 percent pebbles and 10 percent flagstones in matrix; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bk--4 to 12 inches; light olive brown (2.5Y 5/4) extremely flaggy silt loam, olive brown (2.5Y 4/3) moist; moderate very fine granular structure; soft,

very friable, slightly sticky and slightly plastic; common very fine and few fine roots; many very fine irregular pores; many hard pendants of carbonates on underside of rock fragments; strongly effervescent; 40 percent pebbles and 40 percent flagstones; moderately alkaline (pH 8.2); abrupt smooth boundary.

BC--12 to 41 inches; light olive brown (2.5Y 5/4) fragmental material, dark grayish brown (2.5Y 4/3) moist; weak coarse platy structure; hard, friable, slightly sticky and slightly plastic; 5 percent channers, 90 percent flagstones; 5 percent fine earth; voids are filled with fine earth; strongly effervescent; moderately alkaline (pH 8.4); diffuse irregular boundary.

R--41 inches; weathered limestone bedrock that fractures into flagstones, stones and boulders.

Typical Pedon Location

Located in ecological unit 1331.
Legal description: about 450 feet east and 1300 feet south of the northwest corner of section 5, T. 42 N., R. 117 W., Wyoming
Latitude: 43 degrees, 41 minutes, 55 seconds, north
Longitude: 111 degrees, 55 minutes, 11 seconds, west

Range in Characteristics

Profile
Depth class: deep (40 to 60 inches)
Restrictive feature: weathered bedrock (R horizon)
Drainage class: somewhat excessively drained
Ochric epipedon thickness: 3 to 7 inches
Depth to fragmental material: 10 to 20 inches
Calcium carbonate equivalent in the mineralogy control section: greater than 40 percent in the less than 20 mm fraction

A horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 27 percent
Rock fragment content: 65 to 90 percent
Pebbles: 35 to 70 percent
Cobbles or flagstones: 5 to 40 percent
Stones: 0 to 20 percent
Calcium carbonate equivalent: 0 to 15 percent in the less than 2 mm fraction
Effervescence: noneffervescent or slightly effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

Bk or Bw (when present) horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 7 to 27 percent
Rock fragment content: 65 to 90 percent
Pebbles: 15 to 70 percent
Cobbles or flagstones: 15 to 70 percent
Stones: 0 to 20 percent
Calcium carbonate equivalent: 15 to 40 percent in the less than 2 mm fraction
Effervescence: noneffervescent to violently effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

BC horizon
Rock fragment content: 90 to 100 percent
Channers: 0 to 5 percent
Cobbles or flagstones: 15 to 90 percent
Stones: 0 to 20 percent
Other: Pores - absent to many very coarse irregular

Related Types, Mosaics and Ecotones

Low Alpine Forb Cryochrepts, loamy-skeletal
- Soils have less than 90 percent rock fragments.

PIAL Lasac Mosaic

Summary

This mosaic is named for a blending of the *Pinus albicaulis/Carex geyeri* p.a. and *Pinus albicaulis/Vaccinium scoparium* p.a. on Lasac soils. It is on escarpments of plateaus in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1225
Landform: escarpments of plateaus
Parent material: local alluvium, colluvium or residuum derived from tephra and loess
Slope: 35 to 60 percent
Elevation: 6500 to 8000 feet
Average annual precipitation: 30 to 60 inches
Average annual air temperature: 30 to 37 degrees F
Soil temperature regime: cryic
Soils moisture regime: udic

Vegetation

Potential Natural Community

A mosaic of:

- *Pinus albicaulis/Carex geyeri* p.a.
- *Pinus albicaulis/Vaccinium scoparium* p.a.

Present Vegetation

A mosaic of:

- *Pinus albicaulis/Carex geyeri* p.a.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.

Succession

The *Pinus albicaulis/Carex geyeri* p.a is commonly on south aspects and the *Pinus albicaulis/Vaccinium scoparium* p.a. is commonly on west aspects. The two plant associations are combined in this mosaic because of their small patch-size.

Early seral conditions, as a result of high intensity fire or clearcutting, are similar for both plant associations. Few residual trees are supported. *Pinus albicaulis*, *Pinus contorta* or *Pseudotsuga menziesii* seedlings may be present. An open shrub layer reproduces vegetatively or from seed. Shrubs may include *Berberis repens*, *Ceanothus velutinus*, *Ribes viscosissimum*, *Sorbus scopulina* or *Spiraea betulifolia*. The herbaceous layer has low cover, low species diversity and is dominated by *Carex geyeri*.

Mid seral conditions for both plant associations support a tree canopy dominated by *Pinus contorta*. *Pinus albicaulis* is present. Other tree species and the composition of the shrub layer distinguish the two plant associations in mid seral conditions. The *Pinus albicaulis/Carex geyeri* p.a. supports all ages of *Pseudotsuga menziesii*. The shrub layer is depauperate and may include *Berberis repens*, *Ceanothus velutinus*, *Ribes viscosissimum*, *Sorbus scopulina* or *Spiraea betulifolia*. The *Pinus albicaulis/Vaccinium scoparium* p.a. supports widely dispersed *Abies lasiocarpa* seedlings in tree shadows. The shrub layer has low cover and is dominated by *Vaccinium scoparium*. The herbaceous layer, for both plant associations, has low to moderate cover, low species diversity and is dominated by *Carex geyeri*.

Distinct plant associations are identifiable in late seral to near PNC conditions. The *Pinus albicaulis/Carex geyeri* p.a. has an open tree canopy dominated by all ages of *Pinus albicaulis*. Dispersed *Pseudotsuga menziesii* may be present. The shrub layer is depauperate. *Carex geyeri* dominates the low to moderate cover in the herbaceous layer. *Carex rossii* or *Stipa occidentalis* may be present in tree interspaces and *Poa nervosa* var. *wheeleri* may be present in tree shadows. Forbs have low cover and low species diversity. The *Pinus albicaulis/Vaccinium scoparium* p.a. has a closed tree canopy dominated by all ages of *Pinus albicaulis*. Widely dispersed *Abies lasiocarpa* may be present. The shrub layer has moderate cover and is dominated by *Vaccinium scoparium*. The herbaceous layer has low cover, low species diversity and is dominated by *Carex geyeri*.

Discussion

A depauperate ground cover may persist after the occurrence of a high intensity fire followed by average growing seasons. An uncommonly moist and cool growing season allows the shrub and herbaceous layers to increase cover and enhances tree seedling establishment.

The somewhat excessively drained, volcanic soils of this mosaic influence community composition and development. The soil retains little moisture and rapidly dries after rain. Shallow rooted plants and

seedlings are limited by increased droughtiness as succession progresses. The soil binds phosphate, limiting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency. Volcanic glass shards are abundant throughout the soil. These shards may impede root and soil fauna development.

The species constancy and cover documentation for vegetation is on page 567.

Soils

Name: Lasac series
Taxonomic class: Ashy-skeletal, glassy Vitrandic Cryochrepts

Typical Pedon Description

Lasac, supporting the *Pinus contorta/Vaccinium scoparium* c.t. on a convex 40 percent slope with north aspect at 7160 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A--0 to 6 inches; brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few medium and coarse roots; many very fine irregular pores; 10 percent pebbles, 5 percent cobbles, 5 percent stones and trace boulders; moderately acid (pH 5.6); abrupt smooth boundary.

Bw--6 to 10 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; moderate fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; common very fine roots, few fine, medium and coarse roots, many very fine irregular pores; 10 percent pebbles, 5 percent cobbles, 5 percent stones and trace boulders; moderately acid (pH 5.7); abrupt smooth boundary.

2BC--10 to 17 inches; light yellowish brown (10YR 6/4) extremely gravelly loamy sand, dark yellowish brown (10YR 4/4) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few fine and medium roots; many fine irregular pores; 55 percent pebbles, 5 percent cobbles, 5 percent stones and trace boulders; slightly acid (pH 6.2); clear smooth boundary.

2C1--17 to 36 inches; variegated very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; many very fine roots, few fine and medium roots; many fine irregular pores; 45 percent pebbles, 5 percent cobbles, 5 percent stones and trace boulders; neutral (pH 6.8); diffuse wavy boundary.

2C2--36 to 60 inches; variegated very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many fine irregular pores; 45 percent pebbles, 5 percent cobbles, 5 percent stones and trace boulders; neutral (pH 7.0).

Typical Pedon Location

Located in ecological unit 1225.
Legal description: about 300 feet south and 2500 feet west of the northeast corner of section 14, T. 14 N., R. 44 E., Idaho
Latitude: 44 degrees, 32 minutes, 40 seconds, north
Longitude: 111 degrees, 13 minutes, 23 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat excessively drained
O horizon thickness: 0 to 2 inches
Ochric epipedon thickness: 4 to 8 inches
Thickness of andic soil properties: 10 to 14 inches
Depth to 2C horizons: 14 to 20 inches

A horizon
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.10 to 1.30 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15-bar water retention: 7 to 11 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent

Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Bw horizon
Hue: 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3, 4, 5 or 6 dry or moist
Texture: silt loam, sandy loam or coarse sandy loam
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 35 percent
Cobbles: 0 to 5 percent
Stones or boulders: 0 to 5 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.1 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15-bar water retention: 7 to 11 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

2BC horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 4 to 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loamy sand or loamy coarse sand
Rock fragment content: 40 to 80 percent
Pebbles: 30 to 60 percent
Cobbles: 5 to 20 percent
Stones or boulders: 5 to 25 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
15-bar water retention: 6 to 9 percent on air-dried samples
Phosphate retention: 35 to 60 percent
Base saturation 30 to 60 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

2C horizons
Color: variegated
Texture: sand or coarse sand
Rock fragment content: 40 to 90 percent
Pebbles: 30 to 60 percent
Cobbles: 5 to 20 percent
Stones or boulders: 5 to 25 percent
Volcanic glass content: greater than 85 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Base saturation: 50 to 80 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

PIAL/CARO5,PICO Lasac

- This ecological type occurs on cooler and drier positions.
- In the plant association, *Vaccinium scoparium* and *Carex geyeri* are poorly represented.

PIAL/ARTRP4 Fitzwil Ecotone

Summary

This ecotone is named for a blending of species from the *Pinus albicaulis/Festuca idahoensis* p.a. and *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Fitzwil soils. It is on plateaus near the upper timberline in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1576
Landform: plateaus
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 4 to 25 percent
Elevation: 7100 to 9400 feet
Average annual precipitation: 25 to 30 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

An ecotone of:

- *Pinus albicaulis/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Pinus albicaulis/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- Shrub dominated communities that have widely dispersed seedling through pole *Pinus albicaulis*.

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. The forestland philosophy suggests the *Pinus albicaulis/Festuca idahoensis* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance is suppressed for a long time period, a forestland plant association will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. The prominent herbaceous layer has high species diversity and is dominated by relatively shade intolerant *Festuca idahoensis*, *Stipa* species or *Trisetum spicatum*. *Achillea millefolium*, *Astragalus miser*, *Eriogonum umbellatum* or *Geum triflorum* are conspicuous. *Pinus albicaulis* may establish from seed caches.

The forestland philosophy suggests PNC occurs in the absence of fire. Reaching PNC may take hundreds of years. Succession may be interrupted by recurring fire, causing communities to regress to earlier seral stages.

Early seral conditions of the *Pinus albicaulis/Festuca idahoensis* p.a. support the species listed in the rangeland description. Mid seral conditions support widely dispersed *Pinus albicaulis*. Relatively shade tolerant graminoids and forbs establish in tree shadows. The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* and *Festuca idahoensis*.

Late seral and near PNC conditions of the *Pinus albicaulis/Festuca idahoensis* p.a. support an open tree canopy dominated by *Pinus albicaulis*. *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* dominates the sparse shrub layer. The diverse herbaceous layer has low to moderate cover and is dominated by *Festuca idahoensis*. *Poa compressa*, *Poa fendleriana* and *Hordeum jubatum* are prominent in tree shadows and *Agropyron trachycaulum* and *Bromus carinatus* are prominent in tree and shrub interspaces.

Discussion

Pinus albicaulis is a slow growing, moderately shade tolerant, long lived tree. *Pinus albicaulis* distribution is strongly influenced by seed cache locations of the Clark's nutcracker (*Nucifraga columbiana*).

Festuca idahoensis is a fire sensitive, perennial bunchgrass that reproduces by seed. Although seed production is high, germination rates are low. The root crowns may be severely damaged by summer and fall fire as a result of prolonged smoldering in the dense tuft of leaves and culms.

The species constancy and cover documentation for vegetation is on page 568.

Soils

Name: Fitzwil series
Taxonomic class: Loamy-skeletal, mixed, active Vitrandic Paleboralfs

Typical Pedon Description

Fitzwil, supporting the *Pinus albicaulis/Festuca idahoensis* p.a. on a 15 percent slope with south aspect at 8660 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 5 inches; brown (10YR 4/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium platy and moderate medium subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine and medium roots; many very fine and few fine tubular pores; 14 percent pebbles and trace cobbles; slightly acid (pH 6.2); abrupt smooth boundary.

A2--5 to 10 inches; brown (10YR 5/3) gravelly silt loam, very dark grayish brown (10YR 3/2) moist; moderate medium subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine and few fine tubular pores; 20 percent pebbles and trace cobbles; slightly acid (pH 6.2); abrupt smooth boundary.

E--10 to 17 inches; pale brown (10YR 6/3) very gravelly loam, brown (10YR 5/3) moist; moderate medium subangular blocky structure parting to moderate fine subangular blocky; slightly hard, friable, slightly sticky and nonplastic; common very fine roots, few fine and medium roots; many very fine tubular and few fine tubular pores; 40 percent pebbles and 5 percent cobbles; moderately acid (pH 6.0); clear smooth boundary.

E/Bt--17 to 26 inches; 90 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, and 10 percent light yellowish brown (10YR 6/4) fine veins and lamellae of B material, dark yellowish brown (10YR 4/4) moist, in a fine (less than 1/4 inch) irregular matrix that mixes to a very gravelly sandy loam; moderate fine subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; many very fine tubular pores; 40 percent pebbles and 5 percent cobbles; moderately acid (pH 6.0); clear smooth boundary.

Bt/E1--26 to 37 inches; 50 percent light brown (7.5 YR 6/4) B material, strong brown (7.5YR 5/6) moist, and 50 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, in a fine (less than 1/4 inch) irregular matrix that mixes to a very gravelly sandy clay loam; moderate medium subangular blocky structure parting to moderate fine subangular blocky; hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; many very fine tubular pores; 45 percent pebbles and 5 percent cobbles; moderately acid (pH 5.8); gradual smooth boundary.

Bt/E2--37 to 60 inches; 65 percent light brown (7.5YR 6/4) B material, strong brown (7.5YR 5/6) moist, and 35 percent very pale brown (10YR 7/3) E material, brown (10YR 5/3) moist, in a fine (less than 1/4 inch) irregular matrix that mixes to a very gravelly sandy clay loam; moderate medium subangular blocky structure; hard, firm, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; 45 percent pebbles and 5 percent cobbles; moderately acid (pH 5.8).

Typical Pedon Location

Located in mapping unit 1576.
Legal description: about 900 feet south and 1200 feet west of the NE corner of section 28, T. 13 N., R. 35 E., Idaho
Latitude: 44 degrees, 25 minutes, 49 seconds, north
Longitude: 112 degrees, 20 minutes, 32 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Umbric epipedon thickness: 10 to 20 inches
Depth to argillic horizon: 24 to 40 inches
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Other: a 1 inch thick O horizon may be present

A1 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 18 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 30 to 50 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

A2 horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 18 percent
Rock fragment content: 15 to 50 percent
Pebbles: 15 to 45 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 30 to 50 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

E or E/B (when present) horizon
Hue: 7.5YR or 10YR
Value:
E portion - 6 or 7 dry, 4 or 5 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 7 to 18 percent
Rock fragment content: 20 to 60 percent
Pebbles: 20 to 50 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Base saturation: 50 to 80 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: 85 to 100 percent E material and 0 to 15 percent B material (by volume)

E/Bt horizon
Hue: 10YR or 7.5YR
Value:
E portion - 6, 7 or 8 dry; 5 or 6 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry; 3, 4 or 6 moist
Texture: loam or sandy loam
Clay content: 12 to 18 percent
Rock fragment content: 35 to 80 percent
Pebbles: 35 to 70 percent
Cobbles: 0 to 15 percent
Stones: 0 to 10 percent
Volcanic glass content: 5 to 60 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)
Other: 50 to 85 percent E material and 15 to 50 percent B material (by volume)

Bt/E horizons
Hue: 7.5YR or 10YR
Value:
B portion - 5 or 6 dry, 4 or 5 moist
E portion: 6, 7 or 8 dry; 5 or 6 moist
Chroma:
B portion - 3 or 4 dry; 3, 4 or 6 moist
E portion - 2 or 3 dry or moist
Texture: loam or sandy clay loam
Clay content: 18 to 27 percent
Rock fragment content: 35 to 80 percent
Pebbles: 30 to 55 percent
Cobbles: 5 to 15 percent
Stones: 0 to 10 percent
Volcanic glass content: 5 to 60 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent B material and 15 to 50 percent E material (by volume)

Related Types, Mosaics and Ecotones

ABLA/ARCO9,ARCO9 Fitzwil

- This ecological type occurs on more moist positions that are sheltered from the wind.
- In the plant association, *Pseudotsuga menziesii* and *Abies lasiocarpa* dominate the tree layer; *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* is absent from the undergrowth.

ABLA/CARU,CARU Fitzwil

- This ecological type occurs on more moist positions that are sheltered from the wind.
- In the plant association, *Pseudotsuga menziesii* dominates the tree layer; *Calamagrostis rubescens* is well represented in the undergrowth.

PIAL/CARO5, PICO Lasac Ecological Type

Summary

This ecological type is named for the occurrence of the *Pinus albicaulis/Carex rossii* p.a., *Pinus contorta* phase on Lasac soils. It is on undulating to rolling plateaus in the cold, moist portion of the forested zone.

Environmental Setting

Ecological Unit: 1570 and 1573
Landform: plateaus
Parent material: local alluvium derived from tephra and loess
Slope: 4 to 25 percent
Elevation: 6800 to 8300 feet
Average annual precipitation: 30 to 60 inches
Average annual air temperature: 30 to 37 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pinus albicaulis/Carex rossii* p.a., *Pinus contorta* phase

Present Vegetation

- *Pinus contorta/Carex rossii* c.t.
- Herbaceous communities dominated by an open layer of *Carex rossii* or *Carex geyeri.*

Succession

Early seral conditions, as a result of high intensity fire or clearcutting, support herbaceous communities that are depauperate or have low cover. These communities are dominated by *Carex geyeri* or *Carex rossii.* Widely dispersed forbs, including *Epilobium angustifolium, Hieracium albiflorum* or *Penstemon montanus* var. *idahoensis* may be present. In more moist and cool growing seasons, *Pinus contorta* seedlings may establish and *Spiraea betulifolia* may sprout to form a dispersed tree and shrub layer.

Mid seral conditions support an open tree canopy dominated by *Pinus contorta. Pinus albicaulis* seedlings and saplings may be present in the openings; widely dispersed *Abies lasiocarpa* seedlings may be present in areas with abundant shade. *Spiraea betulifolia* or *Vaccinium scoparium* may form small, widely dispersed patches in an otherwise depauperate shrub layer. The herbaceous layer, dominated by *Carex geyeri* or *Carex rossii*, has low cover and low species diversity.

Late seral or near PNC conditions support an open tree canopy dominated by all ages of *Pinus albicaulis. Pinus contorta* and widely dispersed *Abies lasiocarpa* may be present.

Discussion

The depauperate undergrowth has low species diversity. The depauperate ground cover in early seral conditions may persist through average growing seasons. Moist and cool growing seasons allow the herbaceous layer to increase cover and enhance tree seedling establishment.

Communities in mid seral to near PNC conditions may resist low and moderate intensity fire because of the open tree canopy and depauperate undergrowth.

This ecological type has the lowest species diversity identified on the Targhee National Forest. The low diversity may result from the harsh climate and certain soil characteristics.

The volcanic soils of this ecological type influence community composition and development. The soil retains little moisture and rapidly dries after rain. Shallow rooted plants and seedlings are limited by increased droughtiness as succession progresses. The soil binds phosphate, limiting the availability of this major nutrient for plant use. Overall plant development is limited by phosphate deficiency. Volcanic glass shards are abundant throughout the soil. These shards may impede root and soil fauna development.

The species constancy and cover documentation for vegetation is on page 570.

Soils

Name: Lasac series
Taxonomic class: Ashy-skeletal, glassy Vitrandic Cryochrepts

Typical Pedon Description

Lasac, supporting the *Carex geyeri* community on a 10 percent slope with southeast aspect at 7650 feet

elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; dark grayish brown (10YR 4/2) gravelly sandy loam, very dark brown (10YR 2/2) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine irregular pores; 15 percent pebbles; moderately acid (pH 5.6); abrupt smooth boundary.

A2--3 to 6 inches; brown (10YR 5/3) gravelly sandy loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and nonplastic; many very fine and fine roots; common very fine irregular and few very fine tubular pores; 15 percent pebbles; moderately acid (pH 5.6); clear smooth boundary.

Bw--6 to 12 inches; light yellowish brown (10YR 6/4) gravelly coarse sandy loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots; common very fine irregular pores; 20 percent pebbles; moderately acid (pH 5.6); clear wavy boundary.

2BC--12 to 20 inches; very pale brown (10YR 7/3) and yellowish brown (10YR 5/4) very gravelly loamy sand, dark brown (10YR 3/3) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots, few fine and medium roots; many very fine and fine irregular pores; 30 percent pebbles, 5 percent cobbles and 5 percent stones; slightly acid (pH 6.2); diffuse wavy boundary.

2C--20 to 60 inches; variegated very gravelly coarse sand; single grain; loose, nonsticky and nonplastic; few very fine and fine roots; many fine irregular pores; 45 percent pebbles, 5 percent cobbles, 5 percent stones and trace boulders; neutral (pH 6.8).

Typical Pedon Location

Located in ecological unit 1570.
Legal description: about 100 feet north and 350 feet east of the northwest corner of section 21, T. 12 N., R. 45 E., Idaho
Latitude: 44 degrees, 20 minutes, 37 seconds, north
Longitude: 111 degrees, 09 minutes, 01 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat excessively drained
O horizon thickness: 0 to 2 inches
Ochric epipedon thickness: 4 to 8 inches
Thickness of andic soil properties: 10 to 14 inches
Depth to 2C horizons: 14 to 20 inches

A horizons
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.1 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15-bar water retention: 7 to 11 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Bw horizon
Hue: 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3, 4, 5 or 6 dry or moist
Texture: silt loam, sandy loam or coarse sandy loam
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 35 percent
Cobbles: 0 to 5 percent
Stones or boulders: 0 to 5 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.1 to 1.3 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15-bar water retention: 7 to 11 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

2BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4, 5, or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loamy sand or loamy coarse sand
Rock fragment content: 40 to 80 percent
Pebbles: 30 to 60 percent
Cobbles: 5 to 20 percent
Stones or boulders: 5 to 25 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
15-bar water retention: 6 to 9 percent on air-dried samples
Phosphate retention: 35 to 60 percent
Base saturation: 30 to 60 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

2C horizon
Color: variegated
Texture: sand or coarse sand
Rock fragment content: 40 to 90 percent
Pebbles: 30 to 60 percent
Cobbles: 5 to 20 percent
Stones or boulders: 5 to 25 percent
Volcanic glass content: greater than 85 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Base saturation: 50 to 80 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

PIAL Lasac

- This ecological type occurs on warmer and more moist positions.
- In the plant association, *Vaccinium scoparium* or *Carex geyeri* are well represented.

PICO Perfa Mosaic

Summary

This mosaic is named for a blending of the *Pinus contorta/Calamagrostis rubescens* c.t., *Pinus contorta/Carex geyeri* c.t. or *Pinus contorta/Vaccinium scoparium* c.t. on Perfa soils. It is on outwash plains and in drainageways of dissected tablelands in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1730 and 2040
Landform: dissected tablelands and outwash plains
Parent material: mixed alluvium
Slope: 0 to 4 percent
Elevation: 6300 to 6500 feet
Average annual precipitation: 28 to 32 inches
Average annual air temperature: 36 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

A mosaic of:

- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.

Present Vegetation

A mosaic of

- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.
- Herbaceous communities dominated by non-native grasses.

Succession

Three *Pinus contorta* community types are combined in this mosaic because of similar positions, small patch-size and limited extent.

Early seral conditions, as a result of fire or a persistent high water table, support few residual trees. Dead, standing trees may be present. *Pinus contorta* may establish from seed and *Populus tremuloides* from root suckers. A diverse shrub layer establishes vegetatively or from seed and may develop low cover. The herbaceous layer has variable cover, high species diversity and is dominant.

Later seral conditions support a closed canopy dominated by *Pinus contorta*. *Populus tremuloides* clones may be present. The shrub layer is dominated by dispersed colonies of *Arctostaphylos uva-ursi*, *Spiraea betulifolia*, *Vaccinium caespitosum* and *Vaccinium scoparium*. Widely dispersed *Lonicera* species and *Salix* species may be present. The herbaceous layer is dominated by patches of *Calamagrostis rubescens* and *Carex geyeri*. Forbs have moderate diversity and low cover.

Discussion

The sandy soils of this mosaic influence community composition and development. The soil is less than 18 inches deep to substratum layers that have sandy textures and a very rapid permeability. An apparent water table saturates this zone in early summer. These sandy layers rapidly dry as the water table recedes throughout the summer. A period of saturation followed by severe droughtiness occurs each growing season.

Long term fluctuations in the water table of this mosaic also influence community composition and development. The greatest seasonal fluctuation in the water table occurs when the forest canopy on adjacent uplands is near maturity. The soils become very droughty in late summer. Tree seedlings and drought intolerant species in the shrub and herbaceous layer lose vigor and die. When the adjacent uplands support early seral conditions, the water table remains close to the surface throughout the growing season. Established *Pinus contorta* may drown and riparian species may establish in the shrub and herbaceous layers.

The species constancy and cover documentation for vegetation is on page 571.

Soils

Name: Perfa series
Taxonomic class: Sandy, mixed Oxyaquic Cryochrepts

Typical Pedon Description

Perfa, supporting the *Pinus contorta/Calamagrostis rubescens* c.t. on a 1 percent slope at 6290 feet

elevation. (Colors are for dry soil unless otherwise noted.)

Oe--1 to 0 inches; forest litter of partially decomposed needles, twigs and cones; abrupt smooth boundary.

A--0 to 3 inches; dark grayish brown (10YR 4/2) sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and fine roots, few medium and coarse roots; common fine irregular pores; 10 percent pebbles; strongly acid (pH 5.4); abrupt smooth boundary.

Bw1--3 to 5 inches; brown (10YR 5/3) sandy loam, dark yellowish brown (10YR 3/4) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots, few medium and coarse roots; common fine irregular pores; 10 percent pebbles; strongly acid (pH 5.4); abrupt smooth boundary.

Bw2--5 to 11 inches; pale brown (10YR 6/3) sandy loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; common fine irregular pores; common medium distinct, yellowish brown (10YR 5/6) moist, and few fine distinct, strong brown (7.5YR 5/6) moist, soft Fe accumulations; 10 percent pebbles; moderately acid (pH 5.6); clear smooth boundary.

2C1--11 to 19 inches; variegated gravelly loamy coarse sand; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine and fine irregular pores; common medium distinct, strong brown (7.5YR 4/6) moist, soft Fe accumulations; 20 percent pebbles; slightly acid (pH 6.2); gradual smooth boundary.

2C2--19 to 44 inches; variegated gravelly coarse sand; massive; soft, very friable, nonsticky and nonplastic; few fine and medium roots; many very fine and fine irregular pores; few distinct, strong brown (7.5YR 5/6) moist, Fe accumulations in horizontal bands about 1 inch thick; 30 percent pebbles; slightly acid (pH 6.4); gradual wavy boundary.

2C3--44 to 62 inches; variegated gravelly coarse sand; single grain; loose; few fine roots; many very fine and fine irregular pores; 25 percent pebbles; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 2040.
Legal description: about 500 feet south and 1000 feet east of the northwest corner of section 6, T.12 N., R. 44 E., Idaho
Latitude: 44 degrees, 23 minutes, 55 seconds, north
Longitude: 111 degrees, 18 minutes, 40 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: moderately well drained
Water table, depth: 6 to 18 inches
Water table, kind: apparent
Water table, duration: April to June
Ochric epipedon thickness: 1 to 7 inches
Depth to redoximorphic features: 6 to 18 inches
Depth to 2C horizons: 10 to 18 inches.

A horizon
Hue: 10YR
Value: 4 or 5 dry; 2, 3 or 4 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 7 to 15 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Bw horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 3, 4, 5 or 6 moist
Chroma: 2 or 3 dry; 2, 3 or 4 moist
Texture: sandy loam
Clay content: 7 to 15 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
Abundance - absent to common
Size - fine or medium
Contrast - faint or distinct
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

2C horizons
Color: variegated
Texture: loamy coarse sand or coarse sand
Clay content: 2 to 6 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 35 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
Abundance - few or common
Size - fine or medium
Contrast - faint or distinct
Reaction: strongly acid to slightly acid (pH 5.1 to 6.5)

Related Types, Mosaics and Ecotones

PICO/VASC Islandpark
- Soils are loamy.

PICO/ARTRP4 Spliten Ecotone

Summary

This ecotone is named for a blending of species from the *Pinus contorta/Purshia tridentata* p.a. and *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Spliten soils. It is on droughty, low relief ridges and shoulders of a caldera floor and occurs in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1000
Landform: caldera floor
Parent material: loess and residuum derived from basalt
Slope: 0 to 4 percent
Elevation: 5900 to 6400 feet
Average annual precipitation: 20 to 30 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

An ecotone of:

- *Pinus contorta/Purshia tridentata* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- Communities that have a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Purshia tridentata* with an herbaceous layer dominated by one or more of the following: *Festuca idahoensis*, *Bromus carinatus, Koeleria nitida*, other native or non-native grasses or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium *Pinus contorta.*

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. The forestland philosophy suggests the *Pinus contorta/Purshia tridentata* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance are suppressed for a long time period, a forestland plant association will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora.* The prominent herbaceous layer has high species diversity and is dominated by *Festuca idahoensis*, *Koeleria nitida* or *Stipa* species. *Aster integrifolius*, *Eriogonum heracleoides* or *Polygonum douglasii* may be conspicuous. *Pinus contorta* seedlings may establish in *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* shadows or other microsites.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching PNC may take hundreds of years. Succession may be interrupted by recurring fire, causing a decrease in tree cover, an increase in shrub cover or a regression to earlier seral stages.

Early seral conditions of the *Pinus contorta/Purshia tridentata* p.a. support the communities listed in the rangeland description. Mid seral conditions support widely dispersed *Pinus contorta.* The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* and *Festuca idahoensis. Purshia tridentata* is conspicuous. *Pinus contorta* seedlings may establish in the shade of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Purshia tridentata* and other *Pinus contorta.*

Late seral and near PNC conditions of the *Pinus contorta/Purshia tridentata* p.a. support an open tree canopy dominated by *Pinus contorta.* The shrub layer has moderate cover and is dominated by *Purshia tridentata. Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* may be present. The herbaceous layer has low cover. *Phleum pratense* and *Poa compressa* are prominent in tree shadows; *Agropyron trachycaulum* and *Bromus carinatus* are prominent in the tree and shrub interspaces.

Discussion

Purshia tridentata is a low to medium height shrub that reproduces vegetatively and from seed. Regeneration is from root crown sprouts and adventitious buds where branches touch the ground. Factors affecting sprouting or seedling establishment are complex and varied. *Purshia tridentata* may have a significant role in the fertility of this ecotone. The shrub reportedly fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The shallow soils of this ecotone influence the community composition and development. Roots are restricted by hard bedrock at depths of 10 to 20 inches. As a result of weak anchoring, trees are susceptible to windthrow throughout the spring and summer.

The species constancy and cover documentation for vegetation is on page 572.

Soils

Name: Spliten series
Taxonomic class: Loamy, mixed, superactive Lithic Cryoborolls

Typical Pedon Description

Spliten, supporting a depauperate community dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Purshia tridentata* and annual forbs on a 2 percent slope at 6164 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 3 inches; brown (10YR 5/3) cobbly loam, dark brown (7.5YR 3/2) moist; weak fine subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine roots; common fine irregular pores; 15 percent cobbles; strongly acid (pH 5.2); clear smooth boundary.

Bw--3 to 12 inches; yellowish brown (10YR 5/4) cobbly loam, dark brown (7.5YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; common very fine and fine roots, few medium roots; few fine and medium tubular pores; 15 percent cobbles; strongly acid (pH 5.2); abrupt smooth boundary.

R--12 inches; hard basalt bedrock.

Typical Pedon Location

Located in ecological unit 1000.
Legal description: about 1200 feet south and 2100 feet east of the northwest corner of section 9, T.11 N., R. 43 E., Idaho
Latitude: 44 degrees, 17 minutes, 54 seconds, north
Longitude: 111 degrees, 23 minutes, 06 seconds, west

Range in Characteristics

Profile
Depth class: shallow (10 to 20 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Mollic epipedon thickness: 7 to 14 inches
Base saturation: 50 to 80 percent

A horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 8 to 16 percent
Rock fragment content: 15 to 35 percent
Pebbles: 0 to 5 percent
Cobbles: 15 to 25 percent
Stones: 0 to 5 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Bw horizon
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2, 3 or 4 dry; 2 or 3 moist
Texture: loam
Clay content: 8 to 16 percent
Rock fragment content: 5 to 35 percent
Pebbles: 0 to 5 percent
Cobbles: 5 to 25 percent
Stones: 0 to 5 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)

Related Types, Mosaics and Ecotones

PICO/ARTRP4 Vadnais
- Soils are 20 to 40 inches deep to hard bedrock.

PICO/ARTRP4 Vadnais Ecotone

Summary

This ecotone is named for a blending of species from the *Pinus contorta/Purshia tridentata* p.a. and the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on Vadnais soils. It is on undulating to rolling plains in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1046 and 1123
Landform: plains
Parent material: local alluvium derived from eolian materials
Slope: 1 to 12 percent
Elevation: 6300 to 6900 feet
Average annual precipitation: 20 to 26 inches
Average annual air temperature: 37 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

An ecotone of:

- *Pinus contorta/Purshia tridentata* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- Communities that have an open tree canopy of *Pinus contorta* and *Populus tremuloides* over a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Purshia tridentata* and *Symphoricarpos oreophilus*. An herbaceous layer is present in these communities. It is dominated by one or more of the following: *Agropyron spicatum, Koeleria nitida, Danthonia intermedia, Calamagrostis rubescens, Festuca idahoensis* or *Poa pratensis*.
- Communities that have a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Purshia tridentata* with an herbaceous layer dominated by one or more of the following: *Agropyron spicatum, Koeleria nitida, Danthonia intermedia* or other native or non-native grasses.
- Shrub dominated communities that have widely dispersed seedling through medium *Pinus contorta*.

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. The forestland philosophy suggests the *Pinus contorta/Purshia tridentata* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance are suppressed for a long time period, a forestland plant association will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. The prominent herbaceous layer has high species diversity and is dominated by *Festuca idahoensis*, *Koeleria nitida* or *Stipa* species. *Achillea millefolium*, *Antennaria microphylla*, *Eriogonum* species, or *Lupinus sericeus* may be conspicuous. *Pinus contorta* seeds establish in *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* shadows or other microsites.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching PNC may take hundreds of years. Succession may be interrupted by recurring fire, causing a decrease in tree cover, an increase in shrub cover or a regression to earlier seral stages.

Early seral conditions of the *Pinus contorta/Purshia tridentata* p.a. support the communities listed in the rangeland description. Mid seral conditions support widely dispersed *Pinus contorta*. Small clones of *Populus tremuloides* are present. The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* and *Festuca idahoensis*. *Purshia tridentata* is conspicuous. *Pinus*

contorta seedlings may establish in the shade of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Purshia tridentata* and other *Pinus contorta*.

Late seral and near PNC conditions of the *Pinus contorta/Purshia tridentata* p.a. support an open tree canopy dominated by *Pinus contorta*. The shrub layer has moderate cover and is dominated by *Purshia tridentata*. *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* may be present. The herbaceous layer has low cover. *Phleum pratense* and *Poa compressa* are prominent in tree shadows; *Agropyron trachycaulum* and *Bromus carinatus* are prominent in the tree and shrub interspaces.

Discussion

Purshia tridentata is a low to medium height shrub that reproduces vegetatively and from seed. Regeneration is from root crown sprouts and adventitious buds where branches touch the ground. Factors affecting sprouting or seedling establishment are complex and varied. *Purshia tridentata* may have a significant role in the fertility of this ecotone. The shrub reportedly fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The loamy soils of this ecotone influence the community composition and development. The surface and subsoil layers of the soil have low strength when moist. Roots are restricted by hard bedrock at depths of 20 to 40 inches. As a result of weak anchoring, trees are susceptible to windthrow during late spring.

The species constancy and cover documentation for vegetation is on page 573.

Soils

Name: Vadnais series
Taxonomic class: Fine-loamy, mixed, superactive Argic Pachic Cryoborolls

Typical Pedon Description

Vadnais, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on an undulating slope of 3 percent at 6540 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 4 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to moderate very fine granular; soft, very friable, nonsticky and nonplastic; many very fine and common fine roots; many very fine irregular pores; moderately acid (pH 6.0); abrupt smooth boundary.

A2--4 to 12 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; moderate very coarse subangular blocky structure parting to strong medium subangular blocky; hard, very friable, nonsticky and slightly plastic; common very fine and few fine roots; many very fine tubular pores; moderately acid (pH 6.0); clear smooth boundary.

Bt1--12 to 18 inches; yellowish brown (10YR 5/4) loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to strong fine subangular blocky; hard, friable, slightly sticky and plastic; few very fine and fine roots; few very fine tubular pores; few faint clay films on ped faces and lining pores; many cicada nodules; trace pebbles and cobbles; slightly acid (pH 6.2); clear smooth boundary.

Bt2--18 to 30 inches; pale brown (10YR 6/3) loam, brown (10YR 4/3) moist; moderate medium prismatic structure parting to strong medium subangular blocky; hard, firm, slightly sticky and plastic; few very fine roots; common very fine tubular pores; common faint clay films on ped paces and lining pores; common uncoated silt grains on ped faces; trace pebbles and cobbles; slightly acid (pH 6.4); abrupt wavy boundary.

R--30 inches; hard basalt bedrock.

Typical Pedon Location

Located in ecological unit 1046.
Legal description: about 250 feet west and 50 feet south of the northeast corner of section 11, T. 12 N., R. 40 E., Idaho
Latitude: 44 degrees, 23 minutes, 25 seconds, north
Longitude: 111 degrees, 41 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Mollic epipedon thickness: 17 to 38 inches
Depth to argillic horizon: 5 to 13 inches

A horizons
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist

Texture: silt loam
Clay content: 12 to 16 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bt horizons
Hue: 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3 or 4 moist
Chroma: 3 or 4 dry, 2 or 3 moist
Texture: silt loam or loam
Clay content: 22 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

PICO/ARTRP4 Spliten
- Soils are less than 20 inches deep to hard bedrock.

PICO/VASC Islandpark Ecological Type

Summary

This ecological type is named for the occurrence of the *Pinus contorta/Vaccinium scoparium* c.t. on Islandpark soils. It is on sideslopes and swales on a caldera floor and occurs in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1000
Landform: caldera floor
Parent material: local alluvium derived from loess and volcanic ash
Slope: 0 to 8 percent
Elevation: 5900 to 6400 feet
Average annual precipitation: 20 to 28 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pinus contorta/Vaccinium scoparium* c.t.

Present Vegetation

- *Pinus contorta/Carex geyeri* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Vaccinium scoparium* c.t.
- Communities that have a tree canopy of *Pinus contorta* with an herbaceous layer dominated by non-native grasses.
- Herbaceous communities dominated by *Carex geyeri* or non-native grasses.

Succession

Early seral conditions, as a result of clearcutting or fire, support few residual trees. *Pinus contorta* may establish from seed and *Populus tremuloides* from root suckers. The depauperate shrub layer may include *Amelanchier alnifolia*, *Salix scouleriana* and *Spiraea betulifolia*. The herbaceous layer has high cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Epilobium angustifolium*, *Geranium viscosissimum* and *Lupinus argenteus* are the most conspicuous forbs.

Mid seral conditions support a closed canopy dominated by *Pinus contorta*. *Populus tremuloides* clones and widely dispersed *Abies lasiocarpa* or *Pseudotsuga menziesii* may be present. Small patches of *Vaccinium scoparium* dominate the shrub layer. *Arctostaphylos uva-ursi*, *Lonicera utahensis* and *Spiraea betulifolia* may be present. The herbaceous layer has high cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Geranium viscosissimum* and *Lupinus argenteus* are conspicuous forbs.

Late seral and near PNC conditions were not observed. As a result of recurring fire and logging, regression to earlier seral conditions prevents many stands from progressing beyond *Pinus contorta* dominated communities. Current knowledge suggests that, in the absence of disturbance, mid seral conditions may progress towards the *Abies lasiocarpa/Vaccinium scoparium*, *Calamagrostis rubescens* p.a. or *Pseudotsuga menziesii/Vaccinium scoparium* community.

Discussion

Vaccinium scoparium is a low growing rhizomatous shrub. It is capable of reproducing by seed but primarily regenerates through rhizome sprouting. Rhizomes occur in the forest litter layer and roots extend into the top 2 or 3 inches of the soil. Because the rhizomes and roots are relatively shallow, they are sensitive to fire, scarification and warmer soil temperatures or droughtiness resulting from direct sunlight. The shrub loses vigor and dies when the tree canopy is removed, and regenerates as the canopy closes.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Carex geyeri is an aggressive, rhizomatous graminoid that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire. Though seed production is low, seeds stored in the soil for several decades may

germinate following a disturbance that opens the canopy.

Calamagrostis rubescens is a long lived graminoid. Reproduction from seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fire. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

The light colored, loamy soils of this ecological type influence community composition and development. Available nutrients are held in the forest litter layer and thin A horizon. The underlying soil layers retain few nutrients as a result of low clay and organic matter content. The thick E horizon has low strength when moist. As a result of weak anchoring, trees are susceptible to windthrow.

The species constancy and cover documentation for vegetation is on page 574.

Soils

Name: Islandpark series
Taxonomic class: Coarse-silty, mixed, active Vitrandic Paleboralfs

Typical Pedon Description

Islandpark, supporting the *Pinus contorta/Calamagrostis rubescens* c.t. on a concave slope of 3 percent at 5980 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots; few very fine irregular pores; very strongly acid (pH 4.8); abrupt wavy boundary.

E1--6 to 14 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine and fine roots; common fine and medium tubular pores; strongly acid (pH 5.4); gradual smooth boundary.

E2--14 to 36 inches; very pale brown (10YR 7/3) silt loam, dark grayish brown (10YR 4/2) moist; strong coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; common fine and medium roots; few fine tubular pores; strongly acid (pH 5.4); clear smooth boundary.

E/B1--36 to 51 inches; 95 percent very pale brown (10YR 7/3) E material, dark brown (10YR 4/3) moist, and 5 percent light yellowish brown (10YR 6/4) B material as fine (less than 1/2 inch) veins and lamellae, dark yellowish brown (10YR 4/4) moist, that mix to a silt loam; moderate coarse subangular blocky structure; soft, very friable, nonsticky and nonplastic; few medium roots; few fine and medium tubular pores; moderately acid (pH 5.8); clear wavy boundary.

E/B2--51 to 65 inches; 90 percent very pale brown (10YR 7/3) E material, dark brown (10YR 4/3) moist, and 10 percent yellowish brown (10YR 6/4) B material as fine (less than 1/2 inch) veins and lamellae, dark yellowish brown (10YR 4/4) moist, that mix to a loam; weak medium subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common fine roots; few fine and medium tubular pores; moderately acid (pH 5.8); abrupt wavy boundary.

2Bt--65 to 75 inches; brown (7.5YR 5/4) clay loam, dark brown (10YR 3/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine roots; few very fine tubular pores; common faint clay films on ped faces; common uncoated sand grains on ped faces; 10 percent pebbles; slightly acid (pH 6.2); abrupt wavy boundary.

R--75 inches; hard basalt bedrock.

Typical Pedon Location

Located in mapping unit 1000.
Legal description: about 500 feet south and 2300 feet west of the northeast corner of section 13, T. 10 N., R. 43 E., Idaho
Latitude: 44 degrees, 12 minutes, 01 seconds, north
Longitude: 111 degrees, 19 minutes, 25 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Depth to argillic horizon: 40 to 70 inches
Depth to R horizon: 60 to 100 inches

A horizon
Hue: 10YR
Value: 5 or 6 dry; 2, 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam

Clay content: 7 to 12 percent
Rock fragment content: 0 percent
Volcanic glass content: 50 to 80 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Phosphate retention: 20 to 50 percent
Base saturation: 20 to 50 percent
Reaction: very strongly acid or strongly acid (pH 4.5 to 5.5)
Other: Color after mixing the upper 7 inches has value greater than 5 dry or 3 moist

E horizons
Hue: 10YR
Value: 6 or 7 dry, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 12 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Base saturation: 30 to 80 percent
Reaction: very strongly acid to moderately acid (pH 4.5 to 6.0)

E/B horizons
Hue: 7.5YR or 10YR
Value:
E portion - 6 or 7 dry, 4 or 5 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 2, 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 7 to 16 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 15 percent
Stones: 0 to 5 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Base saturation: 60 to 100 percent
Reaction: strongly acid or moderately acid (pH 5.1 to 6.0)
Other: 85 to 95 percent E material and 5 to 15 percent B material (by volume)

2Bt horizon
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: clay loam or loam
Clay content: 24 to 35 percent
Rock fragment content: 0 to 20 percent
Pebbles: 0 to 20 percent
Cobbles: 0 to 15 percent
Stones: 0 to 5 percent
Volcanic glass content: less than 5 percent in the 0.02 to 2.0 mm fraction
Base saturation: 60 to 100 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

PICO Perfa
- Soils are sandy.

PIEN Cryaquolls Mosaic

Summary

This mosaic is named for a blending of the *Picea engelmannii/Galium triflorum* p.a. and the *Picea engelmannii/Equisetum arvense* p.a. on Cryaquoll soils. It is on cold, moist floodplains in the forested zone. This riparian mosaic occurs on stream terraces and in overflow channels that have a high water table and frequent, moderate to high-intensity floods.

Environmental Setting

Ecological Unit: 2609
Landform: floodplains
Parent material: mixed alluvium
Slope: 2 to 8 percent
Elevation: 5600 to 7800 feet
Average annual precipitation: 20 to 30 inches
Average annual air temperature: 34 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

A mosaic of:

- *Picea engelmannii/Galium triflorum* c.t.
- *Picea engelmannii/Equisetum arvense* c.t.

Present Vegetation

- *Picea engelmannii/Galium triflorum* c.t.
- *Picea engelmannii/Equisetum arvense* c.t.
- *Cornus stolonifera/Heracleum lanatum* c.t.
- *Alnus incana/Ribes hudsonianum* c.t.
- *Salix boothii/Smilacina stellata* c.t.
- *Salix geyeriana*/Mesic Forb c.t.
- *Picea engelmannii/Cornus stolonifera* community
- *Salix bebbiana/Urtica dioica* community

Succession

The *Picea engelmannii/Equisetum arvense* c.t. and the *Picea engelmannii/Galium triflorum* c.t. are combined in this mosaic because of their similar position and small patch-size. Both communities occur in patches of 1/10 to 1/4 acre. The *Picea engelmannii/Equisetum arvense* c.t. occupies narrow overflow channels that flood or pond for slightly longer periods than the subtle terraces occupied by the *Picea engelmannii/Galium triflorum* c.t.

Early seral conditions, as a result of fire or severe flooding, support few residual trees. Widely dispersed *Picea engelmannii*, *Pinus contorta* or *Pseudotsuga menziesii* may establish from seed. The diverse shrub layer establishes vegetatively or from seed and may develop high cover. *Alnus incana* var. *occidentalis*, *Cornus stolonifera*, *Ribes* species, *Salix bebbiana*, *S. boothii*, *S. drummondiana*, or *S. geyeriana* may be present. The herbaceous layer has high cover, high species diversity and is dominated by forbs.

Mid seral conditions support a canopy with variable cover codominated by *Picea engelmannii*, *Pinus contorta* and *Pseudotsuga menziesii*. *Abies lasiocarpa* may establish in tree shadows. The shrub layer has low cover and high species diversity. *Ribes lacustre* is common. Overflow channels support an herbaceous layer with high cover that is dominated by *Equisetum arvense*. The subtle terraces support a diverse herbaceous layer with low or moderate cover that is dominated by forbs. *Equisetum arvense*, *Fragaria virginiana*, *Galium triflorum* and *Osmorhiza chilensis* are present. Tree interspaces are similar to early seral conditions.

Late seral and near PNC conditions support a closed canopy dominated by *Picea engelmannii*. *Abies lasiocarpa* or *Pseudotsuga menziesii* may be present. The shrub layer is depauperate. Tree hummocks and old stumps support a sparse herbaceous layer codominated by *Galium triflorum* and other mesic forbs. *Equisetum arvense* dominates more moist positions.

Discussion

Equisetum arvense is a cryptogam that usually reproduces vegetatively. Rhizomes may extend as deep as 40 inches and resprout from fragments as small as 2 inches. Regeneration after disturbance is from residual or transported rhizomes.

Picea engelmannii is a long lived tree that tolerates cold, moist conditions. The tree establishes on bare mineral soil in shaded microsites. Seedlings and saplings may be extremely slow growing. *Picea engelmannii* has a shallow root system and is susceptible to windthrow.

The dynamic floodplains of this mosaic influence community composition and development. Narrow overflow channels and subtle terraces constantly shift across the floodplain in response to high intensity floods during peak snowmelt periods. The floods cut old terraces, open new channels and deposit new terraces.

The species constancy and cover documentation for vegetation is on page 575.

Soils

Name: Cryaquolls great group
Taxonomic class: Cryaquolls

Typical Pedon Description

Cryaquolls, supporting the *Picea engelmannii/Galium triflorum* c.t. on a 5 percent slope with west aspect at 6350 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 6 inches; very dark grayish brown (10YR 3/2) fine sandy loam, black (10YR 2/1) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and common fine roots; many very fine irregular pores; trace boulders; slightly acid (pH 6.1); abrupt wavy boundary.

A2--6 to 20 inches; very dark grayish brown (10YR 3/2) fine sandy loam, black (10YR 2/1) moist; weak very coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; common very fine irregular pores; few fine distinct, dark yellowish brown (10YR 3/4) moist, soft Fe accumulations in matrix and lining root channels; slightly acid (pH 6.1); abrupt wavy boundary.

AC--20 to 30 inches; grayish brown (10YR 5/2) stratified fine sandy loam, sandy loam and gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many very fine irregular and few very fine tubular pores; common medium distinct, dark yellowish brown (10YR 3/4) moist, soft Fe accumulations in matrix and lining root channels; 10 percent pebbles (mixed) and trace boulders; slightly acid (pH 6.1); abrupt wavy boundary.

2C--30 to 60 inches; variegated extremely cobbly loamy sand; single grain; loose; few very fine and fine roots; many medium and coarse irregular pores; 35 percent pebbles, 45 percent cobbles and 5 percent boulders; slightly acid (pH 6.1).

Typical Pedon Location

Located in ecological unit 2609.
Legal description: about 850 feet east and 1700 feet north of the southwest corner of section 2, T. 11 N., R. 44 E., Idaho
Latitude: 44 degrees, 18 minutes, 17 seconds, north
Longitude: 111 degrees, 13 minutes, 46 seconds, west

Range in characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat poorly drained
Ponding, depth: 6 to 0 inches
Water table, kind: apparent
Water table, duration: April to August
Mollic epipedon thickness: 7 to 30 inches
Depth to redoximorphic features: 0 to 18 inches
Depth to 2C horizon: 15 to greater than 60 inches
Other: Some pedons have a 1 to 8 inch thick Oe horizon, with a mucky peat texture, on the surface.

A horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: fine sandy loam
Clay content: 4 to 12 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Soft Fe accumulations:
  Abundance - absent to common
  Size - fine or medium
  Contrast - faint or distinct
Reaction: slightly acid to slightly alkaline (pH 6.1 to 7.8)

AC or Bw (when present) horizon
Hue: 10YR, 2.5Y or 5Y
Value: 4, 5 or 6 dry; 2, 3, 4 or 5 moist
Chroma: 1, 2 or 3 dry or moist
Texture: stratified silt loam to gravelly sandy loam
Clay content: 4 to 18 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 20 percent
Cobbles: 0 to 10 percent
Stones and boulders: 0 to 5 percent
Soft Fe accumulations:

Abundance - few to many
Size - fine to coarse
Contrast - faint to prominent
Soft to hard Fe/Mn accumulations:
Abundance - absent to common
Size - fine
Contrast - faint or distinct
Reaction: slightly acid to slightly alkaline (pH 6.1 to 7.8)

2C horizon
Color: variegated
Texture: stratified gravelly sandy loam to extremely cobbly coarse sand
Clay content: 0 to 12 percent
Rock fragment content: 15 to 90 percent
Pebbles: 5 to 40 percent
Cobbles: 5 to 50 percent
Stones and boulders: 0 to 15 percent
Soft Fe accumulations:
Abundance - absent to many
Size - fine to coarse
Contrast - distinct or prominent
Soft or hard Fe/Mn accumulations:
Abundance - absent to common
Size - fine
Contrast - faint or distinct
Reaction: moderately acid to slightly alkaline (pH 5.6 to 7.8)

Related Types, Mosaics and Ecotones

Graminoid Cryaquolls
- This ecological type occurs in closed basins.
- In the plant association, *Picea engelmannii* is absent.
- Soils have a subsoil layer with greater than 27 percent clay.

PIEN/GATR3 Cryofluvents
- Soils have a dark colored surface layer less than 7 inches thick.

Salix/Graminoid Cryaquolls
- This ecological type occurs on warmer positions.
- In the plant association, *Picea engelmannii* is absent.

Salix/Graminoid Cryaquolls, poorly drained
- This ecological type occurs on warmer positions.
- In the plant association, *Picea engelmannii* is absent.

PIEN/GATR3 Cryofluvents Ecological Type

Summary

This ecological type is named for the occurrence of the *Picea engelmannii/Galium triflorum* c.t. on Cryofluvent soils. It is a riparian ecological type on islands and river terraces within cool, moist floodplains.

Environmental Setting

Ecological Unit: 2604
Landform: floodplains
Parent material: mixed alluvium
Slope: 0 to 2 percent
Elevation: 5000 to 5600 feet
Average annual precipitation: 14 to 20 inches
Average annual air temperature: 35 to 41 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Picea engelmannii/Galium triflorum* c.t.

Present Vegetation

- *Populus angustifolia/Cornus stolonifera* c.t.
- *Populus angustifolia/Poa pratensis* c.t.
- *Populus angustifolia/Galium triflorum* c.t.
- *Picea engelmannii/Cornus stolonifera* c.t.
- *Picea engelmannii/Galium triflorum* c.t.
- Communities dominated by *Populus angustifolia* that have widely dispersed sapling through pole *Picea engelmannii* or *Pseudotsuga menziesii.*

Succession

Early seral conditions, as a result of fire or severe flooding, support few residual trees. *Populus angustifolia* may establish from seed. The shrub layer establishes vegetatively or from seed and may develop high cover. *Elaeagnus commutata, Salix exigua* and *Salix lutea* are prominent. The herbaceous layer may initially support annual forbs. *Phalaris arundinaceaea* may develop a high cover in 2 or 3 seasons, obscuring other graminoids and forbs.

Mid seral conditions support a variable canopy of *Populus angustifolia. Picea engelmannii* or *Pseudotsuga menziesii* may establish in tree shadows and *Juniperus scopulorum* may be present in interspaces. The shrub layer has variable cover and is dominated by *Cornus stolonifera. Elaeagnus commutata* or *Salix bebbiana* may be prominent in tree interspaces. The diverse herbaceous layer is dominated by graminoids or forbs. *Poa pratensis, Galium triflorum, Osmorhiza chilensis* or *Smilacina stellata* may be present.

Late seral and near PNC conditions support a closed canopy dominated by *Picea engelmannii.* The depauperate shrub layer may include *Cornus stolonifera* or *Ribes* species. The herbaceous layer has low cover and is dominated by forbs. *Actea rubra, Galium triflorum, Senecio triangularis, Smilacina stellata* and *Thalictrum occidentale* may be present.

Discussion

This ecological type occurs on what historically was an extremely dynamic flood plain, with channel movement, spring flooding, terrace erosion and deposition. *Populus angustifolia* communities persisted as a result of the recurring disturbance. Channels, islands and terraces have stabilized following the construction and operation of Palisades Dam. The more static conditions favor late seral and near PNC conditions.

Populus angustifolia is a shade intolerant pioneer in tree canopy development. Reproduction is from seeds that are viable for about 3 weeks and require freshly disturbed, moist, sandy soil in full sunlight for successful germination. The tree has a life span of 100 to 150 years.

Poa pratensis is an opportunistic graminoid that reproduces vegetatively and by seed. Seedling recruitment and establishment usually occur on disturbed sites. Abundant, viable seed is produced and, once established, is highly resistant to browsing or trampling. *Poa pratensis* is moderately shade tolerant and is replaced by *Calamagrostis rubescens* as the tree canopy closes.

Spiranthes diluvialis, an orchid listed as threatened under the Endangered Species Act of 1973, has been observed in this ecological type.

The species constancy and cover documentation for vegetation is on page 578.

Soils

Name: Cryofluvents subgroup
Taxonomic class: Oxyaquic Cryofluvents

Typical Pedon Description

Cryofluvents, supporting the *Populus angustifolia/Cornus stolonifera* c.t. on an undulating 1 percent slope at 5270 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 4 inches; grayish brown (10YR 5/2) loamy very fine sand, very dark grayish brown (10YR 3/2) moist; single grain; loose, nonsticky and nonplastic; common fine and medium roots; common very fine irregular pores; few fine and medium distinct, brown (7.5YR 5/4) moist, soft Fe accumulations in matrix; slightly effervescent; moderately alkaline (pH 8.0); abrupt wavy boundary.

AC--4 to 15 inches; light brownish gray (10YR 6/2) very fine sand, dark grayish brown (10YR 4/2) moist; single grain; loose, nonsticky and nonplastic; common medium and coarse roots; common very fine irregular pores; common fine and medium distinct, brown (7.5YR 5/4) moist, soft Fe accumulations in matrix; strongly effervescent; moderately alkaline (pH 8.0); abrupt smooth boundary.

2C--15 to 60 inches; variegated, stratified gravelly loamy fine sand to extremely cobbly coarse sand; single grain; loose, nonsticky and nonplastic; common fine and medium roots, few coarse roots; many fine irregular pores; common fine and medium distinct, brown (7.5YR 5/4) moist, soft Fe accumulations in matrix; 30 percent pebbles and 45 percent cobbles (mixed); strongly effervescent; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in ecological unit 2604.
Legal description: about 700 feet south and 1800 feet east of the northwest corner of section 11, T.1 N., R. 43 E., Idaho
Latitude: 43 degrees, 26 minutes, 08 seconds, north
Longitude: 111 degrees, 21 minutes, 43 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat poorly drained
Water table, depth: 0 to 36 inches
Water table, kind: apparent
Water table, duration: March to June
Ochric epipedon thickness: 1 to 7 inches
Depth to 2C horizon: 4 to 36 inches
Depth to redoximorphic features: 0 to 36 inches
Rock fragment content in the particle-size control section: 0 to 80 percent

A horizon
Hue: 10YR
Value: 4 or 5 dry; 2, 3 or 4 moist
Chroma: 2 dry, 2 or 3 moist
Texture: loamy very fine sand
Clay content: 1 to 5 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles: 0 percent
Stones or boulders: 0 percent
Soft Fe accumulations:
Abundance - absent to common
Size - fine to coarse
Contrast - faint to prominent
Calcium carbonate equivalent: 0 to 15 percent in the less than 2 mm fraction
Effervescence: noneffervescent to strongly effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

AC horizon
Hue: 10YR, 2.5Y or 5Y
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 1, 2, 3, or 4 dry or moist
Texture: very fine sand, loamy very fine sand or loam
Clay content: 1 to 14 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 25 percent
Cobbles: 0 to 10 percent
Stones or boulders: 0 percent
Soft Fe accumulations:
Abundance - few or common
Size - fine to coarse
Contrast - distinct or prominent
Calcium carbonate equivalent: 0 to 15 percent in the less than 2 mm fraction
Effervescence: noneffervescent to strongly effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)
Other: Horizon is absent in some pedons.

2C horizon
Color: variegated
Texture: stratified gravelly loamy fine sand to extremely cobbly coarse sand
Clay content: 0 to 5 percent
Rock fragment content: 15 to 90 percent
Pebbles: 15 to 35 percent
Cobbles: 0 to 45 percent
Stones or boulders: 0 to 10 percent
Soft Fe accumulations:
Abundance - common or many
Size - fine to coarse
Contrast - distinct or prominent
Calcium carbonate equivalent: 0 to 15 percent in the less than 2 mm fraction
Effervescence: noneffervescent to strongly effervescent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

Related Types, Mosaics and Ecotones

PIEN Cryaquolls
- Soils have a dark colored surface layer greater than 7 inches thick.

PIFL2/LEKI2 Fritz Ecological Type

Summary

This ecological type is named for the occurrence of the *Pinus flexilis/Leucopoa kingii* p.a. on Fritz soils. It is on warm, south facing mountain sideslopes in the dry portion of the forested zone.

Environmental Setting

Ecological Unit: 1129
Landform: mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 40 to 70 percent
Elevation: 7400 to 9800 feet
Average annual precipitation: 16 to 22 inches
Average annual air temperature: 37 to 43 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pinus flexilis/Leucopoa kingii* p.a.

Present Vegetation

- *Pinus flexilis/Leucopoa kingii* p.a.
- *Pinus flexilis/Cercocarpus ledifolius* var. *intercedens* community
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Shrub communities that are dominated by a closed layer of *Cercocarpus ledifolius* var. *intercedens* over a depauperate herbaceous layer.

Succession

Early seral conditions, as a result of fire, may support widely dispersed, mature *Pinus flexilis* or *Pseudotsuga menziesii*. *Juniperus scopulorum* or *Pinus flexilis* seedlings may be present. *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Cercocarpus ledifolius* var. *intercedens* may establish from seed and form a shrub layer with low cover. The diverse herbaceous layer has variable cover and is dominated by *Agropyron spicatum* or *Leucopoa kingii*.

Mid seral conditions support an open tree canopy dominated by *Juniperus scopulorum*, *Pinus flexilis* or *Pseudotsuga menziesii*. *Pseudotsuga menziesii* seedlings may establish in microsites shaded by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Pinus flexilis* or mature *Pseudotsuga menziesii*. *Cercocarpus ledifolius* var. *intercedens* forms an open to closed tall shrub layer. Tree and tall shrub interspaces support a low shrub layer dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. The herbaceous layer, dominated by graminoids, is depauperate under the closed tall shrub layer and has low or moderate cover in the interspaces.

Late seral and near PNC conditions support an open tree canopy codominated by *Pinus flexilis* and *Pseudotsuga menziesii*. The shrub layer has low cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*. Decadent *Cercocarpus ledifolius* var. *intercedens* may be present. The herbaceous layer has low to moderate cover and high species diversity. *Carex rossii* is dominant in tree shadows and *Leucopoa kingii* or *Agropyron spicatum* dominate tree interspaces.

Discussion

Juniperus scopulorum and *Pinus flexilis* are long-lived and drought tolerant. Both species establish from seed dispersed by water, birds or small mammals. Growth rates are slow.

Young *Juniperus scopulorum*, *Pinus flexilis* and *Pseudotsuga menziesii* are susceptible to low intensity fire as a result of short stature, compact crowns and thin bark. Older trees have thicker bark and more open crowns which enable them to survive low intensity fires.

Cercocarpus ledifolius var. *intercedens* is suggested as a seral species in this ecological type. Specific characteristics of community composition or landscape position have been difficult to discern. Minimal reproduction was observed in the Birch Creek and Medicine Lodge Creek drainages. Attempts at stimulating reproduction have had limited success, suggesting the present stands are decadent and likely seral to other communities.

Limited data collected in Indian Head Canyon and Coal Kiln Canyon suggests *Cercocarpus ledifolius* var. *intercedens* age varies from 40 to 100 years. The age of the supporting communities correlates roughly with the beginning of wild fire suppression

and disturbance associated with mining and milling activities during the late 1800's.

Cercocarpus ledifolius var. *intercedens* is a long-lived, relatively shade intolerant shrub that reproduces from seed. Seed production may be sporadic or cyclic. Germination requirements and conditions for seedling establishment are not clearly understood. Seedlings are sensitive to drought, frost and browsing. Sprouting after top-kill is weak or non-existent. Closed, even-aged layers are somewhat resistant to fire as a result of scattered fuels in the undergrowth. *Cercocarpus ledifolius* var. *intercedens* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major nutrient in the soil.

Leucopoa kingii is a rhizomatous, tufted bunchgrass that reproduces both vegetatively and by seed. The tufted growth form protects the interior of the plant and minimizes fire impact. Low intensity fires may enhance *Leucopoa kingii* survival.

Agropyron spicatum is a drought resistant, perennial bunchgrass that reproduces from seed. The seeds have low viability. First year seedlings are slow growing and easily outcompeted by more aggressive graminoids or forbs.

The species constancy and cover documentation for vegetation is on page 579.

Soils

Name: Fritz series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Typical Pedon Description

Fritz, supporting the *Pinus flexilis/Leucopoa kingii* p.a. on a 55 percent slope with south aspect at 9040 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 4 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; common very fine roots; many very fine irregular pores; strongly effervescent; 40 percent pebbles and trace cobbles; slightly alkaline (pH 7.8); abrupt smooth boundary.

A2--4 to 12 inches; brown (10YR 5/3) very gravelly loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots, common medium and coarse roots; many very fine irregular pores; common hard pendants of carbonates on underside of rock fragments; strongly effervescent; 45 percent pebbles and trace cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bkq1--12 to 24 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots, common medium and few coarse roots; many very fine irregular pores; many hard pendants of carbonates and few hard pendants of silica on underside of rock fragments; violently effervescent; 60 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bkq2--24 to 32 inches; light gray (10YR 7/2) extremely gravelly sandy loam, brown (10YR 5/3) moist; massive; hard, friable, nonsticky and slightly plastic; few fine roots; common very fine tubular pores; many hard pendants of carbonates and common hard pendants of silica on underside of rock fragments; many fine and medium (less than 1/5 inch) masses of soft powdery lime in matrix and on rock fragments; violently effervescent; 55 percent pebbles and 20 percent cobbles; moderately alkaline (pH 8.2); clear smooth boundary.

Bkq3--32 to 60 inches; light yellowish brown (2.5Y 6/3) extremely gravelly sandy loam; light olive brown (2.5Y 5/3) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine irregular pores; common hard pendants of carbonates and few hard pendants of silica on underside of rock fragments; violently effervescent; 60 percent pebbles and 20 percent cobbles; moderately alkaline (pH 8.2).

Typical Pedon Location

Located in ecological unit 1129.

Legal description: about 1100 feet south and 200 feet east of the northwest corner of section 20, T. 12 N., R. 30 E., Idaho

Latitude: 44 degrees, 21 minutes, 45 seconds, north

Longitude: 112 degrees, 54 minutes, 48 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

Mollic epipedon thickness: 8 to 15 inches

Depth to calcic horizon: 0 to 15 inches
Calcium carbonate equivalent in the mineralogy control section: greater than 40 percent in the less than 20 mm fraction

A1 horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 15 percent
Rock fragment content: 35 to 55 percent
Pebbles: 35 to 55 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 15 to 45 percent in the less than 2 mm fraction
Effervescence: slightly effervescent or strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

A2 horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam, silt loam or sandy loam
Clay content: 7 to 18 percent
Rock fragment content: 40 to 70 percent
Pebbles: 40 to 65 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 25 to 60 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq horizons
Hue: 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5 or 6 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 8 to 18 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 75 percent
Cobbles: 5 to 30 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 40 to 80 percent in the less than 2 mm fraction
Effervescence: violently effervescent or strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

Alpine Graminoid Fritz
- This ecological type occurs at higher elevations on cooler positions.
- In the plant association, graminoids are the dominant lifeform.

PSME/BERE,SYOR2 Fritz
- This ecological type occurs on slightly warmer positions.
- In the plant association, *Pseudotsuga menziesii* dominates the tree layer; *Berberis repens* is well represented in the undergrowth.

PSME/ARTRV Fourme Ecotone

Summary

This ecotone is named for a blending of species from the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. and the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or the *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. on Fourme soils. It is on alluvial fans and stream terraces in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1760
Landform: alluvial fans and stream terraces
Parent material: mixed alluvium
Slope: 0 to 4 percent
Elevation: 6300 to 7000 feet
Average annual precipitation: 18 to 26 inches
Average annual air temperature: 34 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

An ecotone of:

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- Communities that have a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* or *Artemisia tridentata* ssp. *spiciformis* with an herbaceous layer dominated by *Bromus carinatus* or *Agropyron trachycaulum.*
- Shrub dominated communities that have widely dispersed seedling through large *Pseudotsuga menziesii.*

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. The forestland philosophy suggests the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance is suppressed for a long time period, a forestland p.a. will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana.* The prominent herbaceous layer has high species diversity and is dominated by relatively shade intolerant *Agropyron spicatum*, *Agropyron trachycaulum*, *Bromus carinatus* or *Festuca idahoensis.* Species of *Astragalus*, *Lupinus* or *Penstemon* may be conspicuous. *Pseudotsuga menziesii* seedlings may establish in the shade of the *Artemisia* species or other microsites.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching PNC may take hundreds of years. Succession may be interrupted by recurring fire, causing the communities to regress to earlier seral stages. Early seral conditions of the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. support the communities listed in the rangeland description. Mid seral conditions support widely dispersed *Pseudotsuga menziesii* or *Juniperus scopulorum.* *Pseudotsuga menziesii* seedlings may establish in the shade of trees and shrubs. Small clones of *Populus tremuloides* may be present. Relatively shade tolerant shrubs, graminoids and forbs establish in tree shadows. These species include:

Amelanchier alnifolia, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Purshia tridentata* and *Symphoricarpos oreophilus.* The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Agropyron spicatum* and *Festuca idahoensis.*

Late seral and near PNC conditions support an open tree canopy dominated by *Pseudotsuga menziesii*. *Juniperus scopulorum* and *Populus tremuloides* are present. The shrub layer has moderate cover and is dominated by *Symphoricarpos oreophilus*. *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis* and *Prunus virginiana* var. *melanocarpa* may be present. The herbaceous layer has low cover. *Carex rossii* and *Poa nervosa* var. *wheeleri* are prominent in tree shadows and *Agropyron trachycaulum* and *Bromus carinatus* are prominent in the tree and shrub interspaces.

Discussion

Low intensity fire may increase shrub cover in the mid seral and PNC conditions of forestland. *Populus tremuloides*, *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus* regenerate by sprouting after low intensity fire. High intensity fire or drought conditions may reduce the resilience of tall shrub species and favor communities dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or var. *vaseyana*.

The species constancy and cover documentation for vegetation is on page 581.

Soils

Name: Fourme series
Taxonomic class: Loamy-skeletal, mixed, superactive Argic Cryoborolls

Typical Pedon Description

Fourme, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 2 percent slope at 6350 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 5 inches; dark brown (10YR 4/3) loam, dark brown (7.5YR 3/2) moist; weak fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; 10 percent pebbles; slightly acid (pH 6.1); clear smooth boundary.

BA--5 to 11 inches; yellowish brown (10YR 5/4) gravelly loam, dark brown (7.5YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and plastic; common very fine and fine roots; common fine irregular pores, few fine tubular pores; 15 percent pebbles; slightly acid (pH 6.1); gradual wavy boundary.

Bt1--11 to 19 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, dark brown (7.5YR 3/3) moist; moderate fine subangular blocky structure; slightly hard, firm, sticky and plastic; few very fine and fine roots; few fine irregular and tubular pores; 50 percent pebbles and 5 percent cobbles; many faint clay films on ped faces; slightly acid (pH 6.1); gradual wavy boundary.

Bt2--19 to 30 inches; light yellowish brown (10YR 6/4) very gravelly sandy clay loam, dark brown (7.5YR 3/3) moist; weak medium granular structure; soft, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine irregular pores; 35 percent pebbles; common distinct clay films bridging sand grains; slightly acid (pH 6.2); gradual wavy boundary.

C--30 to 60 inches; variegated extremely gravelly coarse sand; single grain; loose, nonsticky and nonplastic; few fine roots; common fine irregular pores; 60 percent pebbles and 10 percent cobbles; neutral (pH 6.6).

Typical Pedon Location

Located in ecological unit 1760.
Legal description: about 100 feet south and 100 feet east of the northwest corner of section 18, T.13 N., R.43 E., Idaho
Latitude: 44 degrees, 27 minutes, 25 seconds, north
Longitude: 111 degrees, 26 minutes, 05 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 10 to 15 inches
Depth to C horizon: 30 to 60 inches

A horizon
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 14 to 24 percent

Rock fragment content: 5 to 15 percent
Pebbles: 5 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

BA horizon
Hue: 7.5YR or 10YR
Value: 3, 4, 5 or 6 dry or moist
Chroma: 3, 4 or 6 dry or moist
Texture: loam
Clay content: 15 to 26 percent
Rock fragment content: 15 to 30 percent
Pebbles: 15 to 30 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt horizons
Hue: 7.5YR or 10YR
Value: 3, 4, 5 or 6 dry or moist
Chroma: 3, 4 or 6 dry or moist
Texture: clay loam or sandy clay loam
Clay content: 20 to 34 percent
Rock fragment content: 35 to 60 percent
Pebbles: 35 to 50 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid to slightly alkaline (pH 6.1 to 7.8)

C horizon
Color: variegated
Texture: sand, coarse sand or loamy sand
Clay content: 2 to 8 percent
Rock fragment content: 60 to 80 percent
Pebbles: 45 to 70 percent
Cobbles: 10 to 20 percent
Stones: 0 to 5 percent
Reaction: neutral to moderately alkaline (pH 6.6 to 8.4)

Related Types, Mosaics and Ecotones

PSME/ARTRV Meegero
- Soils have carbonates and lack an argillic horizon.

PSME/ARTRV Povey
- Soils have a dark colored surface layer greater than 16 inches thick and lack an argillic horizon.

PSME/ARTRV Tophat
- Soils are clayey and have less than 35 percent rock fragments.

PSME/ARTRV Meegero Ecotone

Summary

This ecotone is named for a blending of species from the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. and the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or the *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. on Meegero soils. It is on foothills, moraines and mountains in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1133
Landform: foothills, moraines and mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 20 to 50 percent
Elevation: 6700 to 9600 feet
Average annual precipitation: 16 to 19 inches
Average annual air temperature: 35 to 42 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

An ecotone of:

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- Shrub dominated communities that have widely dispersed seedling through medium *Pseudotsuga menziesii.*

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. The forestland philosophy suggests the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance is suppressed for a long time period, a forestland plant association will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions of the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana.* The prominent herbaceous layer has high species diversity and is dominated by relatively shade intolerant *Agropyron spicatum, Agropyron trachycaulum, Bromus carinatus* or *Festuca idahoensis.* Species of *Astragalus, Lupinus* or *Penstemon* may be conspicuous. *Pseudotsuga menziesii* seedlings may establish in the shade of the *Artemisia* species or other microsites.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching PNC may take hundreds of years. Succession may be interrupted by recurring fire, causing the communities to regress to earlier seral stages. Early seral conditions of the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. support the communities listed in the rangeland description. Mid seral conditions support widely dispersed *Juniperus scopulorum, Pinus flexilis* or *Pseudotsuga menziesii. Pseudotsuga menziesii* seedlings may establish in the shade of trees and shrubs. Relatively shade tolerant graminoids and forbs establish in tree shadows. The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Agropyron spicatum* and *Festuca idahoensis. Symphoricarpos oreophilus* is present.

Late seral and near PNC conditions support an open tree canopy dominated by *Pseudotsuga menziesii.*

Juniperus scopulorum and *Pinus flexilis* are present. The shrub layer has moderate cover and is dominated by *Symphoricarpos oreophilus*. The herbaceous layer has low cover. *Carex rossii* and *Poa nervosa* var. *wheeleri* are prominent in tree shadows and *Agropyron trachycaulum*, *Bromus carinatus* or *Festuca idahoensis* are prominent in the tree and shrub interspaces.

Discussion

Low intensity fire may increase shrub cover in the mid seral and PNC conditions of forestland. *Populus tremuloides*, *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus* regenerate by sprouting after low intensity fire. High intensity fire or drought conditions may reduce the resilience of tall shrub species and favor communities dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or var. *vaseyana*.

The species constancy and cover documentation for vegetation is on page 583.

Soils

Name: Meegero series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Pachic Cryoborolls

Typical Pedon Description

Meegero, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 32 percent slope with northeast aspect at 7900 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 6 inches; dark grayish brown (10YR 4/2) loam, very dark brown (10YR 2/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; many hard pendants of carbonates on underside of rock fragments; 10 percent pebbles; slightly alkaline (pH 7.6); clear smooth boundary.

AB--6 to 18 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots; many very fine irregular pores; many hard pendants of carbonates on underside of rock fragments; violently effervescent; 25 percent pebbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bkq1--18 to 24 inches; light brownish gray (10YR 6/2) extremely gravelly loam, grayish brown (10YR 5/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; few very fine and common fine roots; many fine and medium irregular pores; many hard pendants of carbonates and few hard pendants of silica on underside of rock fragments; violently effervescent; 70 percent pebbles and 10 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bkq2--24 to 32 inches; light gray (10YR 7/2) extremely cobbly sandy loam, pale brown (10YR 6/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; few very fine and fine roots; common fine tubular pores; continuous coats of soft powdery lime on rock fragments and few hard pendants of silica on underside of rock fragments; many masses of soft powdery lime in matrix; violently effervescent; 30 percent pebbles and 30 percent cobbles; moderately alkaline (pH 8.2); gradual smooth boundary.

Bkq3--32 to 60 inches; pale brown (10YR 6/3) extremely cobbly sandy loam, light olive brown (2.5Y 5/3) moist; weak coarse subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common fine tubular pores; continuous coats of soft powdery lime on rock fragments and few hard pendants of silica on underside of rock fragments; many masses of soft powdery lime in matrix; violently effervescent; 20 percent pebbles and 50 percent cobbles; moderately alkaline (pH 8.2).

Typical Pedon Location

Located in ecological unit 1133.

Legal description: about 2200 feet east and 1000 feet south of the northwest corner of section 2, T. 10 N., R. 31 E., Idaho

Latitude: 44 degrees, 13 minutes, 40 seconds, north

Longitude: 112 degrees, 47 minutes, 15 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

Mollic epipedon thickness: 17 to 28 inches

Depth to calcic horizon: 4 to 12 inches

Rock fragment content in the particle-size control section: average 35 to 80 percent
Calcium carbonate equivalent in mineralogy control section: average 40 to 55 percent in the less than 20 mm fraction

A horizon
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 12 to 18 percent
Rock fragment content: 5 to 15 percent
Pebbles: 5 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Calcium carbonate equivalent: 0 to 10 percent in the less than 2 mm fraction
Effervescence: noneffervescent or slightly effervescent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

AB horizon
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry: 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam or silt loam
Clay content: 14 to 22 percent
Rock fragment content: 20 to 35 percent
Pebbles: 20 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Calcium carbonate equivalent: 20 to 30 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq1 horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5, 6 or 7 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam
Clay content: 16 to 26 percent
Rock fragment content: 35 to 90 percent
Pebbles: 30 to 70 percent
Cobbles: 5 to 25 percent
Stones: 0 percent
Calcium carbonate equivalent: 35 to 45 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq2 and Bkq3 horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5, 6 or 7 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 12 to 24 percent
Rock fragment content: 65 to 90 percent
Pebbles: 20 to 40 percent
Cobbles: 30 to 50 percent
Stones: 0 percent
Calcium carbonate equivalent: 40 to 60 percent in the less than 2 mm fraction
Effervescence: violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Related Types, Mosaics and Ecotones

PSME/ARTRV Fourme
- Soils have an argillic horizon and lack carbonates.

PSME/ARTRV Povey
- Soils lack carbonates.

PSME/ARTRV Tophat
- Soils are clayey and have less than 35 percent rock fragments.

PSME/ARTRV Povey Ecotone

Summary

This ecotone is named for a blending of species from the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. and the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or the *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. on Povey soils. It is on canyons, dissected tablelands, foothills and mountains in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1204, 1216, 1219, 1224, 1250 and 1315

Landform: canyons, dissected tablelands, foothills and mountains

Parent material: local alluvium or colluvium derived from igneous or sedimentary rocks and loess

Slope: 4 to 60 percent

Elevation: 5300 to 9600 feet

Average annual precipitation: 18 to 26 inches

Average annual air temperature: 36 to 40 degrees F

Soil temperature regime: cryic

Soil moisture regime: xeric

Vegetation

Potential Natural Community

An ecotone of:

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Communities that have a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana, Ceanothus velutinus*, or *Symphoricarpos oreophilus* with an herbaceous layer dominated by *Stipa comata, Bromus carinatus, Agropyron spicatum, Carex geyeri*, or *Agropyron trachycaulum.*
- Communities that have a dispersed to open tree canopy of *Pseudotsuga menziesii, Juniperus scopulorum* or *Populus tremuloides* over a shrub layer dominated by one or more of the following: *Amelanchier alnifolia, Ceanothus velutinus, Symphoricarpos oreophilus, Purshia tridentata* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana.*
- Shrub dominated communities that have widely dispersed seedling through large *Pseudotsuga menziesii, Pinus contorta* or *Juniperus scopulorum.*

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. The forestland philosophy suggests the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance is suppressed for a long time period, a forestland plant association will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana.* The prominent herbaceous layer has high species diversity and is dominated by relatively shade intolerant *Agropyron spicatum, Agropyron trachycaulum, Bromus carinatus* or *Festuca idahoensis.* Species of *Astragalus, Lupinus* or *Penstemon* may be conspicuous. *Pseudotsuga menziesii* seedlings may establish in the shade of the *Artemisia* species or other microsites.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching PNC may

take hundreds of years. Succession may be interrupted by recurring fire, causing the communities to regress to earlier seral stages. Early seral conditions of the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. support the communities listed in the rangeland description. Mid seral conditions support widely dispersed *Juniperus scopulorum* or *Pseudotsuga menziesii*. *Pseudotsuga menziesii* seedlings may establish in the shade of trees and shrubs. Small clones of *Populus tremuloides* may be present. Relatively shade tolerant graminoids and forbs establish in tree shadows. These species include: *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Purshia tridentata* or *Symphoricarpos oreophilus*. The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Agropyron spicatum* and *Festuca idahoensis*.

Late seral and near PNC conditions support an open tree canopy dominated by *Pseudotsuga menziesii*. *Juniperus scopulorum* and *Populus tremuloides* are present. The shrub layer has moderate cover and is dominated by *Symphoricarpos oreophilus*. *Amelanchier alnifolia* and *Prunus virginiana* var. *melanocarpa* may be present. The herbaceous layer has low cover. *Carex rossii* and *Poa nervosa* var. *wheeleri* are prominent in tree shadows; *Agropyron trachycaulum* and *Bromus carinatus* are prominent in the tree and shrub interspaces.

Discussion

Low intensity fire may increase shrub cover in the mid seral and PNC conditions of forestland. *Populus tremuloides*, *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus* regenerate by sprouting after low intensity fire. High intensity fire or drought conditions may reduce the resilience of tall shrub species and favor communities dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or var. *vaseyana*.

The species constancy and cover documentation for vegetation is on page 585.

Soils

Name: Povey series

Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls

Typical Pedon Description

Povey, supporting a community of native and non-native grass on a 4 percent slope at 6440 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate very fine granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots, few fine and medium roots; many very fine irregular pores; 15 percent pebbles; slightly acid (pH 6.4); abrupt smooth boundary.

A2--3 to 27 inches; dark grayish brown (10YR 4/2) gravelly loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; common very fine and fine roots, few coarse roots; common very fine, few fine and medium tubular pores; 25 percent pebbles and trace cobbles; slightly acid (pH 6.1); clear wavy boundary.

Bw--27 to 39 inches; dark grayish brown (10YR 4/2) very gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; hard, very friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine tubular pores, few fine and medium tubular pores; 40 percent pebbles, 15 percent cobbles and trace stones; slightly acid (pH 6.2); clear wavy boundary.

BC--39 to 60 inches; pale brown (10YR 6/3) extremely gravelly sandy loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine tubular pores; 50 percent pebbles, 10 percent cobbles and 15 percent stones; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1250.

Legal description: about 300 feet east and 350 feet north of the southwest corner of section 27, T. 11 N., R 41 E., Idaho

Latitude: 44 degrees, 14 minutes, 48 seconds, north

Longitude: 111 degrees, 36 minutes, 53 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained

Mollic epipedon thickness: 20 to 44 inches

A horizons
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry; 1, 2 or 3 moist
Texture: loam
Clay content: 8 to 18 percent
Rock fragment content: 15 to 30 percent
Pebbles: 15 to 25 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizon
Hue: 10YR
Value: 4 or 5 dry; 2, 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam or loam
Clay content: 10 to 20 percent
Rock fragment content: 35 to 75 percent
Pebbles: 30 to 55 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Reaction: sightly acid or neutral (pH 6.1 to 7.3)

BC horizon
Hue: 10YR
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam or loam
Clay content: 8 to 18 percent
Rock fragment content: 50 to 75 percent
Pebbles: 30 to 60 percent
Cobbles: 5 to 30 percent
Stones: 0 to 15 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

PSME/ARTRV Fourme
- Soils have a dark colored surface layer less than 16 inches thick and an argillic horizon.

PSME/ARTRV Meegero
- Soils have carbonates.

PSME/ARTRV Tophat
- Soils are clayey and have less than 35 percent rock fragments.

PSME/ARTRV Tophat Ecotone

Summary

This ecotone is named for a blending of species from the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. and the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or the *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. on Tophat soils. It is on south facing foothill and mountain sideslopes and shoulders in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1209 and 1303
Landform: foothills and mountains
Parent material: local alluvium, colluvium or residuum derived from mixed sources
Slope: 15 to 50 percent
Elevation: 5600 to 8000 feet
Average annual precipitation: 20 to 28 inches
Average annual air temperature: 36 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

An ecotone of:

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a.
- *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a.

Present Vegetation

- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Communities that have a shrub layer dominated by *Artemisia tridentata* ssp. *spiciformis* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, with an herbaceous layer dominated by *Agropyron spicatum, Agropyron trachycaulum*, or *Bromus carinatus*.
- Shrub communities dominated by *Symphoricarpos oreophilus* or *Purshia tridentata*.
- Shrub dominated communities that have widely dispersed seedling through medium *Pseudotsuga menziesii* or *Juniperus scopulorum*.

Succession

The PNC of this ecotone may be considered from either a rangeland or a forestland philosophy. The rangeland philosophy suggests the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana/Bromus carinatus* p.a. The forestland philosophy suggests the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. Fire occurrence is the determining factor in the initial establishment of the two potential natural communities. If fire occurs within short time intervals, the area will remain rangeland. If fire and other disturbance is suppressed for a long time period, a forestland plant association will develop.

The rangeland philosophy includes a natural recurring fire frequency of 20 to 60 years. Early seral conditions support grasses and forbs. As succession progresses, the shrub layer develops a low to moderate cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*. The prominent herbaceous layer has high species diversity and is dominated by relatively shade intolerant *Agropyron spicatum*, *Agropyron trachycaulum*, *Bromus carinatus* or *Festuca idahoensis*. Species of *Astragalus*, *Lupinus* or *Penstemon* may be conspicuous. *Pseudotsuga menziesii* seedlings may establish in the shade of the *Artemisia* species or other microsites.

The forestland philosophy suggests PNC occurs in the absence of fire disturbance. Reaching climax conditions may take hundreds of years. Succession may be interrupted by recurring fire, causing the communities to regress to earlier seral stages.

Early seral conditions of the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. support communities listed in the rangeland description. Mid seral conditions support widely dispersed *Juniperus scopulorum* or *Pseudotsuga menziesii*. *Pseudotsuga menziesii* seedlings, may establish in the shade of trees and shrubs. Small clones of *Populus tremuloides* may be present. Relatively shade tolerant shrubs, graminoids and forbs establish in

tree shadows. The tree interspaces are dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Agropyron spicatum* and *Festuca idahoensis*. *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Purshia tridentata* or *Symphoricarpos oreophilus* may be present.

Late seral and near PNC conditions support an open tree canopy dominated by *Pseudotsuga menziesii*. *Juniperus scopulorum* and *Populus tremuloides* are present. The shrub layer has moderate cover and is dominated by *Symphoricarpos oreophilus*. *Amelanchier alnifolia* and *Prunus virginiana* var. *melanocarpa* may be present. The herbaceous layer has low cover. *Carex rossii* and *Poa nervosa* var. *wheeleri* are prominent in tree shadows; *Agropyron trachycaulum* and *Bromus carinatus* are prominent in the tree and shrub interspaces.

Discussion

Low intensity fire may increase shrub cover in the mid seral and PNC conditions of forestland. *Populus tremuloides*, *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *spiciformis*, *Ceanothus velutinus*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus* regenerate by sprouting after low intensity fire. High intensity fire or drought conditions may reduce the resilience of tall shrub species and favor communities dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or var. *vaseyana*.

The species constancy and cover documentation for vegetation is on page 585.

Soils

Name: Tophat series

Taxonomic class: Fine, mixed, superactive Argic Pachic Cryoborolls

Typical Pedon Description

Tophat, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* p.a. on a 47 percent slope with east aspect at 6000 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 7 inches; very dark grayish brown (10YR 3/2) cobbly loam, very dark brown (10YR 2/2) moist; moderate medium granular structure parting to weak very fine granular; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots, common medium roots; many very fine and common fine irregular pores; 10 percent pebbles and 10 percent cobbles; neutral (pH 7.0); abrupt smooth boundary.

AB--7 to 17 inches; reddish gray (5YR 5/2) cobbly clay loam, dark reddish brown (5YR 3/2) moist; moderate medium subangular blocky structure parting to moderate medium granular; hard, firm, sticky and plastic; common very fine, fine and medium roots; many very fine tubular pores, common fine irregular pores; few faint, dark reddish brown (5YR 3/2) moist, clay films on ped faces; 10 percent pebbles and 15 percent cobbles; slightly acid (pH 6.5); clear smooth boundary.

Bt1--17 to 28 inches; reddish brown (5YR 5/3) cobbly clay loam, dark reddish brown (5YR 3/3) moist; strong medium subangular blocky structure parting to strong very fine subangular blocky; hard, firm, sticky and very plastic; few very fine, fine and medium roots; common very fine tubular and few fine tubular pores; many faint, dark reddish brown (5YR 3/3) moist, clay films on ped faces; few distinct, dark reddish brown (5YR 3/3) moist, clay films lining pores; 10 percent pebbles and 15 percent cobbles; slightly acid (pH 6.5); clear smooth boundary.

Bt2--28 to 34 inches; reddish brown (5YR 5/3) cobbly clay loam, dark reddish brown (5YR 3/3) moist; strong medium subangular blocky structure; very hard, firm, sticky and very plastic; few very fine, fine and medium roots; common very fine and few fine tubular pores; common distinct, dark reddish brown (5YR 3/3) moist, clay films on ped faces and lining pores; 10 percent pebbles and 20 percent cobbles; slightly acid (pH 6.5); clear smooth boundary.

Bt3--34 to 45 inches; reddish brown (5YR 5/3) cobbly silty clay loam, weak red (2.5YR 4/2) moist, moderate coarse prismatic structure parting to moderate coarse subangular blocky; very hard, very firm, sticky and very plastic; few very fine and medium roots; common very fine tubular pores; common distinct, weak red (2.5YR 4/2) moist, clay films on ped faces and lining pores; 10 percent pebbles and 20 percent cobbles; slightly acid (pH 6.5); gradual smooth boundary.

Bt4--45 to 60 inches; reddish brown (5YR 5/3) very cobbly silty clay loam, weak red (2.5YR 4/2) moist; moderate very coarse prismatic structure parting to moderate very coarse subangular blocky; very hard, very firm, sticky and very plastic; few very fine and medium roots; common very fine tubular

pores; common distinct, weak red (2.5 YR 4/2) moist, clay films on ped faces and lining pores; 5 percent pebbles, 20 percent cobbles and 10 percent stones; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1303.
Legal description: about 1200 feet east and 1500 feet south of the northwest corner of section 1, T. 2 S., R. 44 E., Idaho
Latitude: 43 degrees, 16 minutes, 34 seconds, north
Longitude: 111 degrees, 14 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 16 to 40 inches
Depth to argillic horizon: 4 to 20 inches

A horizon
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 20 to 27 percent
Rock fragment content: 15 to 35 percent
Pebbles: 0 to 15 percent
Cobbles: 10 to 20 percent
Stones: 0 to 5 percent
Reaction: neutral (pH 6.6 to 7.3)

AB horizon
Hue: 2.5YR, 5YR, 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silty clay loam or clay loam
Clay content: 27 to 40 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)
Other: horizon absent in some pedons

Bt1 and Bt2 horizons
Hue: 2.5YR, 5YR, 7.5YR or 10YR
Value: 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: clay, silty clay loam or clay loam
Clay content: 35 to 50 percent
Rock fragment content: 0 to 35 percent
Pebbles: 0 to 15 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt3 and Bt4 horizons
Hue: 2.5YR, 5YR, 7.5YR, or 10YR
Value: 4, 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silty clay loam or clay loam
Clay content: 27 to 40 percent
Rock fragment content: 15 to 60 percent
Pebbles: 0 to 15 percent
Cobbles: 10 to 30 percent
Stones: 0 to 20 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

PSME/ARTRV Fourme
- Soils are loamy and have greater than 35 percent rock fragments.

PSME/ARTRV Meegero
- Soils are loamy and have greater than 35 percent rock fragments.

PSME/ARTRV Povey
- Soils are loamy and have greater than 35 percent rock fragments.

PSME/BERE,SYOR2 Cryochrepts, fine Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase on Cryochrepts, fine soils. It is on droughty, south facing mountain sideslopes in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1970
Landform: mountains
Parent material: residuum derived from calcareous shale
Slope: 15 to 70 percent
Elevation: 5700 to 8400 feet
Average annual precipitation: 20 to 24 inches
Average annual air temperature: 37 to 42 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase

Present Vegetation

- *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase
- Communities that have a dispersed to open layer of *Juniperus scopulorum* or *Cercocarpus ledifolius* var. *intercedens* over a low shrub and herbaceous layer dominated by one or more of the following: *Berberis repens, Symphoricarpos oreophilus, Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana, Artemisia tridentata* ssp. *spiciformis, Chrysothamnus* sp., *Balsamorhiza sagittata, Agropyron spicatum* or *Oryzopsis hymenoides.*

Succession

Early seral conditions, as a result of fire, may support widely dispersed, mature *Pseudotsuga menziesii. Juniperus scopulorum* and *Pinus flexilis* may establish from seed. *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana, Symphoricarpos oreophilus* or *Cercocarpus ledifolius* var. *intercedens* may reproduce from seed and develop a low to moderate shrub cover. An herbaceous layer dominated by *Agropyron spicatum* is prominent. Annual, biennial and short lived perennial forbs may be present.

Mid seral conditions support a dispersed to open tree canopy codominated by *Juniperus scopulorum, Pinus flexilis* and *Pseudotsuga menziesii. Pseudotsuga menziesii* seedlings may establish in microsites shaded by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Cercocarpus ledifolius* var. *intercedens, Pinus flexilis* or residual *Pseudotsuga menziesii.* Two distinct communities may be observed in the undergrowth. *Cercocarpus ledifolius* var. *intercedens* may form a closed shrub layer over a depauperate herbaceous layer. Several species codominate the shrub layer. They include *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana, Berberis repens, Cercocarpus ledifolius* var. *intercedens, Prunus virginiana* var. *melanocarpa* or *Symphoricarpos oreophilus.* The herbaceous layer has low cover and is dominated by *Agropyron spicatum.*

Late seral and near PNC conditions support an open *Pseudotsuga menziesii* canopy. Widely dispersed *Juniperus scopulorum* or *Pinus flexilis* may be present. Tree interspaces support a tall shrub layer with low cover. This layer is codominated by *Amelanchier alnifolia, Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus.* The prominent low shrub layer is dominated by *Berberis repens* or *Pachistima myrsinites.* Decadent *Cercocarpus ledifolius* var. *intercedens* is usually present. The herbaceous layer has low cover and moderate species diversity. *Calamagrostis rubescens, Carex geyeri* or *Poa nervosa* var. *wheeleri* are prominent in tree shadows and *Agropyron spicatum, Balsamorhiza sagittata* or *Helianthella uniflora* are prominent in the tree interspaces. Late seral conditions are somewhat resistant to low and moderate intensity fire. This may be the result of an open tree canopy, the relatively thick, corky bark of *Pseudotsuga menziesii* and scattered fuels.

Discussion

Cercocarpus ledifolius var. *intercedens* is a long-lived, relatively shade intolerant shrub that reproduces from seed. Seed production may be sporadic or cyclic. Germination requirements and conditions for seedling establishment are not clearly understood. Seedlings are sensitive to drought, frost and browsing. Sprouting after top-kill is weak or non-existent. Closed, even-aged layers are somewhat resistant to fire as a result of scattered fuels in the undergrowth. *Cercocarpus ledifolius* var. *intercedens* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major nutrient in the soil.

The droughty soils of this ecological type influence community composition and development. The soils are dry for significant periods during the mid and late portions of the growing season. The absence of shade and a strong southerly exposure accelerates drying during early seral stages. Extensive root systems and increased evapotranspiration dry the soil during late seral and PNC conditions. Shallow rooted plants and seedlings are limited by droughtiness in all seral stages.

The species constancy and cover documentation for vegetation is on page 591.

Soils

Name: Cryochrepts, fine family
Taxonomic class: Fine, carbonatic Typic Cryochrepts

Typical Pedon Description

Cryochrepts, fine, supporting the *Juniperus scopulorum/Agropyron spicatum* community on a 55 percent slope with south aspect at 6550 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 2 inches; brown (10YR 5/3) channery silty clay loam, brown (10YR 4/3) moist; strong fine granular structure; hard, firm, slightly sticky and plastic; many very fine, fine and medium roots; many fine irregular pores; 1/8 inch thick vesicular crust on surface; violently effervescent; 15 percent channers, 10 percent flagstones and 5 percent channer-size fragments of soft shale; moderately alkaline (pH 8.0); abrupt smooth boundary.

Bw1--2 to 8 inches; yellowish brown (10YR 5/4) silty clay loam, dark yellowish brown (10YR 4/4) moist; moderate fine angular blocky structure; hard, very firm, sticky and very plastic; few very fine and fine roots; few very fine tubular pores; violently effervescent; 5 percent channers, 5 percent flagstones and 20 percent channer-size fragments of soft shale; moderately alkaline (pH 8.0); clear smooth boundary.

Bw2-- 8 to 18 inches; yellow (10YR 7/6) silty clay loam, brownish yellow (10YR 6/6) moist; moderate fine angular blocky structure; hard, firm, sticky and very plastic; few very fine roots; violently effervescent; 5 percent channers and 40 percent channer-size fragments of soft shale; moderately alkaline (pH 8.0); gradual wavy boundary.

BC--18 to 30 inches; brownish yellow (10YR 6/6) silty clay, yellowish brown (10YR 5/6) moist; weak coarse platy structure; very hard, very firm, sticky and very plastic; violently effervescent; 85 percent channer-size fragments of soft shale; moderately alkaline (pH 8.0); diffuse wavy boundary.

Cr--30 to 40 inches; brownish yellow (10YR 6/6) soft shale, yellowish brown (10YR 5/6) moist; violently effervescent.

Typical Pedon Location

Located in ecological unit 1970.
Legal description: about 300 feet south and 400 feet east of the northwest corner of section 5, T. 1 S., R. 43 E., Idaho
Latitude: 43 degrees, 21 minutes, 53 seconds, north
Longitude: 111 degrees, 26 minutes, 58 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: weathered bedrock (Cr horizon)
Drainage class: well drained
Ochric epipedon thickness: 2 to 7 inches
Depth to BC horizon: 3 to 30 inches

A horizon
Hue: 10YR or 2.5Y
Value: 4, 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silty clay loam
Clay content: 27 to 40 percent
Rock fragment and soft shale fragment content: 15 to 60 percent
Rock fragment content: 15 to 35 percent
Channers: 10 to 20 percent

Cobbles or flagstones: 0 to 15 percent
Stones: 0 to 5 percent
Soft shale fragments: 0 to 45 percent
Calcium carbonate equivalent: 40 to 80 percent in the less than 2 mm fraction
Effervescence: strongly or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Bw horizons
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry or moist
Texture: silty clay loam, silty clay or clay
Clay content: 35 to 60 percent
Rock fragment and soft shale fragment content: 15 to 80 percent
Rock fragment content: 0 to 35 percent
Channers: 0 to 35 percent
Cobbles or flagstones: 0 to 15 percent
Stones: 0 to 5 percent
Soft shale fragments: 15 to 60 percent
Calcium carbonate equivalent: greater than 60 percent in the less than 2 mm fraction
Reaction: moderately alkaline (pH 7.9 to 8.4)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3, 4 or 6 dry or moist
Texture: silty clay loam, silty clay or clay
Clay content: 35 to 60 percent
Rock fragment and soft shale fragment content: 80 to 95 percent
Rock fragment content: 0 to 35 percent
Channers: 0 to 15 percent
Cobbles or flagstones: 0 to 35 percent
Stones: 0 to 5 percent
Soft shale fragments: 60 to 95 percent
Calcium carbonate equivalent: 60 to 70 percent in the less than 2 mm fraction
Reaction: moderately alkaline (pH 7.9 to 8.4)

Cr horizon
Other: soft shale with 5 to 60 percent massive limestone bands that are fractured into flagstones, stones or boulders

Related Types, Mosaics and Ecotones

Low Alpine Forb Cryochrepts, loamy-skeletal
- This ecological type occurs at higher elevations, on cooler positions.
- In the plant association, low alpine forbs dominate.
- Soils are loamy and have greater than 35 percent rock fragments.

PSME/BERE,SYOR2 Fritz
- Soils are loamy and have greater than 35 percent rock fragments.

PSME/BERE,SYOR2 Fritz Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase on Fritz soils. It is on droughty, south facing foothill and mountain sideslopes and ridges in the mid and warm portions of the forested zone.

Environmental Setting

Ecological Unit: 1106, 1172 and 1219
Landform: foothills and mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 35 to 70 percent
Elevation: 5200 to 9700 feet
Average annual precipitation: 20 to 24 inches
Average annual air temperature: 37 to 43 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase

Present Vegetation

- *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase
- *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Agropyron spicatum* community
- Communities that have a dispersed to open tree canopy dominated by *Pseudotsuga menziesii* with an open to closed shrub layer dominated by *Cercocarpus ledifolius* var. *intercedens*. Other trees and shrubs present in these communities include: *Pinus flexilis, Juniperus scopulorum, Acer grandidentatum, Symphoricarpos oreophilus* and *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*.
- Communities that have a dispersed to closed layer of *Cercocarpus ledifolius* var. *intercedens* or *Juniperus scopulorum* over a low shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Symphoricarpos oreophilus*, *Purshia tridentata* or *Berberis repens*. *Balsamorhiza sagittata* and *Agropyron spicatum* are common in the herb layer.

Succession

Early seral conditions, as a result of fire, may support widely dispersed, mature *Pseudotsuga menziesii*. *Juniperus scopulorum* and *Pinus flexilis* establish from seed. *Acer grandidentatum*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Cercocarpus ledifolius* var. *intercedens* and *Symphoricarpos oreophilus*, reproduce from seed and develop a low to moderate shrub cover. An herbaceous layer dominated by *Agropyron spicatum* is prominent. Annual, biennial and short lived perennial forbs may be present.

Mid seral conditions support a dispersed to open tree canopy codominated by *Juniperus scopulorum*, *Pinus flexilis* and *Pseudotsuga menziesii*. *Pseudotsuga menziesii* seedlings may establish in microsites shaded by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Pinus flexilis* or residual *Pseudotsuga menziesii*. Two distinct communities may be observed in the undergrowth. *Cercocarpus ledifolius* var. *intercedens* may form a closed shrub layer over a depauperate herbaceous layer. Several species codominate the shrub layer. They include: *Acer grandidentatum*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Berberis repens*, *Cercocarpus ledifolius* var. *intercedens*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus*. The herbaceous layer has low cover and is dominated by *Agropyron spicatum*.

Late seral and near PNC conditions support an open *Pseudotsuga menziesii* canopy. Widely dispersed *Juniperus scopulorum* or *Pinus flexilis* may be present. Tree interspaces support a tall shrub layer with low cover. This layer is codominated by *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus*. The prominent, low shrub layer is dominated by *Berberis repens* or *Pachistima myrsinites*. Decadent *Cercocarpus ledifolius* var. *intercedens* is usually present. The herbaceous layer has low cover and moderate species diversity. *Calamagrostis rubescens*, *Carex geyeri* or *Poa nervosa* var. *wheeleri* are prominent in tree shadows and *Agropyron spicatum*, *Balsamorhiza sagittata* or *Helianthella uniflora* are prominent in the tree interspaces. Late seral conditions are somewhat resistant to low and moderate intensity fire. This may

be the result of an open tree canopy, the relatively thick corky bark of *Pseudotsuga menziesii* and scattered fuels.

Discussion

Cercocarpus ledifolius var. *intercedens* is a long-lived, relatively shade intolerant shrub that reproduces from seed. Seed production may be sporadic or cyclic. Germination requirements and conditions for seedling establishment are not clearly understood. Seedlings are sensitive to drought, frost and browsing. Sprouting after top-kill is weak or non-existent. Closed, even-aged layers are somewhat resistant to fire as a result of scattered fuels in the undergrowth. *Cercocarpus ledifolius* var. *intercedens* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major nutrient in the soil.

The droughty soils of this ecological type influence community composition and development. The soils are dry for significant periods during the mid and late portions of the growing season. The absence of shade and a strong southerly exposure accelerates drying during early seral stages. Extensive root systems and increased evapotranspiration dry the soil during late seral and PNC conditions. Shallow rooted plants and seedlings are limited by droughtiness in all seral stages.

The species constancy and cover documentation for vegetation is on page 592.

Soils

Name: Fritz series

Taxonomic class: Loamy-skeletal, carbonatic Calcic Cryoborolls

Typical Pedon Description

Fritz, supporting the *Pseudotsuga menziesii/Berberis repens* p.a., *Symphoricarpos oreophilus* phase on a 48 percent slope with east aspect at 5900 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 5 inches; grayish brown (10YR 5/2) gravelly silt loam, brown (10YR 3/3) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine and few fine roots; common very fine and fine irregular pores; slightly effervescent; 15 percent pebbles and trace cobbles; moderately alkaline (pH 7.9); clear smooth boundary.

A2--5 to 11 inches; brown (10YR 5/3) gravelly silt loam, dark brown (10YR 3/3) moist; weak fine and medium granular structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; common very fine and fine irregular pores; few hard pendants of carbonates on underside of rock fragments; strongly effervescent; 20 percent pebbles and 10 percent cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bk1--11 to 26 inches; light gray (10YR 7/2) very gravelly loam, grayish brown (10YR 5/2) moist; weak fine subangular blocky structure; hard, friable, nonsticky and slightly plastic; few very fine and fine roots; few very fine and common fine tubular pores; many hard pendants of carbonates and continuous coats of soft powdery lime on underside of rock fragments; violently effervescent; 30 percent pebbles, 10 percent cobbles and 5 percent stones; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk2--26 to 39 inches; very pale brown (10YR 7/3) very gravelly sandy loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; hard, friable, nonsticky and slightly plastic; few very fine roots; few very fine and fine tubular pores; many hard pendants of carbonates and continuous coats of soft powdery lime on underside of rock fragments; violently effervescent; 30 percent pebbles, 15 percent cobbles and 5 percent stones; moderately alkaline (pH 8.2); gradual wavy boundary.

Bk3--39 to 45 inches; very pale brown (10YR 8/2) very cobbly sandy loam, very pale brown (10YR 7/3) moist; massive; hard, friable, nonsticky and slightly plastic; few very fine roots; few very fine tubular pores; many hard pendants of carbonates and continuous coats of soft powdery lime on rock fragments; violently effervescent: 20 percent pebbles, 20 percent cobbles and 5 percent stones; moderately alkaline (pH 8.4); abrupt irregular boundary.

R--45 inches; hard limestone bedrock.

Typical Pedon Location

Located in ecological unit 1106.

Legal description: about 2500 feet east and 700 feet north of the southwest corner of section 33, T. 4 N., R. 42 E., Idaho

Latitude: 43 degrees, 36 minutes, 28 seconds, north

Longitude: 111 degrees, 31 minutes, 00 seconds, west

Range in Characteristics

Profile
Depth class: deep (40 to 60 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Mollic epipedon thickness: 8 to 15 inches
Depth to calcic horizon: 0 to 15 inches
Rock fragment content in the particle-size control section: average 40 to 85 percent
Calcium carbonate equivalent in the mineralogy control section: average 40 to 80 percent in the less than 20 mm fraction

A1 horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 15 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 35 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Effervescence: slightly effervescent or strongly effervescent
Calcium carbonate equivalent: 15 to 45 percent in the less than 2 mm fraction
Reaction: slightly or moderately alkaline (pH 7.4 to 8.4)

A2 horizon
Hue: 10YR or 2.5Y
Value: 5 dry, 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam or loam
Clay content: 7 to 18 percent
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 50 percent
Cobbles: 0 to 10 percent
Stones: 0 to 15 percent
Effervescence: strongly effervescent or violently effervescent
Calcium carbonate equivalent: 25 to 50 percent in the less than 2 mm fraction
Reaction: slightly or moderately alkaline (pH 7.4 to 8.4)

Bk horizons
Hue: 10YR or 2.5Y
Value: 5, 6, 7 or 8 dry; 4, 5, 6 or 7 moist
Chroma: 1, 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 8 to 18 percent
Rock fragment content: 35 to 90 percent
Pebbles: 10 to 60 percent
Cobbles: 0 to 50 percent
Stones: 0 to 15 percent
Effervescence: violently effervescent
Calcium carbonate equivalent: 40 to 80 percent in the less than 2 mm fraction
Reaction: slightly or moderately alkaline (pH 7.4 to 8.4)

Related Types, Mosaics and Ecotones

Alpine Graminoid Fritz
- This ecological type occurs at higher elevations on cooler positions.
- In the plant association, graminoids are the dominant lifeform.

PIFL2/LEKI2 Fritz
- This ecological type occurs on slightly cooler positions.
- In the plant association, a *Pinus flexilis* canopy is present; *Leucopoa kingii* or *Cercocarpus ledifolius* var. *intercedens* is well represented in the undergrowth.

PSME/BERE,SYOR2 Cryochrepts, fine
- Soils are clayey and have less than 35 percent rock fragments.

PSME/CARU,CARU Edgway Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on Edgway soils. It is on foothills and mountains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1149
Landform: foothills and mountains
Parent material: local alluvium or colluvium derived from mixed sources
Slope: 15 to 40 percent
Elevation: 6500 to 7100 feet
Average annual precipitation: 22 to 24 inches
Average annual air temperature: 36 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* community
- *Populus tremuloides/Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- *Populus tremuloides/Calamagrostis rubescens* c.t.
- Communities that have a tree canopy of *Pseudotsuga menziesii* over an herbaceous layer dominated by non-native grasses.
- Communities that have a shrub layer of *Ceanothus velutinus* with an herbaceous layer dominated by *Carex geyeri* or non-native grasses.

Succession

Early seral conditions, as a result of fire or clearcutting, support few residual trees. *Pinus contorta* or *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub layer is diverse, has low cover and may include *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Ceanothus velutinus*, *Ribes cereum*, *Symphoricarpos oreophilus* or *Amelanchier alnifolia*. The prominent herbaceous layer is dominated by *Bromus carinatus*, *Bromus inermis*, *Calamagrostis rubescens* or *Carex geyeri*. *Lupinus* species may be present.

Mid seral conditions support a variable tree canopy dominated by *Pseudotsuga menziesii*. *Populus tremuloides* clones or *Pinus contorta* may be present. The shrub and herbaceous layers have high species diversity and are dominated by relatively shade tolerant species. *Symphoricarpos oreophilus* or *Amelanchier alnifolia* may be conspicuous in the sparse shrub layer. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Antennaria microphylla*, *Epilobium angustifolium*, *Fragaria vesca* or *Geranium viscosissimum* are well represented.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. *Amelanchier alnifolia* is widely dispersed in the depauperate shrub layer. The prominent herbaceous layer has low species diversity and is dominated by *Calamagrostis rubescens* and *Carex geyeri*. *Poa nervosa* var. *wheeleri*, *Aster conspicuus*, *Antennaria racemosa*, *Arnica cordifolia* or *Lupinus argenteus* may be present.

Discussion

Pinus contorta commonly regenerates in frost pockets and *Pseudotsuga menziesii* regenerates in warmer positions. The *Pseudotsuga menziesii* canopy becomes more dense as stand conditions progress from mid seral to late seral stages. *Populus tremuloides* clones may be relatively persistent if conifers do not establish within the stand. As shading increases, *Populus tremuloides* and the shrub layer decrease in cover. Shrubs are pioneer species in early seral stages. They enhance establishment of *Pseudotsuga menziesii* by providing shaded microsites.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management

treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth of all seral conditions. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas. The dense sod provides watershed protection and limits tree establishment.

The species constancy and cover documentation for vegetation is on page 594.

Soils

Name: Edgway series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Typical Pedon Description

Edgway, supporting the *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on a 35 percent slope with west aspect at 7000 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, twigs and cones; abrupt smooth boundary.

A1--0 to 3 inches; dark grayish brown (10YR 4/2) very gravelly loam, dark brown (10YR 2/2) moist; weak coarse granular structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots, few medium and coarse roots; many very fine and common fine irregular pores; 30 percent pebbles and 5 percent cobbles; neutral (pH 6.8); abrupt wavy boundary.

A2--3 to 10 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots, few medium and coarse roots; many very fine irregular pores; 30 percent pebbles and 5 percent cobbles; neutral (pH 7.0); abrupt smooth boundary.

E--10 to 15 inches; light brownish gray (10YR 6/2) very gravelly loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to weak very fine granular; slightly hard, very friable, nonsticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine irregular pores; 30 percent pebbles and 5 percent cobbles; neutral (pH 7.0); clear smooth boundary.

Bt1--15 to 28 inches; yellowish brown (10YR 5/4) very gravelly loam, brown (10YR 4/3) moist; moderate coarse subangular blocky structure parting to strong fine subangular blocky; slightly hard, firm, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; few very fine tubular pores; many faint, dark yellowish brown (10YR 4/4), clay films on ped faces, on rock fragments and lining pores, brown (10YR 4/3) moist; 25 percent pebbles, 10 percent cobbles and 5 percent stones; neutral (pH 7.0); gradual smooth boundary.

Bt2--28 to 42 inches; yellowish brown (10YR 5/4) very gravelly clay loam, brown (10YR 4/3) moist; moderate very coarse subangular blocky structure parting to strong medium subangular blocky; hard, firm, sticky and plastic; common very fine roots; few very fine tubular pores; many faint, dark yellowish brown (10YR 4/4), clay films on ped faces, on rock fragments and lining pores, brown (10YR 4/3) moist; 30 percent pebbles, 10 percent cobbles and 5 percent stones; neutral (pH 7.0); clear smooth boundary.

BC--42 to 54 inches; light yellowish brown (10YR 6/4) very cobbly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine and fine roots; few very fine tubular pores; 20 percent pebbles, 20 percent cobbles and 5 percent stones; neutral (pH 6.8); gradual smooth boundary.

C--54 to 60 inches; light yellowish brown (10YR 6/4) very cobbly loam, brown (10YR 4/3) moist; massive; slightly hard, very friable, slightly sticky and slightly plastic; few very fine roots; few very fine

tubular pores; 20 percent pebbles, 20 percent cobbles and 10 percent stones; neutral (pH 6.6).

Typical Pedon Location

Located in ecological unit 1149.
Legal description: about 1800 feet north and 1600 feet west of the southeast corner of section 34, T. 13 N., R. 37 E., Idaho
Latitude: 44 degrees, 24 minutes, 30 seconds, north
Longitude: 111 degrees, 04 minutes, 15 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 10 to 14 inches
Depth to argillic horizon: 14 to 22 inches
Depth to BC horizon: greater than 40 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 15 to 24 percent
Rock fragment content: 35 to 45 percent
Pebbles: 30 to 35 percent
Cobbles: 5 to 10 percent
Stones: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

E or AB (when present) horizon
Hue: 10YR
Value: 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 15 to 24 percent
Rock fragment content: 30 to 45 percent
Pebbles: 25 to 35 percent
Cobbles: 5 to 10 percent
Stones: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt horizons
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam, clay loam or sandy clay loam
Clay content: 24 to 34 percent
Rock fragment content: 35 to 60 percent
Pebbles: 20 to 40 percent
Cobbles: 5 to 15 percent
Stones: 0 to 10 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

BC and C horizons
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 18 to 24 percent
Rock fragment content: 35 to 65 percent
Pebbles: 10 to 35 percent
Cobbles: 10 to 25 percent
Stones: 5 to 15 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

ABLA/OSCH,PAMY Edgway
- This ecological type occurs on cooler and more moist positions.
- In the plant association, *Abies lasiocarpa* is present in the tree layer; *Calamagrostis rubescens* is poorly represented in the undergrowth.

PSME/CARU,CARU Nopla
- Soils have less than 35 percent rock fragments.

PSME/CARU,CARU Nopla Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on Nopla soils. It is on undulating to rolling plains and dissected shield volcanos in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1228
Landform: plains and shield volcanos
Parent material: local alluvium derived from loess, volcanic ash and igneous rocks
Slope: 2 to 15 percent
Elevation: 6000 to 7000 feet
Average annual precipitation: 20 to 28 inches
Average annual air temperature: 35 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Populus tremuloides/Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- *Pseudotsuga menziesii/Symphoricarpos oreophilus* community
- Herbaceous communities dominated by *Carex geyeri* or *Calamagrostis rubescens* with lesser amounts of *Epilobium angustifolium*, *Potentilla glandulosa* or *Geranium viscosissimum*.

Succession

Early seral conditions, as a result of fire or clearcutting, support few residual trees. *Pinus contorta* or *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub layer is diverse, has low cover and may include *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Ceanothus velutinus*, *Ribes cereum*, *Symphoricarpos oreophilus* or *Amelanchier alnifolia*. The prominent herbaceous layer is dominated by *Bromus carinatus*, *Bromus inermis*, *Calamagrostis rubescens* or *Carex geyeri*. *Lupinus* species may be present.

Mid seral conditions support a variable tree canopy dominated by *Pseudotsuga menziesii* or *Pinus contorta*. *Populus tremuloides* clones may be present. The shrub and herbaceous layers have high species diversity and are dominated by relatively shade tolerant species. *Symphoricarpos oreophilus* or *Amelanchier alnifolia* may be conspicuous in the sparse shrub layer. The prominent herbaceous layer is dominated by *Calamagrostis rubescens* or *Carex geyeri*. *Antennaria microphylla*, *Epilobium angustifolium*, *Fragaria vesca* or *Geranium viscosissimum* are well represented.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. *Amelanchier alnifolia* is widely dispersed in the depauperate shrub layer. The prominent herbaceous layer has low species diversity and is dominated by *Calamagrostis rubescens* and *Carex geyeri*. *Poa nervosa* var. *wheeleri*, *Aster conspicuus*, *Antennaria racemosa*, *Arnica cordifolia* or *Lupinus argenteus* may be present.

Discussion

Pinus contorta commonly regenerates in frost pockets and *Pseudotsuga menziesii* regenerates in warmer positions. The *Pseudotsuga menziesii* canopy becomes more dense as stand conditions progress from mid seral to late seral stages. *Populus tremuloides* clones may be relatively persistent if conifers do not establish within the stand. As shading increases, *Populus tremuloides* and the shrub layer decrease in cover. Shrubs are pioneer species in early seral stages. They enhance establishment of *Pseudotsuga menziesii* by providing shaded microsites.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus*

competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth of all seral conditions. *Calamagrostis rubescens* will typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

The species constancy and cover documentation for vegetation is on page 596.

Soils

Name: Nopla series

Taxonomic class: Fine-loamy, mixed, superactive Cryic Paleborolls

Typical Pedon Description

Nopla, supporting the *Pseudotsuga menziesii/Calamagrostis rubescens* p.a., *Calamagrostis rubescens* phase on a concave 8 percent slope with south aspect at 6280 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of needles, twigs and leaves; abrupt smooth boundary.

A1--0 to 4 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky and weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, common fine and medium roots, few coarse roots; many very fine irregular and few very fine tubular pores; 5 percent pebbles, trace cobbles and stones; slightly acid (pH 6.4); clear smooth boundary.

A2--4 to 14 inches; brown (10YR 5/3) silt loam, dark grayish brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; common very fine and fine roots, few medium and coarse roots; many very fine tubular pores; 5 percent pebbles, trace cobbles and stones; slightly acid (pH 6.5); clear wavy boundary.

E--14 to 24 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; moderate very coarse subangular blocky structure; hard, very friable, nonsticky and slightly plastic; common very fine and fine roots, few medium and coarse roots; many very fine tubular pores, few fine and medium tubular pores; 5 percent pebbles, trace cobbles and stones; slightly acid (pH 6.1); clear wavy boundary.

Bt/E--24 to 39 inches; 60 percent yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 4/4) moist, and 40 percent pale brown (10YR 6/3) E material, brown (10YR 5/3) moist, in a medium (5 to 15 mm) irregular matrix that mixes to a gravelly silt loam; moderate coarse subangular blocky structure parting to moderate fine subangular blocky (B portion) and weak fine subangular blocky (E portion); hard, friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; many very fine and common fine tubular pores; common distinct clay films on rock fragments, ped faces and lining pores of B material; few fine to medium (less than 1/2 inch) distinct lamellae; 10 percent pebbles, 5 percent cobbles and trace stones; slightly acid (pH 6.3); gradual wavy boundary.

2Bt1--39 to 54 inches; brown (10YR 5/3) very cobbly loam, brown (10YR 4/3) moist; moderate medium subangular blocky structure parting to weak fine subangular blocky; hard, friable, slightly sticky and plastic; few very fine and fine roots; many very fine and common fine tubular pores; many distinct clay films on rock fragments and few distinct clay films on ped faces and lining pores; many distinct uncoated silt grains on ped faces; 25 percent pebbles, 30 percent cobbles and trace stones; slightly acid (pH 6.2); clear smooth boundary.

3Bt2--54 to 68 inches; brown (7.5YR 5/2) silt loam, brown (7.5YR 4/2) moist; strong medium subangular blocky structure parting to moderate very fine angular blocky; hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common fine and few medium tubular pores; few faint clay films on rock fragments, ped faces and lining pores; many distinct uncoated silt grains on ped faces; common medium to coarse (1/4 to 3/4 inch) faint lamellae; 10 percent pebbles and trace cobbles; slightly acid (pH 6.3); clear smooth boundary.

3Bt3--68 to 75 inches; light brown (7.5YR 6/3) silt loam, brown (7.5YR 4/3) moist; strong coarse subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and plastic; common fine and few medium tubular pores; many distinct clay films on rock fragments, on ped faces and lining pores; 10 percent pebbles and trace cobbles; slightly acid (pH 6.3).

Typical Pedon Location

Located in ecological unit 1228.
Legal description: about 2600 feet east and 1350 feet south of the northwest corner of section 24, T. 11 N., R. 41 E., Idaho
Latitude: 44 degrees, 33 minutes, 58 seconds, north
Longitude: 111 degrees, 16 minutes, 15 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 10 to 20 inches
Depth to argillic horizon: 24 to 40 inches
Clay in particle-size control section: average 18 to 27 percent
Rock fragment content in the particle-size control section: average 5 to 35 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Base saturation: 60 to 100 percent

A horizons
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 7 to 14 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

E horizon
Hue: 7.5YR or 10YR
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 7 to 14 percent
Rock fragment content: 0 to 30 percent
Pebbles: 0 to 20 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bt/E horizon
Hue: 7.5YR or 10YR
Value:
B portion - 5 or 6 dry, 3 or 4 moist
E portion - 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 16 to 27 percent
Rock fragment content: 5 to 35 percent
Pebbles: 5 to 25 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)
Other: 50 to 85 percent B material and 15 to 50 percent E material (by volume)

2Bt horizon
Hue: 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: clay loam or loam
Clay content: 20 to 35 percent
Rock fragment content: 20 to 60 percent
Pebbles: 10 to 30 percent
Cobbles: 10 to 40 percent
Stones: 0 to 15 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

3Bt horizons
Hue: 7.5YR or 10YR
Value: 4, 5 or 6 dry; 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam or loam
Clay content: 18 to 27 percent
Rock fragment content: 5 to 35 percent
Pebbles: 5 to 35 percent
Cobbles: 0 to 20 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

PSME/CARU,CARU Edgway
- Soils have greater than 35 percent rock fragments.

PSME/FEID Pikaden Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Festuca idahoensis* p.a. on Pikaden soils. It is on warm, south facing mountain sideslopes in the dry portion of the forested zone.

Environmental Setting

Ecological Unit: 1154
Landform: mountains
Parent material: colluvium derived from quartzite and loess
Slope: 40 to 65 percent
Elevation: 7500 to 9800 feet
Average annual precipitation: 18 to 24 inches
Average annual air temperature: 33 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Festuca idahoensis* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Festuca idahoensis* p.a.
- Communities that have a shrub layer of *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* with an herbaceous layer dominated *Agropyron spicatum* or *Festuca idahoensis.*
- Shrub dominated communities that have widely dispersed seedling through medium *Pseudotsuga menziesii, Pinus flexilis* or *Juniperus scopulorum.*

Succession

Early seral conditions, as a result of fire, support few residual trees. Widely dispersed *Pinus flexilis, Pseudotsuga menziesii* or *Juniperus scopulorum* may establish from seed in microsites shaded by residual trees or shrubs. The shrub layer has low cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora.* The prominent herbaceous layer is dominated by *Agropyron spicatum* or *Festuca idahoensis. Leucopoa kingii, Poa* species or *Lupinus* species are present. Forbs have moderate diversity and low cover.

Mid seral conditions support a dispersed tree canopy codominated by *Pseudotsuga menziesii, Pinus flexilis* and *Juniperus scopulorum.* Shrubs have low cover and may include *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Symphoricarpos oreophilus, Ribes cereum* or *Rosa* species. The prominent herbaceous layer is dominated by graminoids.

Late seral and near PNC conditions support an open tree canopy dominated by *Pseudotsuga menziesii. Pinus flexilis* and *Juniperus scopulorum* may be present. *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Symphoricarpos oreophilus, Juniperus communis* and *Ribes cereum* codominate the sparse shrub layer. The herbaceous layer has low to moderate cover. *Carex rossii* or *Poa nervosa* var. *wheeleri* dominate in tree shadows and *Agropyron spicatum* or *Festuca idahoensis* dominate tree interspaces. Forbs are sparse.

Discussion

Lupinus species are deep rooted, perennial forbs. Reproduction is from root sprouting or soil stored seed following fire or severe ground disturbance. Their cover increases in early seral conditions as a result of increased sunlight and decreased competition. *Lupinus* species have a significant role in the fertility of this ecological type. The forbs generally fix nitrogen, increasing the availability of this major plant nutrient in the soil.

Agropyron spicatum is a drought resistant, perennial bunchgrass that reproduces from seed. The seeds have low viability. First year seedlings are slow growing and easily outcompeted by more aggressive graminoids or forbs.

Festuca idahoensis is a fire sensitive, perennial bunchgrass that reproduces by seed. Although seed production is high, germination rates are low. The root crowns may be severely damaged by summer and fall fire as a result of prolonged smoldering in the dense tuft of leaves and culms.

The somewhat excessively drained soils of this ecological type influence community composition and development. The water reservoir is in the upper 10 to 20 inches of the soil. Snowmelt and early season rains recharge the reservoir enough to maintain a shallow rooted herbaceous layer and an

open shrub or tree layer. This zone is dry for significant periods during the late portion of the growing season. Below this zone the soil is too porous to hold water in a liquid state.

The species constancy and cover documentation for vegetation is on page 598.

Soils

Name: Pikaden series
Taxonomic class: Sandy-skeletal, mixed Typic Cryochrepts

Typical Pedon Description

Pikaden, supporting the *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora/Festuca idahoensis* p.a. on a 58 percent slope with south aspect at 8400 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; dark grayish brown (10YR 4/2) extremely gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 60 percent pebbles and 5 percent cobbles; neutral (pH 6.8); abrupt smooth boundary.

A2--3 to 7 inches; grayish brown (10YR 5/2) extremely gravelly sandy loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few fine roots; many very fine irregular pores; 60 percent pebbles, 5 percent cobbles and trace stones; neutral (pH 7.0); abrupt smooth boundary.

Bw--7 to 17 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, brown (7.5YR 4/2) moist; single grain; loose, nonsticky and nonplastic; many very fine and few fine roots; many very fine irregular pores; 60 percent pebbles, 5 percent cobbles or flagstones, 5 percent stones; neutral (pH 6.8); gradual irregular boundary.

BC--17 to 30 inches; light gray (10YR 7/2) extremely cobbly loamy sand, brown (7.5YR 5/3) moist; single grain; loose, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; 35 percent pebbles, 45 percent cobbles or flagstones, 5 percent stones; neutral (pH 6.8); gradual irregular boundary.

C--30 to 60 inches; fragmental material; single grain; loose; common very fine roots; many coarse irregular pores; many coats of silt and sand on upperside of rock fragments; 95 percent pebbles and 5 percent cobbles.

Typical Pedon Location

Located in ecological unit 1154.
Legal description: about 750 feet south and 800 feet west of the northeast corner of section 1, T. 12 N., R. 31 E., Idaho
Latitude: 44 degrees, 23 minutes, 29 seconds, north
Longitude: 112 degrees, 46 minutes, 19 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat excessively drained
O horizon thickness: 0 to 4 inches
Ochric epipedon thickness: 2 to 7 inches
Depth to BC horizon: 10 to 20 inches
Depth to fragmental material: 25 to greater than 50 inches

A horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam
Clay content: 4 to 10 percent
Rock fragment content: 60 to 90 percent
Pebbles: 60 to 80 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizon
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam, loam or silt loam
Clay content: 2 to 10 percent
Rock fragment content: 60 to 90 percent
Pebbles: 60 to 80 percent
Cobbles or flagstones: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

BC horizon
Hue: 5YR, 7.5YR or 10YR
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 2 or 3 dry or moist

Texture: loamy sand or sand
Clay content: 1 to 4 percent
Rock fragment content: 70 to 90 percent
Pebbles: 35 to 80 percent
Cobbles or flagstones: 5 to 45 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

PSME/JUCO6 Pikaden

- This ecological type occurs on cooler positions.
- In the plant association, *Juniperus communis* is well represented.

PSME/JUCO6 Gany Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Juniperus communis* p.a. on Gany soils. It is on cold, north facing mountain sideslopes in the dry portion of the forested zone.

Environmental Setting

Ecological Unit: 1129
Landform: mountains
Parent material: local alluvium or colluvium derived from limestone and loess
Slope: 40 to 70 percent
Elevation: 7400 to 9800 feet
Average annual precipitation: 22 to 24 inches
Average annual air temperature: 34 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Juniperus communis* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Juniperus communis* p.a.
- *Pseudotsuga menziesii/Cercocarpus ledifolius* var. *intercedens* community

Succession

Early seral conditions, as a result of logging or fire, support few residual trees. *Pinus flexilis*, *Pseudotsuga menziesii* or *Juniperus scopulorum* may establish from seed in the shaded microsites of shrubs or residual trees. The shrub layer has low to moderate cover and may include *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Shepherdia canadensis* or *Symphoricarpos oreophilus*. The diverse herbaceous layer has variable cover and is dominated by graminoids. *Agropyron spicatum*, *Festuca idahoensis*, *Leucopoa kingii* or *Melica bulbosa* may be prominent. Conspicuous forbs include *Balsamorhiza sagittata*, *Geranium viscosissimum*, *Potentilla* species or *Senecio streptanthifolius*.

Mid seral conditions support a closed tree canopy codominated by *Pseudotsuga menziesii* and *Pinus flexilis*. *Juniperus scopulorum* is present. The shrub layer has low cover and may include *Juniperus communis*, *Symphoricarpos oreophilus*, *Shepherdia canadensis*, *Ribes cereum* or *Ribes montigenum*. The depauperate herbaceous layer may include *Carex rossii*, *Hordeum jubatum*, *Poa compressa*, other *Poa* species, *Trisetum spicatum*, *Antennaria microphylla* or *Penstemon* species.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. *Juniperus communis* forms large patches in the otherwise depauperate shrub and herbaceous layers. Widely dispersed graminoids and forbs may include *Poa nervosa* var. *wheeleri*, *Arnica cordifolia*, *Astragalus miser* or *Lupinus argenteus*.

Discussion

Shepherdia canadensis is a moderately shade tolerant shrub that regenerates both vegetatively and by seed. Root crowns sprout after low and moderate intensity fire. Seed germination is the main source of reestablishment after high intensity fires. Seeds are produced annually after the shrub reaches 4 to 6 years of age. Cold stratification is needed for embryo development, causing seed germination to be erratic or delayed. *Shepherdia canadensis* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Juniperus communis is a shade tolerant, low growing evergreen shrub. The stems have thin bark and are easily killed by fire. Establishment after fire is primarily by water, bird or mammal dispersed seed. Relatively slow growth and poor germination characteristics make *Juniperus communis* slow to assume prominence. Dominance in the undergrowth may not occur for more than 100 years.

Pinus flexilis, prominent in early and mid seral stages, is a pioneer in tree establishment. Regeneration is by seed. Distribution of *Pinus flexilis* is strongly influenced by seed cache location of the Clark's nutcracker (*Nucifraga columbiana*), chipmunks, squirrels and deer mice. This hardy, slow growing tree is tolerant of cold, drought and wind. Relatively shade intolerant and susceptible to white pine blister rust, *Pinus flexilis* decreases in canopy cover in late seral stages.

The cold, droughty soils of this ecological type influence community composition and development. Soil temperatures are cold during the early portion of the growing season. As shading from the tree canopy increases, summer soil temperatures decrease. The soils are dry for significant periods during the late portion of the growing season and throughout most of the winter. Shallow rooted plants and seedlings are limited by increased droughtiness as succession moves towards late seral and PNC conditions.

The species constancy and cover documentation for vegetation is on page 575.

Soils

Name: Gany series
Taxonomic class: Loamy-skeletal, mixed, superactive Calcic Cryoborolls

Typical Pedon Description

Gany, supporting the *Pseudotsuga menziesii/Juniperus communis* p.a. on a 67 percent slope with northeast aspect at 8070 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--2 to 0 inches; forest litter of needles; 20 percent pebbles and trace cobbles; abrupt smooth boundary.

A1--0 to 3 inches; grayish brown (10YR 5/2) extremely gravelly silt loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure parting to moderate very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots; many very fine irregular pores; few coats of soft powdery lime on underside of rock fragments; few fine (less than 1/4 inch) masses of soft powdery lime in matrix; slightly effervescent; 60 percent pebbles and trace cobbles; moderately alkaline (pH 8.0); abrupt smooth boundary.

A2--3 to 9 inches; dark grayish brown (10YR 4/2) extremely gravelly silt loam, very dark grayish brown (10YR 3/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine irregular pores; common hard pendants of carbonates and few coats of soft powdery lime on underside of rock fragments; few fine (less than 1/4 inch) masses of soft powdery lime in matrix; many fine charcoal fragments in matrix; strongly effervescent; 70 percent pebbles and trace cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bk1--9 to 19 inches; grayish brown (10YR 5/2) extremely gravelly silt loam, dark grayish brown (10YR 4/2) moist; weak medium subangular blocky structure parting to weak very fine granular; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine and medium roots, common coarse roots; many very fine irregular pores; many hard pendants of carbonates and few coats of soft powdery lime on underside of rock fragments; few fine (less than 1/4 inch) masses of soft powdery lime in matrix; strongly effervescent; 70 percent pebbles and trace cobbles; moderately alkaline (pH 8.0); clear smooth boundary.

Bk2--19 to 33 inches; pale brown (10YR 6/3) extremely gravelly loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine roots, few medium and common coarse roots; many very fine and few fine tubular pores; many hard pendants of carbonates and few coats of soft powdery lime on underside of rock fragments; few fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 70 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.2); clear smooth boundary.

Bkq--33 to 60 inches; light brownish gray (10YR 6/2) extremely gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine and few coarse roots; many very fine and common fine irregular pores; many hard pendants of carbonates, few hard pendants of silica and many coats of soft powdery lime on underside of rock fragments; many fine (less than 1/4 inch) masses of soft powdery lime in matrix; violently effervescent; 80 percent pebbles and 5 percent cobbles; moderately alkaline (pH 8.2).

Typical Pedon Location

Located in ecological unit 1129.
Legal description: about 1350 feet west and 1450 feet north of the southeast corner of section 33, T. 11 N., R. 32 E., Idaho
Latitude: 44 degrees, 19 minutes, 17 seconds, north
Longitude: 112 degrees, 42 minutes, 12 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 1/4 to 3 inches

Mollic epipedon thickness: 7 to 15 inches (Requires mixing of the A horizons or the upper 7 inches of the soil profile.)
Depth to calcic horizon: 0 to 15 inches
Clay content in the particle-size control section: average 10 to 22 percent
Calcium carbonate equivalent in the mineralogy control section: 25 to 40 percent in the less than 20 mm fraction

A horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 4 or 5 dry; 2, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 20 percent
Rock fragment content: 60 to 80 percent
Pebbles: 50 to 75 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 5 to 15 percent in the less than 2 mm fraction
Effervescence: slightly effervescent to violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bk horizons
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 14 to 22 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 80 percent
Cobbles: 0 to 15 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 15 to 30 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 10 to 16 percent
Rock fragment content: 60 to 90 percent
Pebbles: 35 to 80 percent
Cobbles: 5 to 30 percent
Stones: 0 to 10 percent
Calcium carbonate equivalent: 25 to 60 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Related Types, Mosaics and Ecotones

ABLA/ACGL Gany
- This ecological type occurs on more moist positions.
- In the plant association, *Abies lasiocarpa* is present in the tree layer; *Acer glabrum* is well represented in the undergrowth.

ABLA/PHMA5 Gany
- This ecological type occurs on warmer positions.
- In the plant association, *Abies lasiocarpa* is present in the tree layer; *Physocarpus malvaceus* is well represented in the undergrowth.

PSME/JUCO6 Pikaden
- Soils lack carbonates.

PSME/JUCO6 Pikaden Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Juniperus communis* p.a. on Pikaden soils. It is on cold, north facing mountain sideslopes in the dry portion of the forested zone.

Environmental Setting

Ecological Unit: 1154
Landform: mountains
Parent material: colluvium derived from quartzite and loess
Slope: 40 to 65 percent
Elevation: 7500 to 9800 feet
Average annual precipitation: 18 to 24 inches
Average annual air temperature: 32 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Juniperus communis* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Juniperus communis* p.a.

Succession

Early seral conditions, as a result of logging or fire, support few residual trees. *Pinus flexilis*, *Pseudotsuga menziesii* or *Juniperus scopulorum* may establish from seed in the shaded microsites of shrubs or residual trees. The shrub layer has low to moderate cover and may include *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Shepherdia canadensis* or *Symphoricarpos oreophilus*. The diverse herbaceous layer has variable cover and is dominated by graminoids. *Agropyron spicatum*, *Festuca idahoensis*, *Leucopoa kingii* or *Melica bulbosa* may be prominent. Conspicuous forbs include *Balsamorhiza sagittata*, *Geranium viscosissimum*, *Senecio streptanthifolius* or *Potentilla* species.

Mid seral conditions support a closed tree canopy codominated by *Pseudotsuga menziesii* and *Pinus flexilis*. *Juniperus scopulorum* is present. The shrub layer has low cover and may include *Juniperus communis*, *Symphoricarpos oreophilus*, *Shepherdia canadensis*, *Ribes cereum* or *Ribes montigenum*. The depauperate herbaceous layer may include *Carex rossii*, *Hordeum jubatum*, *Poa compressa*, other *Poa* species, *Trisetum spicatum*, *Antennaria microphylla* or *Penstemon* species.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. *Juniperus communis* forms large patches in the otherwise depauperate shrub and herbaceous layers. Widely dispersed graminoids and forbs may include *Poa nervosa* var. *wheeleri*, *Arnica cordifolia*, *Astragalus miser* or *Lupinus argenteus*.

Discussion

Shepherdia canadensis is a moderately shade tolerant shrub that regenerates both vegetatively and by seed. Root crowns sprout after low and moderate intensity fire. Seed germination is the main source of reestablishment after high intensity fires. Seeds are produced annually after the shrub reaches 4 to 6 years of age. Cold stratification is needed for embryo development, causing seed germination to be erratic or delayed. *Shepherdia canadensis* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

Juniperus communis is a shade tolerant, low growing evergreen shrub. The stems have thin bark and are easily killed by fire. Establishment after fire is primarily by water, bird or mammal dispersed seed. Relatively slow growth and poor germination characteristics make *Juniperus communis* slow to assume prominence. Dominance in the undergrowth may not occur for more than 100 years.

Pinus flexilis, prominent in early and mid seral stages, is a pioneer in tree establishment. Regeneration is by seed. Distribution of *Pinus flexilis* is strongly influenced by seed cache location of the Clark's nutcracker (*Nucifraga columbiana*), chipmunks, squirrels and deer mice. This hardy, slow growing tree is tolerant of cold, drought and wind. Relatively shade intolerant and susceptible to white pine blister rust, *Pinus flexilis* decreases in canopy cover in late seral stages.

The cold, droughty soils of this ecological type influence community composition and development. Soil temperatures are cold during the early portion of the growing season. As shading from the tree

canopy increases, summer soil temperatures decrease. The soils are dry for significant periods during the late portion of the growing season and throughout most of the winter. Shallow rooted plants and seedlings are limited by increased droughtiness as succession moves towards late seral and PNC conditions.

The species constancy and cover documentation for vegetation is on page 575.

Soils

Name: Pikaden series
Taxonomic class: Sandy-skeletal, mixed Typic Cryochrepts

Typical Pedon Description

Pikaden, supporting the *Pseudotsuga menziesii/Juniperus communis* p.a. on a 55 percent slope with northwest aspect at 7720 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1/2 to 0 inches; forest litter of needles; 15 percent pebbles, 10 percent cobbles and trace stones; abrupt broken boundary.

A--0 to 5 inches; brown (10YR 4/3) extremely gravelly silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure parting to weak very fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine roots, few medium and coarse roots; many very fine irregular pores; 60 percent pebbles and 5 percent cobbles; slightly acid (pH 6.4); abrupt smooth boundary.

Bw--5 to 12 inches; light brownish gray (10YR 6/2) extremely gravelly loam, dark grayish brown (10YR 4/2) moist; weak very fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, few medium and coarse roots; many very fine irregular pores; many faint coats of silt on upperside of rock fragments; 80 percent pebbles and 5 percent cobbles; slightly acid (pH 6.4); clear smooth boundary.

BC--12 to 27 inches; light brownish gray (10YR 6/2) extremely gravelly loamy sand, grayish brown (10YR 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; many very fine roots, few medium and coarse roots; many very fine tubular pores; many faint coats of silt on upperside of rock fragments; 80 percent pebbles and 5 percent cobbles; neutral (pH 6.6); gradual smooth boundary.

C--27 to 60 inches; fragmental material; single grain; loose; common very fine roots; many coarse irregular pores; many coats of silt and sand on upperside of rock fragments; 95 percent pebbles and 5 percent cobbles.

Typical Pedon Location

Located in ecological unit 1154.
Legal description: about 100 feet west and 1950 feet north of the southeast corner of section 15, T. 13 N., R. 31 E., Idaho
Latitude: 44 degrees, 27 minutes, 11 seconds, north
Longitude: 112 degrees, 47 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat excessively drained
O horizon thickness: 0 to 4 inches
Ochric epipedon thickness: 2 to 7 inches
Depth to BC horizon: 10 to 20 inches
Depth to fragmental material: 25 to greater than 50 inches

A horizon
Hue: 7.5YR, 10YR or 2.5Y
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 4 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 60 to 80 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizon
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: sandy loam, loam or silt loam
Clay content: 2 to 10 percent
Rock fragment content: 60 to 90 percent
Pebbles: 60 to 80 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

BC horizon
Hue: 5YR, 7.5YR or 10YR
Value: 6 or 7 dry, 5 or 6 moist

Chroma: 2 or 3 dry or moist
Texture: loamy sand or sand
Clay content: 1 to 4 percent
Rock fragment content: 70 to 90 percent
Pebbles: 35 to 80 percent
Cobbles: 5 to 45 percent
Stones: 0 to 5 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

C horizon
Rock fragment content: 90 to 100 percent

Related Types, Mosaics and Ecotones

PSME/FEID Pikaden

- This ecological type occurs on warmer positions.
- In the plant association, *Festuca idahoensis* is well represented.

PSME/JUCO6 Gany

- Soils have carbonates.

PSME/OSCH Paleborolls Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Osmorhiza chilensis* p.a. on Paleboroll soils. It is on south facing foothill sideslopes in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1112
Landform: foothills
Parent material: local alluvium derived from loess and volcanic ash
Slope: 4 to 35 percent
Elevation: 5400 to 7400 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Osmorhiza chilensis* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Osmorhiza chilensis* p.a.
- *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Amelanchier alnifolia* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Symphoricarpos oreophilus* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Calamagrostis rubescens* c.t.

Succession

Early seral conditions, as a result of fire, support few residual trees. *Populus tremuloides* may regenerate from root suckers. The shrub layer has moderate to high cover and may include *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Artemisia tripartita*, *Crataegus douglasii*, *Prunus virginiana* var. *melanocarpa*, and *Symphoricarpos oreophilus*. The herbaceous layer has moderate cover and is dominated by *Calamagrostis rubescens*, *Carex geyeri* or *Poa* species. *Geranium viscosissimum* and *Lupinus* species may be conspicuous.

Mid seral conditions support a closed tree canopy dominated by *Populus tremuloides*. *Pseudotsuga menziesii* seedlings may be present. Relatively shade tolerant species dominate the shrub and herbaceous layers. The multistructured shrub layer has moderate to high cover and is dominated by *Amelanchier alnifolia*, *Prunus virginiana* var. *melanocarpa*, *Symphoricarpos albus* and *Symphoricarpos oreophilus*. *Berberis repens*, *Crataegus douglasii*, *Pachistima myrsinites*, and *Rosa woodsii* are present. The herbaceous layer has moderate to high cover and is dominated by *Calamagrostis rubescens* and *Carex geyeri*. *Geranium viscosissimum*, *Lupinus argenteus*, *Osmorhiza* species and *Thalictrum* species may be conspicuous.

Late seral and near PNC conditions support a closed tree canopy dominated by all ages of *Pseudotsuga menziesii*. A few residual *Populus tremuloides* may be present. *Amelanchier alnifolia* or *Symphoricarpos oreophilus* form a dispersed shrub layer. The herbaceous layer has low to moderate cover and is dominated by *Osmorhiza chilensis* or *Osmorhiza depauperata*. *Calamagrostis rubescens*, *Carex geyeri*, *Arnica cordifolia*, *Smilacina racemosa*, *Thalictrum occidentale* or *Thalictrum fendleri* are present.

Discussion

Populus tremuloides, highly valued for its visual resource, wildlife habitat, and forage production capabilities, is an important component in early through mid seral conditions. Reproduction is from seed or regeneration from root suckering. Regeneration typically occurs in response to removal of the overstory, increased sunlight and the stimulation of light to moderate intensity fires. *Populus tremuloides* clones may become relatively persistent because the leaf litter is allelopathic to some plant species and may affect conifer germination and establishment.

Amelanchier alnifolia, *Crataegus douglasii*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus* are pioneer species in early seral stages. Regeneration is primarily by sprouting. These prominent browse species become decadent under

a closed conifer canopy. In later seral stages, shrub growth may be stimulated by clipping, browsing, tree canopy removal or low intensity fire. Positions occupied by this ecological type burn frequently under a natural or uncontrolled fire regime. As a result of recurring fire, early seral conditions may persist.

The loamy soils of this ecological type influence community composition and development. The thick surface layer of the soil has low strength when moist. As a result of weak anchoring, trees are susceptible to windthrow during late spring.

The species constancy and cover documentation for vegetation is on page 601.

Soils

Name: Paleborolls family

Taxonomic class: Fine-silty, mixed, superactive Cryic Paleborolls

Typical Pedon Description

Cryic Paleborolls, supporting the *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t. on a 10 percent slope with southeast aspect at 5800 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 3 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine and fine roots, common medium roots; many very fine irregular pores; moderately acid (pH 6.0); abrupt smooth boundary.

A2--3 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure; soft, very friable, nonsticky and slightly plastic; few very fine, fine and medium roots; many fine tubular pores; moderately acid (pH 6.0); abrupt smooth boundary.

A3--6 to 14 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate coarse subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; common very fine and fine tubular pores; moderately acid (pH 6.0); clear smooth boundary.

E--14 to 20 inches; pale brown (10YR 6/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; common very fine and few fine tubular pores; moderately acid (pH 6.0); clear smooth boundary.

E/B--20 to 31 inches; 80 percent light gray (10YR 7/2) E material, grayish brown (10YR 5/2) moist, and 20 percent yellowish brown (10YR 5/4) B material as fine (less than 1/2 inch) veins and lamellae, dark yellowish brown (10YR 4/4) moist, that mix to a silt loam; moderate medium subangular blocky structure parting to moderate fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; common very fine and few fine tubular pores; moderately acid (pH 6.0); clear smooth boundary.

Bt1--31 to 48 inches; brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4/4) moist; moderate medium prismatic structure parting to moderate medium subangular blocky; hard, firm, sticky and plastic; few very fine and fine roots; common very fine and few fine tubular pores; many faint clay films on ped faces and lining pores; moderately acid (pH 6.0); clear smooth boundary.

Bt2-- 48 to 58 inches; brown (7.5YR 5/4) silty clay loam, brown (7.5YR 4/3) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine and fine roots; common very fine and few fine tubular pores; common faint clay films on ped faces and lining pores; moderately acid (pH 6.0); clear smooth boundary.

Bt3--58 to 70 inches; light brown (7.5YR 6/4) silty clay loam, brown (7.5YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, very friable, slightly sticky and plastic; few very fine roots; common very fine and few fine tubular pores; few faint clay films on ped faces and lining pores; neutral (pH 6.6).

Typical Pedon Location

Located in ecological unit 1112.

Legal description: about 500 feet west and 3750 feet south of the northeast corner of section 27, T. 3 S., R. 46 E., Idaho

Latitude: 43 degrees, 07 minutes, 30 seconds, north

Longitude: 111 degrees, 02 minutes, 36 seconds, west

Range in Characteristics

Profile

Depth class: very deep (greater than 60 inches)

Drainage class: well drained
Mollic epipedon thickness: 10 to 20 inches
Depth to E/B horizon: 16 to 24 inches
Depth to argillic horizon: 24 to 40 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent
Base saturation: 50 to 100 percent

A horizons
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 18 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

E horizon
Hue: 10YR
Value: 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

E/B horizon
Hue:
E portion - 10YR
B portion - 7.5YR or 10YR
Value:
E portion - 7 or 8 dry, 5 or 6 moist
B portion - 5 or 6 dry, 4 or 5 moist
Chroma:
E portion - 2 or 3 dry or moist
B portion - 3 or 4 dry and moist
Texture: silt loam
Clay content: 12 to 25 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)
Other: 50 to 85 percent E material and 15 to 50 percent B material (by volume)

Bt horizons
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silty clay loam or silt loam
Clay content: 18 to 35 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles or stones: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

PSME/OSCH Rin
- Soils lack an argillic horizon.

PSME/OSCH Rin Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Osmorhiza chilensis* p.a. on Rin soils. It is on dissected tablelands and foothills in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1294
Landform: dissected tablelands and foothills
Parent material: local alluvium derived from loess
Slope: 15 to 35 percent
Elevation: 5300 to 6500 feet
Average annual precipitation: 17 to 19 inches
Average annual air temperature: 38 to 41 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Osmorhiza chilensis* p.a.

Present Vegetation

- *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- Communities dominated by *Populus tremuloides* that have widely dispersed seedling through medium *Pinus contorta* and *Pseudotsuga menziesii.*

Succession

Early seral conditions, as a result of fire, support few residual trees. *Populus tremuloides* rapidly regenerates from root suckers. The shrub layer has moderate to high cover and may include *Amelanchier alnifolia*, *Artemisia tripartita*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Crataegus douglasii*, *Prunus virginiana* var. *melanocarpa* or *Symphoricarpos oreophilus.* The herbaceous layer has moderate cover and is dominated by *Calamagrostis rubescens*, *Carex geyeri* or *Poa* species. *Geranium viscosissimum* and *Lupinus* species may be conspicuous.

Mid seral conditions support a closed tree canopy dominated by *Populus tremuloides. Pseudotsuga menziesii* seedlings may be present. Relatively shade tolerant species dominate the shrub and herbaceous layers. The multistructured shrub layer has moderate to high cover and is dominated by *Amelanchier alnifolia*, *Prunus virginiana* var. *melanocarpa*, *Symphoricarpos albus* and *Symphoricarpos oreophilus. Berberis repens*, *Crataegus douglasii*, *Pachistima myrsinites*, and *Rosa woodsii* are present. The herbaceous layer has moderate to high cover and is dominated by *Calamagrostis rubescens* and *Carex geyeri. Thalictrum* species may be conspicuous.

Late seral and near PNC conditions support a closed tree canopy dominated by all ages of *Pseudotsuga menziesii.* A few residual *Populus tremuloides* may be present. *Amelanchier alnifolia* or *Symphoricarpos oreophilus* form a dispersed shrub layer. The herbaceous layer has low to moderate cover and is dominated by *Osmorhiza chilensis* or *Osmorhiza depauperata. Calamagrostis rubescens*, *Carex geyeri*, *Arnica cordifolia*, *Smilacina racemosa*, *Thalictrum occidentale* or *Thalictrum fendleri* are present.

Discussion

Populus tremuloides, highly valued for its visual resource, wildlife habitat, and forage production capabilities, is an important component in early through mid seral conditions. Reproduction is from seed or regeneration from root suckering. Regeneration typically occurs in response to removal of the overstory, increased sunlight and the stimulation of light to moderate intensity fires. *Populus tremuloides* clones may become relatively persistent because the leaf litter is allelopathic to some plant species and may affect conifer germination and establishment.

Amelanchier alnifolia, *Crataegus douglasii*, *Prunus virginiana* var. *melanocarpa* and *Symphoricarpos oreophilus* are pioneer species in early seral stages. Regeneration is primarily by sprouting. These prominent browse species become decadent under a closed conifer canopy. In later seral stages, shrub growth may be stimulated by clipping, browsing, tree canopy removal or low intensity fire.

Positions occupied by this ecological type burn frequently under a natural or uncontrolled fire regime. As a result of recurring fire, early seral conditions may persist.

The species constancy and cover documentation for vegetation is on page 602.

Soils

Name: Rin series
Taxonomic class: Coarse-silty, mixed, superactive Pachic Cryoborolls

Typical Pedon Description

Rin, supporting the *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t. on 30 percent slope with northeast aspect at 5540 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of leaves; abrupt smooth boundary.

A1--0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonsticky; many very fine, fine and medium roots, common coarse roots; many very fine and common fine irregular pores; neutral (pH 7.0); abrupt wavy boundary.

A2--9 to 17 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate fine and medium granular structure; soft, very friable, slightly sticky and slightly plastic; many very fine roots, common fine and medium roots, few coarse roots; many very fine and fine irregular pores; neutral (pH 7.2); clear wavy boundary.

AB-17 to 29 inches; grayish brown (10YR 5/2) silt loam, dark brown (10YR 3/3) moist; weak coarse prismatic structure parting to weak fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; common very fine and few fine tubular pores; neutral (pH 6.8); clear wavy boundary.

Bw1--29 to 44 inches; light brownish gray (10YR 6/2) silt loam, dark grayish brown (10YR 4/2) moist; weak very coarse prismatic structure parting to weak fine subangular blocky; slightly hard, very friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; common very fine and few fine tubular pores; many uncoated silt grains on ped faces; neutral (pH 7.0) gradual wavy boundary.

Bw2--44 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; many very fine tubular pores, few fine and medium tubular pores; many uncoated silt grains on ped faces; neutral (pH 7.2).

Typical Pedon Location

Located in ecological unit 1294.
Legal description: about 400 feet west and 1500 feet south of the northeast corner of section 3, T. 3 N., R. 42 E., Idaho
Latitude: 43 degrees, 37 minutes, 05 seconds, north
Longitude: 111 degrees, 32 minutes, 57 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 16 to 30 inches

A and AB horizons
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 6 to 18 percent
Rock fragment content: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bw horizons
Hue: 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Related Types, Mosaics and Ecotones

PSME/OSCH Paleborolls
- Soils have an argillic horizon.

PSME/SPBE2,CARU Vitricryands Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Spiraea betulifolia* p.a., *Calamagrostis rubescens* phase on Vitricryand soils. It is on droughty, south facing mountain sideslopes in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1230
Landform: mountains
Parent material: local alluvium, colluvium or residuum derived from tephra and loess
Slope: 35 to 60 percent
Elevation: 6800 to 8000 feet
Average annual precipitation: 28 to 32 inches
Average annual air temperature: 32 to 37 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Spiraea betulifolia* p.a., *Calamagrostis rubescens* phase

Present Vegetation

- *Pseudotsuga menziesii/Spiraea betulifolia* p.a., *Calamagrostis rubescens* phase
- *Pinus contorta/Spiraea betulifolia* c.t.
- *Pinus contorta/Calamagrostis rubescens* c.t.
- *Pinus contorta/Carex geyeri* c.t.
- *Pseudotsuga menziesii/Calamagrostis rubescens* community

Succession

Early seral conditions, as a result of fire or clearcutting, support few residual trees. *Pinus contorta* and *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub layer has moderate cover and is dominated by *Spiraea betulifolia*. *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Ceanothus velutinus* and *Ribes cereum* may be present. *Calamagrostis rubescens* or *Carex geyeri* is prominent in the herbaceous layer.

Mid seral conditions support a tree canopy dominated by *Pinus contorta* or *Pseudotsuga menziesii*. Relatively shade tolerant species dominate the shrub and herbaceous layers. The shrub layer has low to moderate cover and is dominated by *Spiraea betulifolia*. *Amelanchier alnifolia* or *Symphoricarpos oreophilus* may be present. The herbaceous layer has low to moderate cover and is dominated by *Calamagrostis rubescens* or *Carex geyeri*.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. The shrub layer has low cover and is dominated by *Spiraea betulifolia*. *Amelanchier alnifolia* and *Symphoricarpos oreophilus* may be conspicuous. The herbaceous layer has low cover, low species diversity and is dominated by *Calamagrostis rubescens*.

Discussion

Artemisia tridentata ssp. *vaseyana* var. *vaseyana*, *Ceanothus velutinus*, *Ribes cereum* and *Spiraea betulifolia* are pioneers in the early seral stages. *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* seed, dispersed from off-site sources by wind, invades soil exposed by scarification or burning. *Ceanothus velutinus* quickly regenerates from sprouting following low intensity fire and from soil-stored seed following high intensity fire. *Ribes cereum* is often the first shrub to dominate well scarified sites following logging. *Ceanothus velutinus* and *Ribes cereum* seed remain viable long after the parent shrubs have died.

Spiraea betulifolia is a moderately shade tolerant, rhizomatous shrub that is highly resistant to fire. Root crowns and rhizomes commonly sprout within one growing season following fire or scarification.

Calamagrostis rubescens and *Carex geyeri* dominate the herbaceous layer in all seral stages. *Carex geyeri* increases following scarification and is slowly replaced by *Calamagrostis rubescens* as succession progresses. Both graminoids develop a dense sod that provides watershed protection and limits tree establishment.

Calamagrostis rubescens is a long lived graminoid. Reproduction by seeds or rhizomes allows the grass to persist and become an aggressive constituent in the undergrowth. *Calamagrostis rubescens* will

typically sprout from surviving rhizomes following low to moderate intensity fires. Wind dispersed seeds may be the primary source of plant establishment on severely burned areas.

Carex geyeri is an aggressive, rhizomatous sedge that can tolerate moisture stress. Regeneration occurs vegetatively and from seed. The extensive root system usually survives scarification and fire.

The somewhat excessively drained, volcanic soils of this ecological type influence community composition and development. The soil binds phosphate, limiting the availability of this major nutrient for plant use. Overall plant development is retarded by phosphate deficiency. The soil retains little moisture and is dry for significant periods during the late portion of the growing season. Shallow rooted plants and seedlings are limited by increased droughtiness as succession progresses.

The species constancy and cover documentation for vegetation is on page 603.

Soils

Name: Vitricryands family
Taxonomic class: Ashy-skeletal, glassy Typic Vitricryands

Typical Pedon Description

Vitricryands, supporting the *Pseudotsuga menziesii/Spiraea betulifolia* p.a., *Calamagrostis rubescens* phase on a convex 45 percent slope with east aspect at 7310 feet elevation. (Colors are for dry soil unless otherwise noted.)

O--1 to 0 inches; forest litter of needles, cones and twigs; abrupt smooth boundary.

A1--0 to 1 inches; very dark gray (10YR 3/1) sandy loam, black (10YR 2/1) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine roots; many very fine irregular pores; trace pebbles; moderately acid (pH 5.8); abrupt smooth boundary.

A2--1 to 8 inches; grayish brown (10YR 5/2) gravelly sandy loam, dark grayish brown (10YR 4/2) moist; weak coarse subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and common fine roots, few medium and coarse roots; many very fine irregular pores; 30 percent pebbles and trace cobbles; moderately acid (pH 5.8); abrupt smooth boundary.

Bw--8 to 19 inches; very pale brown (10YR 7/3) very gravelly sandy loam, pale brown (10YR 6/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few fine, medium and coarse roots; many very fine tubular pores; 50 percent pebbles and 5 percent cobbles; slightly acid (pH 6.2); clear smooth boundary.

2BC--19 to 30 inches; very pale brown (10YR 8/2) extremely gravelly loamy sand, light gray (10YR 7/2) moist; weak fine granular structure; soft, very friable, nonsticky and nonplastic; common very fine roots, few fine, medium and coarse roots; many fine irregular pores; 55 percent pebbles, 20 percent cobbles and 5 percent stones; slightly acid (pH 6.2); gradual smooth boundary.

2C1--30 to 46 inches; very pale brown (10YR 8/2) extremely cobbly loamy sand, light gray (10YR 7/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine and fine roots; many very fine irregular pores; 35 percent pebbles, 50 percent cobbles and 5 percent stones; slightly acid (pH 6.2); gradual smooth boundary.

2C2--46 to 60 inches; very pale brown (10YR 8/2) extremely cobbly loamy sand, light gray (10YR 7/2) moist; massive; soft, very friable, nonsticky and nonplastic; few very fine roots; many fine irregular pores; 30 percent pebbles, 50 percent cobbles and 5 percent stones; slightly acid (pH 6.2).

Typical Pedon Location

Located in ecological unit 1230.
Legal description: about 1800 feet south and 600 feet west of the northeast corner of section 31, T. 13 N., R. 38 E., Idaho
Latitude: 44 degrees, 24 minutes, 47 seconds, north
Longitude: 112 degrees, 01 minutes, 23 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat excessively drained
O horizon thickness: 0 to 2 inches
Ochric epipedon thickness: 4 to 8 inches
Thickness of andic soil properties: 14 to 22 inches
Depth to 2C horizons: 14 to 30 inches

A horizons
Hue: 10YR
Value: 3, 4 or 5 dry; 2, 3 or 4 moist

Chroma: 1, 2, 3 or 4 dry or moist
Texture: sandy loam
Rock fragment content: 15 to 35 percent (after mixing the A horizons)
Pebbles: 15 to 35 percent (after mixing the A horizons)
Cobbles: 0 to 5 percent (after mixing the A horizons)
Stones or boulders: 0 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.10 to 1.30 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15 bar water retention: 7 to 11 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 30 percent
Reaction: very strongly acid to moderately acid (pH 4.5 to 6.0)

Bw horizon
Hue: 10YR
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 3, 4, or 6 dry or moist
Texture: loam or sandy loam
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 50 percent
Cobbles: 0 to 10 percent
Stones or boulders: 0 to 10 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.10 to 1.30 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: 0.4 to 1.5 percent
15 bar water retention: 7 to 11 percent on air-dried samples
Phosphate retention: 40 to 70 percent
Base saturation: 10 to 60 percent
Reaction: very strongly acid to slightly acid (pH 4.5 to 6.5)

2BC horizon
Hue: 2.5Y or 10YR
Value: 6, 7 or 8 dry; 4, 5, 6 or 7 moist
Chroma: 2 or 3 dry or moist
Texture: loamy sand or loamy coarse sand
Rock fragment content: 50 to 90 percent
Pebbles: 30 to 60 percent
Cobbles: 0 to 30 percent
Stones or boulders: 0 to 10 percent
Volcanic glass content: greater than 50 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Phosphate retention: 35 to 60 percent
Base saturation: 10 to 60 percent
Reaction: very strongly acid to slightly acid (pH 4.5 to 6.5)

2C horizons
Hue: 7.5YR to 5Y
Value: 3, 4, 5, 6, 7 or 8 dry; 2, 3, 4, 5, 6, or 7 moist
Chroma: 0, 1 or 2 dry or moist
Texture: sand, coarse sand or loamy sand
Rock fragment content: 60 to 90 percent
Pebbles: 30 to 60 percent
Cobbles: 5 to 60 percent
Stones or boulders: 0 to 15 percent
Volcanic glass content: greater than 85 percent in the 0.02 to 2.0 mm fraction
Bulk density: 1.4 to 1.6 grams per cubic centimeter
Ammonium oxalate extractable Al plus 1/2 Fe: less than 0.4 percent
Base saturation: 50 to 80 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

PSME/SYAL Lagall Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Symphoricarpos albus* p.a. on Lagall soils. It is on south facing sideslopes of canyons, escarpments of plateaus, foothills and mountains in both the warm and mid portions of the forested zone.

Environmental Setting

Ecological Unit: 1222 and 1592
Landform: canyons, escarpments of plateaus, foothills and mountains
Parent material: local alluvium or colluvium derived from igneous rocks, loess and volcanic ash
Slope: 25 to 70 percent
Elevation: 5300 to 7000 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 36 to 41 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Symphoricarpos albus* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Symphoricarpos albus* p.a.
- *Populus tremuloides-Pseudotsuga menziesii/Amelanchier alnifolia* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Symphoricarpos oreophilus* c.t.
- *Populus tremuloides/Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Calamagrostis rubescens* c.t.
- *Populus tremuloides/Amelanchier alnifolia-Symphoricarpos oreophilus/Thalictrum fendleri* c.t.
- *Populus tremuloides/Amelanchier alnifolia/Pteridium aquilinum* c.t.
- *Pseudotsuga menziesii/Spiraea betulifolia* community
- Shrub communities dominated by *Ceanothus velutinus.*

Succession

Early seral conditions, as a result of fire or clearcutting, support few residual trees. *Pinus contorta* and *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub and herbaceous layers have moderate to high cover and high species diversity. Shrubs may include *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Ceanothus velutinus*, *Ribes cereum*, *Prunus virginiana* var. *melanocarpa*, *Spiraea betulifolia* or *Symphoricarpos oreophilus.* The herbaceous layer includes *Calamagrostis rubescens*, *Carex geyeri*, *Agastache urticifolia*, *Balsamorhiza sagittata*, *Epilobium angustifolium*, *Geranium viscosissimum*, *Hackelia micrantha*, *Helianthella uniflora, Thalictrum fendleri* or *Pteridium aquilinum.*

Mid seral conditions support a closed tree canopy dominated by *Populus tremuloides*, *Pinus contorta* or *Pseudotsuga menziesii.* Relatively shade tolerant species dominate the diverse shrub and herbaceous layers. The shrub layer has moderate to high cover and may include *Amelanchier alnifolia*, *Prunus virginiana* var. *melanocarpa*, *Spiraea betulifolia*, *Symphoricarpos albus* or *Symphoricarpos oreophilus.* The herbaceous layer is similar to early seral conditions.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. The shrub layer has moderate cover and is dominated by *Symphoricarpos albus. Amelanchier alnifolia*, *Spiraea betulifolia* or *Symphoricarpos oreophilus* may be present. The herbaceous layer has low cover and is codominated by graminoids and forbs. *Calamagrostis rubescens*, *Carex geyeri*, *Poa nervosa* var. *wheeleri*, *Arnica cordifolia*, *Aster conspicuus* or *Thalictrum* species may be conspicuous.

Discussion

Pinus contorta commonly regenerates in frost pockets and *Pseudotsuga menziesii* regenerates in warmer positions. The *Pseudotsuga menziesii* canopy becomes more dense as stand conditions progress from mid seral to late seral stages. *Populus tremuloides* clones may be relatively persistent if

conifers do not establish within the stand. As shading increases, *Populus tremuloides* decreases in cover.

Shrubs are pioneer species in early seral stages. They enhance establishment of *Pseudotsuga menziesii* by providing shaded microsites.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The species constancy and cover documentation for vegetation is on page 604.

Soils

Name: Lagall series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Typical Pedon Description

Lagall, supporting the *Pseudotsuga menziesii/Symphoricarpos albus* p.a. on a 32 percent slope with south aspect at 6600 feet elevation (Photo 7). (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, leaves, twigs and stems; abrupt smooth boundary.

A1--0 to 7 inches; very dark gray (10YR 3/1) very gravelly loam, black (10YR 2/1) moist; weak very fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine and medium roots, common coarse roots; many very fine irregular and tubular pores; 25 percent pebbles, 5 percent cobbles and 10 percent stones; neutral (pH 6.8); clear smooth boundary.

A2--7 to 15 inches; very dark grayish brown (10YR 3/2) very cobbly loam, very dark brown (10YR 2/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and slightly plastic; common very fine, fine, medium and coarse roots; many very fine and fine irregular pores, common very fine tubular pores; 15 percent pebbles, 35 percent cobbles and 5 percent stones; neutral (pH 6.8); abrupt smooth boundary.

Bw--15 to 23 inches; pale brown (10YR 6/3) extremely cobbly loam, brown (10YR 4/3) moist; weak fine and medium subangular blocky structure; soft, very friable, slightly sticky and nonplastic; common very fine, fine and medium roots, few coarse roots; many very fine irregular pores, few very fine tubular pores; 35 percent pebbles, 35 percent cobbles and 10 percent stones; neutral (pH 6.6); abrupt wavy boundary.

BC--23 to 62 inches; pale brown (10YR 6/3) extremely cobbly loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine, fine and medium roots; many very fine irregular pores, common very fine tubular pores; 20 percent pebbles, 40 percent cobbles and 20 percent stones; slightly acid (pH 6.4).

Typical Pedon Location

Located in ecological unit 1592.
Legal description: about 1400 feet west and 2600 feet north of the southeast corner of section 5, T. 10 N., R. 42 E., Idaho
Latitude: 44 degrees, 13 minutes, 16 seconds, north
Longitude: 111 degrees, 31 minutes, 16 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 1 to 4 inches
Mollic epipedon thickness: 10 to 15 inches
Rock fragment content in the particle-size control section: average 50 to 90 percent
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam or sandy loam
Clay content: 10 to 16 percent
Rock fragment content: 35 to 70 percent

Pebbles: 15 to 65 percent
Cobbles: 0 to 50 percent
Stones or boulders: 0 to 15 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizon
Hue: 10YR
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 7 to 14 percent
Rock fragment content: 40 to 90 percent
Pebbles: 15 to 60 percent
Cobbles: 15 to 50 percent
Stones or boulders: 5 to 30 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 5 to 12 percent
Rock fragment content: 60 to 90 percent
Pebbles: 5 to 20 percent
Cobbles: 5 to 60 percent
Stones or boulders: 10 to 70 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

ABLA/PHMA5 Lagall
- This ecological type occurs on more moist positions.
- In the plant association, *Abies lasiocarpa* is present in the tree layer; *Physocarpus malvaceus* is well represented in the undergrowth.

PSME/SYAL Lagall, till substratum
- Soils have 40 to 85 percent cobbles and stones in the lower subsoil layer.

PSME/SYAL Potrmound
- Soils have 20 to 80 percent stones in the surface layer.

Photo 7. Typical pedon of Lagall soils in the PSME/SYAL Lagall Ecological Type. The rock hammer is 12 inches long.

PSME/SYAL Lagall, till substratum Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Symphoricarpos albus* p.a. on Lagall, till substratum soils. It is on dissected tablelands in the warm portion of the forested zone.

Environmental Setting

Ecological Unit: 1506
Landform: dissected tablelands
Parent material: local alluvium derived from mixed sources
Slope: 4 to 25 percent
Elevation: 5600 to 6500 feet
Average annual precipitation: 20 to 25 inches
Average annual air temperature: 38 to 41 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Symphoricarpos albus* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Symphoricarpos albus* p.a.
- *Populus tremuloides-Pseudotsuga menziesii/Amelanchier alnifolia* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Symphoricarpos oreophilus* c.t.

Succession

Early seral conditions, as a result of fire or clearcutting, support few residual trees. *Pinus contorta* or *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub and herbaceous layers have moderate to high cover and high species diversity. Shrubs may include *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Ceanothus velutinus*, *Ribes cereum*, *Prunus virginiana* var. *melanocarpa*, *Spiraea betulifolia* or *Symphoricarpos oreophilus*. The herbaceous layer is codominated by graminoids and forbs. *Calamagrostis rubescens*, *Carex geyeri*, *Agastache urticifolia*, *Balsamorhiza sagittata*, *Epilobium angustifolium*, *Geranium viscosissimum*, *Hackelia micrantha* or *Helianthella uniflora* may be conspicuous.

Mid seral conditions support a closed tree canopy dominated by *Populus tremuloides*, *Pinus contorta* or *Pseudotsuga menziesii*. Relatively shade tolerant species dominate the diverse shrub and herbaceous layers. The shrub layer has moderate to high cover and may include *Amelanchier alnifolia*, *Prunus virginiana* var. *melanocarpa*, *Spiraea betulifolia*, *Symphoricarpos albus* or *Symphoricarpos oreophilus*. The herbaceous layer is similar to early seral conditions.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. The shrub layer has moderate cover and is dominated by *Symphoricarpos albus*. *Amelanchier alnifolia*, *Spiraea betulifolia* or *Symphoricarpos oreophilus* may be present. The herbaceous layer has low cover and is codominated by graminoids and forbs. *Calamagrostis rubescens*, *Carex geyeri*, *Poa nervosa* var. *wheeleri*, *Arnica cordifolia*, *Aster conspicuus* or *Thalictrum* species may be conspicuous.

Discussion

Pinus contorta commonly regenerates in frost pockets and *Pseudotsuga menziesii* regenerates in warmer positions. The *Pseudotsuga menziesii* canopy becomes more dense as stand conditions progress from mid seral to late seral stages. *Populus tremuloides* clones may be relatively persistent if conifers do not establish within the stand. As shading increases, *Populus tremuloides* decreases in cover.

Shrubs are pioneer species in early seral stages. They enhance establishment of *Pseudotsuga menziesii* by providing shaded microsites.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role

in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The species constancy and cover documentation for vegetation is on page 606.

Soils

Name: Lagall series, till substratum phase
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryoborolls

Typical Pedon Description

Lagall, till substratum, supporting the *Pseudotsuga menziesii/Symphoricarpos albus* p.a. on a rolling 5 percent slope with north aspect at 6300 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; forest litter of needles, leaves and twigs; abrupt smooth boundary.

A1--0 to 6 inches; grayish brown (10YR 5/2) silt loam, very dark brown (10YR 2/2) moist; weak very fine subangular blocky structure; soft, very friable, nonsticky and nonplastic; many very and fine roots, common medium roots; common fine tubular pores; 5 percent pebbles and 5 percent cobbles; slightly acid (pH 6.1); clear smooth boundary.

A2--6 to 14 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak fine subangular blocky structure; soft, very friable, nonsticky and slightly plastic; common very fine and fine roots, few medium roots; few fine and medium tubular pores; 5 percent pebbles and 5 percent cobbles; slightly acid (pH 6.1); gradual smooth boundary.

Bw1--14 to 25 inches; yellowish brown (10YR 5/4) very gravelly silt loam, brown (10YR 4/3) moist; weak coarse subangular blocky structure parting to weak medium subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine roots, few fine and medium roots; common fine and few medium tubular pores; 25 percent pebbles, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.5); gradual wavy boundary.

Bw2--25 to 35 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 4/4) moist; weak medium subangular blocky structure; hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine and few fine tubular pores; 35 percent pebbles, 15 percent cobbles and 5 percent stones; slightly acid (pH 6.5); gradual wavy boundary.

Bw3--35 to 48 inches; yellowish brown (10YR 5/4) very gravelly loam, dark yellowish brown (10YR 3/4) moist; slightly hard, very friable, nonsticky and slightly plastic; few very fine and fine roots; many very fine and common fine tubular pores; 35 percent pebbles, 10 percent cobbles and 5 percent stones; slightly acid (pH 6.5); gradual wavy boundary.

BC--48 to 60 inches; brown (10YR 5/3) very gravelly sandy loam, olive brown (2.5Y 3/3) moist; massive; slightly hard, very friable, nonsticky and nonplastic; few very fine and fine roots, many very fine and common fine tubular pores; 25 percent gray (2.5Y 5/1) channer-size fragments of dense basal till, dark grayish brown (2.5Y 4/2) moist; 35 percent pebbles, 15 percent cobbles and 5 percent stones; slightly acid (pH 6.5).

Typical Pedon Location

Located in ecological unit 1506.
Legal description: about 1000 feet west and 400 feet south of the northeast corner of section 3, T. 8 N., R. 45 E., Idaho
Latitude: 44 degrees, 03 minutes, 20 seconds, north
Longitude: 111 degrees, 07 minutes, 28 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
O horizon thickness: 1 to 4 inches
Mollic epipedon thickness: 10 to 15 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: silt loam
Clay content: 8 to 16 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones or boulders: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam, loam or sandy loam
Clay content: 8 to 18 percent
Rock fragment content: 35 to 85 percent
Pebbles: 20 to 55 percent
Cobbles: 0 to 25 percent
Stones or boulders: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

BC horizon
Hue: 10YR or 2.5Y
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: sandy loam
Clay content: 4 to 10 percent
Rock fragment content: 35 to 85 percent
Pebbles: 30 to 55 percent
Cobbles: 5 to 25 percent
Stones or boulders: 0 to 5 percent
Soft dense basal till fragments: 0 to 35 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

PSME/SYAL Lagall
- Soils have 5 to 30 percent cobbles and stones in the lower subsoil layer.

PSME/SYAL Potrmound
- Soils have 40 to 85 percent cobbles and stones throughout the profile.

PSME/SYAL Potrmound Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Symphoricarpos albus* p.a. on Potrmound soils. It is on droughty ridges of a low relief, caldera floor in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 1000
Landform: caldera floor
Parent material: loess, volcanic ash and residuum derived from basalt
Slope: 4 to 35 percent
Elevation: 5900 to 6400 feet
Average annual precipitation: 20 to 28 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Symphoricarpos albus* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Symphoricarpos albus* p.a.
- *Populus tremuloides-Pinus contorta/Symphoricarpos oreophilus* c.t.
- *Populus tremuloides-Pseudotsuga menziesii/Symphoricarpos oreophilus* c.t.

Succession

Early seral conditions, as a result of fire or clearcutting, support few residual trees. *Pinus contorta* or *Pseudotsuga menziesii* seedlings and *Populus tremuloides* root suckers may be present. The shrub and herbaceous layers have low to moderate cover and high species diversity. Shrubs may include *Amelanchier alnifolia*, *Artemisia tridentata* ssp. *vaseyana* var. *vaseyana*, *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora*, *Ceanothus velutinus*, *Ribes cereum*, *Prunus virginiana* var. *melanocarpa*, *Spiraea betulifolia* or *Symphoricarpos oreophilus*. The herbaceous layer is codominated by graminoids and forbs. *Calamagrostis rubescens*, *Carex geyeri*, *Agastache urticifolia*, *Balsamorhiza sagittata*, *Epilobium angustifolium*, *Geranium viscosissimum*, *Hackelia micrantha* or *Helianthella uniflora* may be conspicuous.

Mid seral conditions support an open to closed tree canopy dominated by *Populus tremuloides*, *Pinus contorta* or *Pseudotsuga menziesii*. Relatively shade tolerant species dominate the diverse shrub and herbaceous layers. The shrub layer has low to moderate cover and may include *Amelanchier alnifolia*, *Prunus virginiana* var. *melanocarpa*, *Spiraea betulifolia*, *Symphoricarpos albus* or *Symphoricarpos oreophilus*. The herbaceous layer is similar to early seral conditions.

Late seral and near PNC conditions support a closed *Pseudotsuga menziesii* canopy. The shrub layer has low cover and is dominated by *Symphoricarpos albus*. *Amelanchier alnifolia*, *Spiraea betulifolia* and *Symphoricarpos oreophilus* are present. The herbaceous layer has low cover and is codominated by graminoids and forbs. *Calamagrostis rubescens*, *Carex geyeri*, *Poa nervosa* var. *wheeleri*, *Arnica cordifolia*, *Aster conspicuus* or *Thalictrum* species may be conspicuous.

Discussion

Pinus contorta commonly regenerates in frost pockets and *Pseudotsuga menziesii* regenerates in warmer positions. The *Pseudotsuga menziesii* canopy becomes more dense as stand conditions progress from mid seral to late seral stages. *Populus tremuloides* clones may be relatively persistent if conifers do not establish within the stand. As shading increases, *Populus tremuloides* decreases in cover.

Shrubs are pioneer species in early seral stages. They enhance establishment of *Pseudotsuga menziesii* by providing shaded microsites.

Ceanothus velutinus is shade intolerant and generally grows on sunny exposed sites. Reproduction from seed is the primary regenerative strategy following high intensity fire. Seeds are long lived and can remain viable in the soil for 300 years or more. Roots or root crowns sprout quickly following low intensity fire or shrub management treatment. At high densities, *Ceanothus velutinus* competes vigorously with *Pseudotsuga menziesii* seedlings. *Ceanothus velutinus* has a significant role

in the fertility of this ecological type. The shrub fixes nitrogen, increasing the availability of this major plant nutrient in the soil.

The soils of this ecological type influence community composition and development. This ecological type occurs on rocky mounds about one quarter acre in size. The mounds have short, steep sideslopes, convex summits and abundant stones or boulders at the soil surface. Sideslopes of the mounds have greater cover by rock fragments, higher shrub cover and lower herbaceous cover than the summits. Roots are restricted to narrow spaces between rock fragments in the upper 20 to 40 inches of the soil and to fractures in the bedrock below this depth. The effective rooting space is greater on mound sideslopes than on summits.

The species constancy and cover documentation for vegetation is on page 607.

Soils

Name: Potrmound series
Taxonomic class: Loamy-skeletal, mixed, superactive Vitrandic Cryumbrepts

Typical Pedon Description

Potrmound, supporting the *Populus tremuloides-Pinus contorta/Symphoricarpos oreophilus* c.t. on a 12 percent slope with northeast aspect at 6060 feet elevation. (Colors are for dry soil unless otherwise noted).

A1--0 to 16 inches; dark grayish brown (10YR 4/2) extremely stony loam, very dark brown (10YR 2/2) moist; moderate fine granular structure; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; many very fine irregular pores; 5 percent cobbles and 80 percent stones; moderately acid (pH 5.8); abrupt wavy boundary.

A2--16 to 24 inches; brown (10YR 5/3) extremely stony loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure parting to weak fine granular; soft, very friable, nonsticky and nonplastic; many very fine, fine, medium and coarse roots; common very fine irregular pores, many very fine tubular pores; 5 percent cobbles and 80 percent stones; slightly acid (pH 6.2); clear wavy boundary.

A3--24 to 30 inches; brown (10YR 5/3) extremely stony loam, dark brown (7.5YR 3/2) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine, medium and coarse roots; common very fine tubular pores; 5 percent pebbles and 80 percent stones; moderately acid (pH 5.8); clear wavy boundary.

Bw--30 to 39 inches; pale brown (10YR 6/3) extremely stony loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure; soft, very friable, nonsticky and nonplastic; common very fine, fine and medium roots; common very fine tubular pores; 5 percent pebbles and 80 percent stones; slightly acid (pH 6.2): abrupt irregular boundary.

R-- 39 inches; hard fractured basalt bedrock.

Typical Pedon Location

Located in ecological unit 1000.
Legal description: about 300 feet north and 200 feet east of the southwest corner of section 2, T. 10 N., R 43 E., Idaho
Latitude: 44 degrees, 12 minutes, 58 seconds, north
Longitude: 111 degrees, 21 minutes, 27 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Umbric epipedon thickness: 20 to 30 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 10 to 18 percent
Rock fragment content: 60 to 90 percent
Pebbles: 5 to 20 percent
Cobbles: 0 to 45 percent
Stones: 20 to 80 percent
Base saturation: 30 to 50 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bw horizon
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 dry or moist
Texture: loam or silt loam
Clay content: 10 to 18 percent
Rock fragment content: 60 to 90 percent
Pebbles: 5 to 20 percent
Cobbles: 0 to 45 percent
Stones: 20 to 80 percent
Base saturation: 30 to 80 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Related Types, Mosaics and Ecotones

PSME/SYAL Lagall
- Soils have 0 to 15 percent stones in the surface layer.

PSME/SYAL Lagall, till substratum
- Soils have 0 to 30 percent cobbles and stones throughout the profile.

PSME/SYOR2 Kyway Ecological Type

Summary

This ecological type is named for the occurrence of the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. on Kyway soils. It is on south facing foothill sideslopes in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1430
Landform: foothills
Parent material: local alluvium or colluvium derived from eolian materials, volcanic ash and rhyolite
Slope: 4 to 30 percent
Elevation: 5600 to 6300 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Vegetation

Potential Natural Community

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.

Present Vegetation

- *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a.
- Communities that have a shrub layer of *Acer grandidentatum, Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Symphoricarpos oreophilus* with an herbaceous layer dominated by one or more of the following: *Agropyron spicatum, Bromus carinatus, Carex geyeri* or annual forbs.
- Shrub dominated communities that have widely dispersed seedling through medium *Pseudotsuga menziesii.*

Succession

Early seral conditions, as a result of fire, support few residual trees. The shrub layer has low cover and is dominated by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora* or *Symphoricarpos oreophilus.* The prominent herbaceous layer is dominated by *Agropyron spicatum, Bromus carinatus, Carex geyeri, Festuca idahoensis* and *Poa* species. Forbs have low cover and moderate species diversity.

Mid seral conditions support dispersed *Pseudotsuga menziesii* and *Juniperus scopulorum* seedlings or saplings. These trees establish in the shade provided by *Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana* or residual *Pseudotsuga menziesii.* Small clones of *Populus tremuloides* saplings may be present. The shrub layer has moderate cover and may include *Acer grandidentatum, Artemisia tridentata* ssp. *vaseyana* var. *pauciflora, Artemisia tridentata* ssp. *vaseyana* var. *vaseyana, Prunus virginiana* var. *melanocarpa* or *Symphoricarpos oreophilus.* The moderate cover in the herbaceous layer is dominated by graminoids.

Late seral and near PNC conditions support an open tree canopy of *Pseudotsuga menziesii. Populus tremuloides* and *Juniperus scopulorum* may be present. The shrub layer has moderate cover and is dominated by *Symphoricarpos oreophilus. Amelanchier alnifolia* or *Prunus virginiana* var. *melanocarpa* may be present. The herbaceous layer has low cover. *Carex rossii* or *Poa nervosa* var. *wheeleri* dominate islands of relatively shade tolerant species in tree shadows. *Agropyron spicatum, Agropyron trachycaulum, Bromus carinatus* or *Festuca idahoensis* dominate in shrub interspaces. Forbs are sparse.

Discussion

Symphoricarpos oreophilus is a pioneer species on highly disturbed sites. This shrub often becomes established in early seral conditions and persists into later stages. Regeneration is vegetative and by seed. Rootcrowns sprout following fire and basal stems sprout after browsing. Regeneration by layering occurs where the lower branches are in contact with the soil surface for an extended period of time.

The loamy soils of this ecological type influence community composition and development. Roots are restricted by hard bedrock at depths of 20 to 40 inches. As a result of weak anchoring, trees are susceptible to windthrow during late spring. Frost heaving in the upper 2 to 4 inches of the soil may tear the roots of tree and shrub seedlings and perennial forbs during the freeze-thaw cycles following snowmelt.

The species constancy and cover documentation for vegetation is on page 608.

Soils

Name: Kyway series
Taxonomic class: Coarse-loamy, mixed, superactive Vitrandic Cryoborolls

Typical Pedon Description

Kyway, supporting the *Pseudotsuga menziesii/Symphoricarpos oreophilus* p.a. on a 5 percent slope with south aspect at 6200 feet elevation. (Colors are for dry soil unless otherwise noted.)

A1--0 to 8 inches; brown (10YR 4/3) sandy loam, very dark brown (10YR 2/2) moist; weak fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine roots, few fine, medium and coarse roots; many very fine irregular pores; 10 percent pebbles; neutral (pH 6.8); clear smooth boundary.

A2--8 to 18 inches; brown (7.5YR 4/2) sandy loam, dark brown (7.5YR 3/2) moist; moderate medium and coarse subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; many very fine and common fine tubular pores; 10 percent pebbles; neutral (pH 6.6); clear smooth boundary.

A3--18 to 27 inches; brown (7.5YR 5/3) sandy loam, dark brown (7.5YR 3/3) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, fine, medium and coarse roots; common very fine tubular pores; 10 percent pebbles; slightly acid (pH 6.4); clear wavy boundary.

Bw--27 to 32 inches; light brown (7.5YR 6/3) sandy loam, brown (7.5YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine, fine and medium roots; common very fine and fine tubular pores; 10 percent pebbles; slightly acid (pH 6.4); abrupt wavy boundary.

R--32 inches; hard rhyolite bedrock.

Typical Pedon Location

Located in ecological unit 1430.

Legal description: about 900 feet north and 2100 feet west of the southeast corner of section 26, T. 10 N., R. 42 E., Idaho
Latitude: 44 degrees, 09 minutes, 40 seconds, north
Longitude: 111 degrees, 27 minutes, 45 seconds, west

Range in Characteristics

Profile
Depth class: moderately deep (20 to 40 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Mollic epipedon thickness: 16 to 40 inches
Volcanic glass content: 5 to 30 percent in the 0.02 to 2.0 mm fraction
Ammonium oxalate extractable Al plus 1/2 Fe: 0.1 to 1.0 percent
Phosphate retention: 20 to 50 percent

A horizons
Hue: 7.5YR or 10YR
Value: 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry; 1, 2 or 3 moist
Texture: sandy loam
Clay content: 10 to 14 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bw horizon
Hue: 7.5YR or 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 2, 3 or 4 dry and moist
Texture: sandy loam
Clay content: 10 to 14 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 10 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

Salix/Graminoid Cryaquolls Ecological Type

Summary

This ecological type is named for the occurrence of *Salix* spp./graminoid dominated communities on Cryaquoll soils. It is on moist floodplains in the shrub steppe and forested zones. This riparian ecological type occurs on stream terraces that have frequent flooding and is commonly associated with intermittent or perennial stream segments with few beaver dams.

Environmental Setting

Ecological Unit: 2606
Landform: floodplains
Parent material: mixed alluvium
Slope: 0 to 6 percent
Elevation: 5600 to 7800 feet
Average annual precipitation: 18 to 28 inches
Average annual air temperature: 34 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

- *Salix* spp./graminoid dominated communities

Present Vegetation

- *Salix boothii/Poa palustris* c.t.
- *Salix boothii/Smilacina stellata* c.t.
- *Salix geyeriana/Poa palustris* c.t.
- *Potentilla fruticosa/Poa pratensis* community
- Herbaceous communities dominated by one or more of the following: *Phleum pratense, Poa pratensis, Juncus balticus, Carex microptera, Stipa occidentalis, Agropyron trachycaulum, Fragaria virginiana, Senecio integerrimus, Iris missouriensis*, or annual forbs.

Succession

Seral stages and successional status are not clearly defined for these dynamic riparian communities. Observations suggest that early seral conditions, following severe ground disturbance, support graminoids. A dense community of *Salix* species may establish from seed in the more moist positions. Forbs may establish from seed where the soil is slightly drier. The prominent graminoids have high species diversity, are aggressive colonizers and may form a dense herbaceous layer within the first growing season. They outcompete many of the *Salix* seedlings and forbs by the second growing season.

As succession progresses, *Salix* species or other shrub seedlings establish and shrub dominated communities may replace the graminoid communities. The shrub layer may achieve high cover and exceed 6 feet in height. *Salix boothii*, *Salix drummondiana* or *Salix geyeriana* dominate or codominate the tall shrub component. *Alnus incana* var. *occidentalis*, *Lonicera involucrata*, *Potentilla fruticosa* or *Ribes lacustre* may develop a dispersed low shrub layer along incised stream channels.

Discussion

The herbaceous layer in shrub dominated communities is highly variable in both species diversity and cover. Herbaceous succession progresses from low cover dominated by forbs, to moderate cover dominated by forbs or graminoids, and eventually to high cover dominated by graminoids.

Succession in the herbaceous layer is more complex and rapid than in the shrub layer and may be interrupted by changes in livestock, wildlife or recreational use. In response to cattle grazing pressure, the rhizomatous graminoids and the forbs that often increase include: *Carex buxbaumii*, *Juncus balticus*, *Poa pratensis*, *Aster foliaceus* var. *canbyi*, *Fragaria virginiana*, *Potentilla gracilis*, *Solidago canadensis*, *Taraxacum officinale* and *Urtica dioica*. The tufted graminoids and the forbs that often decrease include: *Agrostis scabra*, *Carex microptera*, *Danthonia intermedia*, *Deschampsia cespitosa*, *Phleum alpinum*, *Galium triflorum*, *Heracleum lanatum*, *Smilacina stellata* and *Thalictrum* species.

Community establishment in this ecological type may hinge more on opportunism than competition. Beaver activity, channel piracy, spring runoff, or other floodplain disturbances may truncate succession or cause abrupt shifts between this ecological type and the more water-obligate Salix/Graminoid Cryaquolls, poorly drained Ecological Type.

The species constancy and cover documentation for vegetation is on page 609.

Soils

Name: Cryaquolls great group
Taxonomic class: Cryaquolls

Typical Pedon Description

Cryaquolls, supporting the *Salix geyeriana/Poa palustris* c.t. on an undulating 3 percent slope at 6720 feet elevation. When described on October 21, 1993 the water table was at 15 inches. (Colors are for dry soil unless otherwise noted.)

A--0 to 5 inches; very dark grayish brown (10YR 3/2) silt loam, black (10YR 2/1) moist; strong fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine roots, few medium and coarse roots; many very fine irregular pores; few fine prominent, yellowish red (5YR 4/6) moist, soft Fe accumulations on ped faces; trace pebbles; neutral (pH 6.6); abrupt smooth boundary.

Bt1--5 to 11 inches; dark grayish brown (10YR 4/2) silt loam, very dark brown (10YR 2/2) moist; strong fine subangular blocky structure; hard, friable, slightly sticky and plastic; common very fine and few fine roots; common very fine and fine tubular pores; few fine prominent, yellowish red (5YR 4/6) moist, soft Fe accumulations on ped faces, lining pores and root channels; 5 percent pebbles; neutral (pH 6.8); abrupt smooth boundary.

Bt2--11 to 17 inches; grayish brown (10YR 5/2) silt loam, very dark grayish brown (10YR 3/2) moist; moderate coarse subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; common very fine and fine tubular pores; common fine prominent, strong brown (7.5YR 4/6) moist, soft Fe accumulations on ped faces, lining pores and root channels; 5 percent pebbles; neutral (pH 6.8); abrupt smooth boundary.

BC--17 to 24 inches; grayish brown (10YR 5/2) loam, dark gray (10YR 4/1) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine and fine roots; many very fine and common fine tubular pores; common fine prominent, dark brown (7.5YR 4/4) moist, soft Fe accumulations lining pores and root channels; 5 percent pebbles; neutral (pH 7.0); abrupt smooth boundary.

Cg --24 to 34 inches; light gray (2.5Y 7/2) stratified fine sandy loam and very fine sandy loam, gray (5Y 5/1) moist; massive; slightly hard, very friable, nonsticky and slightly plastic; few very fine roots; many very fine and few fine tubular pores; few fine prominent, yellowish brown (10YR 5/6) moist, soft Fe accumulations lining pores; few fine distinct, black (2.5Y 2/0) moist, soft Fe/Mn accumulations in matrix; 5 percent pebbles and trace cobbles; neutral (pH 7.3); clear smooth boundary.

2C--34 to 60 inches; variegated, stratified extremely gravelly sandy loam to extremely gravelly loamy sand; single grain; loose; many very fine irregular pores; 60 percent pebbles and 10 percent cobbles; neutral (pH 7.3).

Typical Pedon Location

Located in ecological unit 2606.
Legal description: about 1900 feet west and 1300 feet north of the southeast corner of section 19, T. 13 N., R. 36 E., Idaho
Latitude: 44 degrees, 26 minutes, 08 seconds, north
Longitude: 112 degrees, 15 minutes, 55 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat poorly drained
Water table, depth: 0 to 18 inches
Water table, kind: apparent
Water table, duration: April to August
Mollic epipedon thickness: 7 to 30 inches
Depth to redoximorphic features: 0 to 18 inches
Depth to 2C horizon: 15 to greater than 60 inches

A horizon
Hue: 7.5YR or 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam
Clay content: 12 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
  Abundance - absent to common
  Size - fine or medium
  Contrast - distinct or prominent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bt, BC or Bw (when present) horizons
Hue: 7.5YR, 10YR or 2.5Y

Value: 4 or 5 dry; 2, 3 or 4 moist
Chroma: 1 or 2 dry or moist
Texture: loam, silt loam or silty clay loam
Clay content: 15 to 30 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
  Abundance - few to many
  Size - fine to coarse
  Contrast - distinct or prominent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Cg or C (when present) horizons
Hue: 10YR, 2.5Y or 5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1 or 2 dry or moist
Texture: stratified silt loam to gravelly sandy loam
Clay content: 4 to 20 percent
Rock fragment content: 5 to 30 percent
Pebbles: 5 to 25 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Soft Fe accumulations:
  Abundance - absent to common
  Size - fine to coarse
  Contrast - prominent
Soft Fe/Mn accumulations:
  Abundance - absent to many
  Size - fine
  Contrast - prominent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

2C horizon
Color: variegated
Texture: stratified very gravelly loam to extremely gravelly sand
Clay content: 0 to 12 percent
Rock fragment content: 35 to 90 percent
Pebbles: 30 to 80 percent
Cobbles: 0 to 10 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

Graminoid Cryaquolls
- This ecological type occurs in closed basins.
- In the plant association, *Salix* species are absent.
- Soils lack substratum layers with greater than 35 percent clay.

PIEN Cryaquolls
- This ecological type occurs on cooler positions.
- In the plant association, *Picea engelmannii* is present.

Salix/Graminoid Cryaquolls, poorly drained
- In the plant association, the undergrowth is usually dominated by *Carex rostrata*.
- Soils are poorly drained.

Salix/Graminoid Tepete
- Soils have an organic surface layer 16 to 34 inches thick and are very poorly drained.

Salix/Graminoid Cryaquolls, poorly drained Ecological Type

Summary

This ecological type is named for the occurrence of *Salix* spp./graminoid dominated communities on Cryaquolls, poorly drained soils. It is on moist floodplains in the shrub steppe and forested zones. This riparian ecological type occurs on stream terraces that have ponding and frequent, moderate intensity floods. Perennial stream segments with frequent beaver dams are commonly associated with this ecological type.

Environmental Setting

Ecological Unit: 2606 and 2608
Landform: floodplains
Parent material: mixed alluvium
Slope: 0 to 2 percent
Elevation: 5600 to 7800 feet
Average annual precipitation: 18 to 28 inches
Average annual air temperature: 34 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

- *Salix* spp./graminoid dominated communities

Present Vegetation

- *Salix boothii/Calamagrostis canadensis* c.t.
- *Salix boothii/Carex rostrata* c.t.
- *Salix geyeriana/Calamagrostis canadensis* c.t.
- *Salix geyeriana/Carex rostrata* c.t.
- *Calamagrostis canadensis* community
- *Carex rostrata* c.t.

Succession

Seral stages and successional status are not clearly defined for these dynamic riparian communities. Observations suggest that early seral conditions, following severe ground disturbance, support graminoids. The herbaceous layer has moderate species diversity, highly variable cover and is dominated by *Calamagrostis canadensis* and *Carex rostrata*. A dense herbaceous layer may develop within one growing season.

As succession progresses, *Salix* or other shrub seedlings establish and shrub dominated communities replace the graminoid communities. The shrub layer may achieve moderate cover and exceed 6 feet in height. *Salix boothii, Salix drummondiana* or *Salix geyeriana* dominate or codominate the tall shrub component.

Discussion

The herbaceous layer in shrub dominated communities reflects earlier seral conditions. As the shrub layer closes, dominance by *Calamagrostis canadensis* increases and *Carex rostrata* decreases.

Calamagrostis canadensis and *Carex rostrata* are aggressive, rhizomatous colonizers and develop a dense herbaceous layer. They require ponding or flooding in the early portion of the growing season. *Carex rostrata* requires a water table to the top of the root mat throughout the year. The graminoid often colonizes bare mineral soil following severe ground disturbance. *Calamagrostis canadensis* may establish in the sod of other graminoids following a significant change in ponding or water table depth. Once established, these species retain dominance until disturbance causes a shift in localized flooding or a change in ponding duration.

Community establishment in this ecological type may hinge more on opportunism than competition. Beaver activity, channel piracy, spring runoff, or other floodplain disturbances may truncate succession or cause abrupt shifts between this ecological type and the more mesic Salix/Graminoid Cryaquolls ecological type.

The species constancy and cover documentation for vegetation is on page 611.

Soils

Name: Cryaquolls great group, poorly drained phase
Taxonomic class: Cryaquolls

Typical Pedon Description

Cryaquolls, supporting a *Salix geyeriana/Calamagrostis canadensis* c.t. on an undulating 1 percent slope at 6620 feet elevation. When described on

August 8, 1993 the water table was at 20 inches. (Colors are for dry soil unless otherwise noted.)

A--0 to 4 inches; very dark grayish brown (10YR 3/2) silt loam, black (10YR 2/1) moist; weak coarse subangular blocky structure parting to moderate medium subangular blocky; hard, friable, slightly sticky and slightly plastic; many very fine and common fine roots; few very fine tubular pores; slightly acid (pH 6.4); abrupt smooth boundary.

Ag--4 to 13 inches; dark gray (5Y 4/1) silt loam, black (5Y 2.5/1) moist; weak coarse subangular blocky structure parting to moderate fine subangular blocky; hard, friable, slightly sticky and slightly plastic; common very fine and fine roots; few very fine tubular pores; few fine prominent, dark yellowish brown (10YR 3/4) moist, soft Fe accumulations on ped faces, lining pores and root channels; neutral (pH 7.2); abrupt smooth boundary.

Bg--13 to 20 inches; gray (5Y 5/1) silt loam, very dark gray (5Y 3/1) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine and few fine roots; few very fine and fine tubular pores; few fine prominent, olive (5Y 5/3) moist, soft Fe accumulations on ped faces, lining pores and root channels; neutral (pH 7.0); clear smooth boundary.

Cg1--20 to 45 inches; light gray (5Y 7/2) stratified sandy loam to silt loam, olive gray (5Y 5/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; few very fine and common fine roots; few very fine tubular pores; common fine and medium prominent, pale green (5G 6/2) and grayish green (5G 5/2) moist, Fe depletions along root channels; many fine and medium prominent, olive yellow (2.5Y 6/6) moist, soft Fe accumulations in matrix; 5 percent pebbles; neutral (pH 6.8); abrupt smooth boundary.

Cg2--45 to 55 inches; light olive gray (5Y 6/2) sandy loam, olive gray (5Y 5/2) moist; massive; soft, very friable, nonsticky and nonplastic; few fine roots; many very fine irregular pores; 5 percent pebbles; neutral (pH 7.0); abrupt smooth boundary.

Cg3--55 to 60 inches; light gray (5Y 7/2) very fine sandy loam, olive gray (5Y 5/2) moist; massive; soft, very friable, slightly sticky and slightly plastic; few fine roots; few fine tubular pores; few fine prominent, pale green (5G 6/2) moist, Fe depletions along root channels; many fine distinct, pale olive (5Y 6/3) moist, soft Fe accumulations in matrix; 5 percent pebbles; neutral (pH 6.8).

2C--60 to 65 inches; variegated, stratified extremely gravelly sandy loam to extremely gravelly loamy sand; single grain; loose; many very fine irregular pores; 60 percent pebbles and 5 percent cobbles; neutral (pH 7.3).

Typical Pedon Location

Located in ecological unit 2606.
Legal description: about 1600 feet east and 1200 feet south of the northwest corner of section 8, T. 13 N., R. 38 E., Idaho
Latitude: 44 degrees, 28 minutes, 17 seconds, north
Longitude: 112 degrees, 00 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: poorly drained
Ponding, depth: 6 to 0 inches
Water table, kind: apparent
Water table, duration: year long
Mollic epipedon thickness: 7 to 30 inches
Depth to redoximorphic features: 0 to 6 inches
Depth to 2C horizon: 15 to greater than 60 inches
Other: Some pedons have a 1 to 8 inch thick 0e horizon, with a mucky peat texture, on the surface.

A and Ag horizons
Hue: 10YR, 2.5Y or 5Y
Value: 3 or 4 dry; 2, 2.5 or 3 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam
Clay content: 12 to 27 percent
Rock fragment content: 0 to 15 percent
Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
  Abundance - absent to common
  Size - fine or medium
  Contrast - distinct or prominent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Bg or Btg (when present) horizons
Hue: 2.5Y or 5Y
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 1 or 2 dry or moist
Texture: loam, silt loam or silty clay loam
Clay content: 15 to 30 percent
Rock fragment content: 0 to 15 percent

Pebbles: 0 to 15 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
  Abundance - few to many
  Size - fine to coarse
  Contrast - distinct or prominent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Cg horizons
Hue: 2.5Y or 5Y
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 1 or 2 dry or moist
Texture: silt loam to gravelly sandy loam
Clay content: 4 to 20 percent
Rock fragment content: 5 to 30 percent
Pebbles: 5 to 25 percent
Cobbles: 0 to 5 percent
Stones: 0 percent
Fe depletions:
  Abundance - absent to many
  Size - fine or medium
  Contrast - distinct or prominent
Soft Fe accumulations:
  Abundance - absent to many
  Size - fine to coarse
  Contrast - distinct or prominent
Soft Fe/Mn accumulations:
  Abundance - absent to many
  Size - fine
  Contrast - prominent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

2C horizon
Color: variegated
Texture: stratified very gravelly loam to extremely gravelly sand
Clay content: 0 to 12 percent
Rock fragment content: 35 to 90 percent
Pebbles: 30 to 80 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

Graminoid Cryaquolls
- This ecological type occurs in closed basins.
- In the plant association, *Salix* species are absent.
- Soils lack substratum layers with greater than 35 percent clay.

PIEN Cryaquolls
- This ecological type occurs on cooler positions.
- In the plant association, *Picea engelmannii* is present.

Salix/Graminoid Cryaquolls
- In the plant association, the undergrowth is usually a mixture of forbs and sedges.
- Soils are somewhat poorly drained.

Salix/Graminoid Tepete
- Soils have an organic surface layer 16 to 34 inches thick and are very poorly drained.

Salix/Graminoid Tepete Ecological Type

Summary

This ecological type is named for the occurrence of *Salix* spp./graminoid dominated communities on Tepete soils. It is a riparian ecological type on moist outwash plains in the cool portion of the forested zone.

Environmental Setting

Ecological Unit: 2020
Landform: outwash plains
Parent material: decomposed plant materials over mixed alluvium
Slope: 0 to 1 percent
Elevation: 6300 to 6600 feet
Average annual precipitation: 20 to 36 inches
Average annual air temperature: 36 to 38 degrees F
Soil temperature regime: cryic
Soil moisture regime: aquic

Vegetation

Potential Natural Community

- *Salix* spp./graminoid dominated communities

Present Vegetation

- *Salix boothii/Carex rostrata* c.t.
- *Salix geyeriana/Carex rostrata* c.t.
- *Salix planifolia* c.t.
- *Carex rostrata* c.t.

Succession

Seral stages and successional status are not clearly defined for these riparian communities. Observations suggest that early seral conditions, following severe ground disturbance, support the open water of a pond or slough and progress to an herbaceous community. The community has low species diversity and is dominated by *Carex rostrata.* A dense herbaceous layer may establish within one growing season. *Salix boothii* or *Salix planifolia* seedlings may establish from seed or cuttings.

As succession progresses, shrub dominated communities replace the herbaceous layer. *Salix geyeriana* is relatively stable and may eventually replace earlier shrub communities. *Salix geyeriana* usually occurs in large, widely spaced clumps and dominates an open shrub layer. Other shrubs may include *Betula glandulosa* or *Salix wolfii.* The dense herbaceous layer has low species diversity and is dominated by *Carex rostrata* throughout succession.

Discussion

Carex rostrata is a water-obligate, perennial graminoid that reportedly produces over 350 shoots per square foot. Shoots reach a height of 1 to 2 feet and have a life span of 2 to 6 years. The thick mat of roots and rhizomes may spread by fragmentation and rafting. Regeneration is primarily through sprouting from rhizomes. *Carex rostrata* remains dominant in a community until site factors change significantly.

The Tepete soils have a surface layer of organic material that is saturated with water for long periods. This layer consists of the Oe1, Oe2 and Oe3 horizons. The Oe1 horizon may be considered a root mat. The underlying Oe2 and Oe3 horizons contain many dead or decaying roots and rhizomes. The layer is commonly 16 to 34 inches thick and, under the *Carex rostrata* c.t., may float freely from the mineral soil horizon. In the *Salix* dominated communities, shrubs anchor the surface layer to the underlying mineral horizon.

This ecological type has an apparent water table with persistent ponding. The water table is spring fed and ponding depth remains relatively constant throughout the year. The presence, age and extent of a timber canopy on adjacent uplands may influence long term fluctuations in the water table and the establishment of *Salix* species or other shrubs.

The species constancy and cover documentation for vegetation is on page 612.

Soils

Name: Tepete series
Taxonomic class: Loamy, mixed, euic Terric Borohemists

Typical Pedon Description

Tepete, supporting a *Salix* spp./graminoid community on a 1 percent slope at 6380 feet elevation. (Colors are for dry soil unless otherwise noted.)

Oe1--0 to 5 inches; very dark gray (10YR 3/1) mucky peat, black (10YR 2/1) moist and rubbed; slightly to moderately decomposed hemic material, 60 percent herbaceous fiber after rubbing; massive; strongly acid (pH 5.4); clear smooth boundary.

Oe2--5 to 14 inches; very dark grayish brown (10YR 3/2) mucky peat, very dark brown (10YR 2/2) moist and rubbed; moderately decomposed hemic material, 30 percent herbaceous fiber after rubbing; massive; strongly acid (pH 5.4); clear smooth boundary.

Oe3--14 to 28 inches; very dark grayish brown (10YR 3/2) mucky peat, very dark brown (10YR 2/2) moist and rubbed; moderately decomposed hemic material, 20 percent herbaceous fiber after rubbing; massive; moderately acid (pH 5.6); clear smooth boundary.

Ab--28 to 40 inches; grayish brown (10YR 5/2) fine sandy loam, very dark grayish brown (2.5Y 3/2) moist; single grain; loose, nonsticky and nonplastic; common very fine and fine roots; many very fine irregular pores; common coarse distinct soft Fe accumulations in matrix; moderately acid (pH 5.8); gradual smooth boundary.

2C1--40 to 62 inches; variegated coarse sand; single grain; loose; few very fine roots; many fine irregular pores; neutral (pH 6.6); gradual smooth boundary.

2C2--62 to 70 inches; variegated very gravelly coarse sand; single grain; loose; many fine irregular pores; 60 percent pebbles; neutral (pH 6.6).

Typical Pedon Location

Located in ecological unit 2020.
Legal description: about 1500 feet south and 300 feet east of the northwest corner of section 31, T. 14 N., R. 44 E., Idaho
Latitude: 44 degrees, 29 minutes, 30 seconds, north
Longitude: 111 degrees, 18 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: very poorly drained
Ponding depth: 6 to 0 inches
Water table, kind: apparent
Water table, duration: year long
Histic epipedon thickness: 16 to 34 inches
Depth to 2C horizons: greater than 40 inches

Oe horizons
Hue: 10YR, 2.5Y or 5Y
Value: 1, 2 or 3 dry or moist
Chroma: 0, 1 or 2 dry or moist
Texture: mucky peat
Rock fragment content: 0 percent
Reaction: strongly acid to neutral (pH 5.1 to 7.3)

Ab horizon
Hue: 10YR, 2.5Y or 5Y
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 1 or 2 dry or moist
Texture: fine sandy loam, silt loam or silty clay loam
Clay content: 10 to 30 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 percent
Stones: 0 percent
Soft Fe accumulations:
Abundance - few or common
Size - fine to coarse
Contrast - faint or distinct
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

2C horizons
Color: variegated
Texture: sand and gravel
Clay content: 0 to 5 percent
Rock fragment content: 35 to 70 percent after mixing
Pebbles: 35 to 65 percent after mixing
Cobbles: 0 to 5 percent
Stones: 0 percent
Reaction: slightly acid or neutral (pH 6.1 to 7.3)

Related Types, Mosaics and Ecotones

Salix/Graminoid Cryaquolls
- Soils lack an organic surface layer and are somewhat poorly drained.

Salix/Graminoid Cryaquolls, poorly drained
- Soils lack an organic surface layer and are poorly drained.

Tall Forb Etnass Ecological Type

Summary

This ecological type is named for the occurrence of tall forb communities on Etnass soils. It is on rolling to hilly foothills in areas that are transitional between the shrub steppe and forested zones.

Environmental Setting

Ecological Unit: 1209
Landform: foothills
Parent material: residuum derived from shale
Slope: 4 to 20 percent
Elevation: 5700 to 6700 feet
Average annual precipitation: 18 to 25 inches
Average annual air temperature: 37 to 42 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Vegetation

Potential Natural Community

- tall forb communities

Present Vegetation

- *Wyethia amplexicaulis* c.t.
- Herbaceous communities dominated by *Balsamorhiza macrophylla*.

Succession

Early seral conditions, resulting from severe ground disturbance, support herbaceous communities. The herbaceous layer has low cover and is dominated by annual forbs. *Epilobium* species, *Madia glomerata*, *Microsteris gracilis*, *Nemophila parviflora*, or *Polygonum* species may be present.

Mid seral conditions support an herbaceous layer with variable cover. This layer is dominated by *Wyethia amplexicaulis*. *Balsamorhiza macrophylla*, *Madia glomerata* and *Lupinus argenteus* may be conspicuous. The graminoid component has low species diversity and is dominated by *Poa pratensis*.

Late seral and near PNC conditions support an herbaceous community. The herbaceous layer has high cover and is dominated by *Balsamorhiza macrophylla*. *Geranium viscosissimum*, *Delphinium occidentale*, *Delphinium nuttallianum* and *Lupinus argenteus* are conspicuous. Graminoids have low cover and may include *Bromus carinatus* and *Agropyron trachycaulum*.

Discussion

Wyethia amplexicaulis dominated communities may be relatively persistent. The highly competitive forb regenerates vegetatively and from seed. Rootstalks and crowns sprout following disturbance. Woody taproots may reach depths of over 6 feet and lateral roots extend 3 to 4 feet.

The clayey soils of this ecological type influence community composition and development. Cracks open as the soil dries and shrinks throughout the summer. The shrinking tears roots and exposes them to greater temperature and humidity extremes. In early spring, the soil becomes moist and swells to the extent that cracks close tightly and roots are compressed. This shrinking and swelling is particularly limiting for shrubs and trees.

The species constancy and cover documented for this ecological type are on page 613.

Soils

Name: Etnass series
Taxonomic class: Fine, smectitic Typic Humicryerts

Typical Pedon Description

Etnass, supporting a *Wyethia amplexicaulis* c.t. on a 12 percent slope with south aspect at 5960 feet elevation. (Colors are for dry soil unless otherwise noted.)

A--0 to 5 inches; grayish brown (2.5Y 5/2) clay loam, very dark grayish brown (10YR 3/2) moist; weak coarse subangular blocky structure parting to strong medium and coarse granular; hard, firm, sticky and plastic; many very fine and common fine roots, few medium and coarse roots; many medium irregular and common coarse irregular pores, few very fine and medium tubular pores; few 1 inch wide vertical desiccation cracks; trace pebbles; neutral (pH 7.3); clear smooth boundary.

Bt--5 to 11 inches; grayish brown (2.5Y 5/2) silty clay, very dark grayish brown (10YR 3/2) moist; moderate very coarse subangular blocky structure parting to strong coarse subangular blocky; very hard, very firm, sticky and very plastic; common very

fine roots, few medium and coarse roots; few very fine, fine and medium tubular pores; few 1/2 to 1 inch wide vertical desiccation cracks; common distinct, very dark grayish brown (10YR 3/2) moist, pressure faces on ped faces; trace pebbles; neutral (pH 7.2); clear wavy boundary.

Btkss1--11 to 36 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; strong very coarse prismatic structure parting to strong coarse angular blocky; very hard, very firm, sticky and very plastic; few very fine, medium and coarse roots; few very fine tubular pores; few distinct intersecting slickensides; very few 3/8 to 5/8 inch wide vertical desiccation cracks; many distinct, grayish brown (2.5Y 5/2) moist, continuous pressure faces on ped faces; few distinct, dark gray (10YR 4/1) moist, discontinuous clay films on ped faces; common fine (1/8 to 2/8 inch) masses and few medium (1/4 to 5/8 inch) discontinuous bands of soft powdery lime in matrix; strongly effervescent; trace pebbles; slightly alkaline (pH 7.8); gradual wavy boundary.

Btkss2--36 to 45 inches; light brownish gray (2.5Y 6/2) silty clay, grayish brown (2.5Y 5/2) moist; strong very coarse prismatic structure parting to strong coarse angular blocky; very hard, very firm, sticky and very plastic; few very fine and medium roots; few very fine tubular pores; many distinct intersecting slickensides; very few 3/8 to 5/8 inch wide vertical desiccation cracks; few fine prominent, brown (10YR 5/3) moist, soft Fe/Mn accumulations along root channels; common distinct, brown (7.5YR 5/3) moist, continuous clay films or pressure faces along slickensides and on ped faces; few distinct, dark gray (10YR 4/1) moist, discontinuous clay films on ped faces; common fine (1/8 to 2/8 inch) and medium (2/8 to 5/8 inch) masses and few fine (1/8 to 2/8 inch) discontinuous bands of soft powdery lime in matrix; violently effervescent; trace pebbles; moderately alkaline (pH 8.0); clear wavy boundary.

Bkss--45 to 60 inches; light olive gray (5Y 6/2) clay, olive gray (5Y 5/2) moist; moderate very coarse prismatic structure parting to moderate coarse angular blocky; very hard, very firm, sticky and very plastic; few very fine roots; few very fine tubular pores; many distinct intersecting slickensides; very few 1/4 to 1/2 inch wide vertical desiccation cracks; few distinct, brown (7.5YR 5/3) moist, discontinuous streaks in matrix and clay films or pressure faces along slickensides; common coarse (3/4 to 3 inch) discontinuous bands and few medium (2/8 to 3/8 inch) masses of soft powdery lime in matrix; violently effervescent; trace pebbles; moderately alkaline (pH 8.0).

Typical Pedon Location

Located in mapping unit 1209.
Legal description: about 550 feet east and 2850 feet south of the northwest corner of section 27, T. 3 S., R. 46 E., Idaho
Latitude: 43 degrees, 07 minutes, 38 seconds, north
Longitude: 111 degrees, 03 minutes, 20 seconds, west

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: moderately well drained
Mollic epipedon thickness: 4 to 40 inches
Depth to argillic horizon: 4 to 12 inches
Depth to carbonates: 10 to 40 inches
Depth to Bkss horizon: 20 to greater than 60 inches
Extra-structural cracks: very few to few subsurface initiated reversible cracks
Organic carbon content: 10 to 15 kg/m2 in the upper 20 inches of the profile

A horizon
Hue: 10YR or 2.5Y
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: clay loam
Clay content: 30 to 40 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: neutral (pH 6.6 to 7.3)

Bt horizon
Hue: 5YR, 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry; 3, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: clay or silty clay
Clay content: 40 to 60 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 percent
Stones: 0 percent
Reaction: neutral (pH 6.6 to 7.3)

Btkss horizons
Hue: 5YR, 7.5YR, 10YR or 2.5Y
Value: 5 or 6 dry; 4, 5 or 6 moist
Chroma: 2 or 3 dry or moist
Texture: clay or silty clay
Clay content: 40 to 60 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles: 0 percent
Stones: 0 percent
Redoximorphic features:
Kind - soft Fe accumulations, soft Fe/Mn accumulations, or Fe/Mn depletions
Abundance - absent to common
Size - fine or medium
Contrast - distinct or prominent
Calcium carbonate equivalent: 5 to 40 percent in the less than 2 mm fraction
Effervescence: slightly effervescent to violently effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkss horizon
Hue: 5YR, 7.5YR, 10YR, 2.5Y or 5Y
Value: 5 or 6 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: clay loam, clay or silty clay
Clay content: 35 to 50 percent
Rock fragment content: 0 to 20 percent
Pebbles: 0 to 20 percent
Cobbles: 0 percent
Stones: 0 percent
Soft shale fragments: 0 to 20 percent
Calcium carbonate equivalent: 15 to 40 percent in the less than 2 mm fraction
Effervescence: strongly effervescent or violently effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Related Types, Mosaics and Ecotones

There are no closely related types, mosaics or ecotones.

Greys Series

Summary

Environmental Setting

Map Unit: 4028, 4029 and 430
Landform: dissected tablelands
Parent material: local alluvium derived from loess
Slope: 1 to 20 percent
Elevation: 5400 to 6840 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Soils

Name: Greys series
Taxonomic class: Fine-silty, mixed, superactive Boralfic Cryoborolls

Typical Pedon Description

Greys, cultivated. (Colors are for dry soil unless otherwise noted.)

Ap1--0 to 5 inches; brown (10YR 5/3) silt loam, very dark grayish brown (10YR 3/2) moist; weak very thick platy structure parting to moderate coarse angular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; moderately acid (pH 5.6); abrupt smooth boundary.

Ap2--5 to 10 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; moderate very thick platy structure parting to moderate coarse angular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine tubular pores; slightly acid (pH 6.2); abrupt smooth boundary.

BE--10 to 19 inches; yellowish brown (10YR 5/4) silt loam, dark brown (10YR 4/3) moist; weak medium subangular blocky structure parting to strong very fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; many very fine and fine roots; many very fine, fine, and medium tubular pores; few thin clay films on ped faces; slightly acid (pH 6.5); abrupt wavy boundary.

Bt1--19 to 33 inches; light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure parting to strong fine subangular blocky; hard, firm, sticky and plastic; many very fine, common fine, and common medium decayed roots; many very fine, fine, medium, and coarse tubular pores; many thick clay films on ped faces and lining pores; common uncoated silt grains on ped faces; about 10 percent krotovinas; neutral (pH 6.6); gradual wavy boundary.

Bt2--33 to 45 inches; light yellowish brown (10YR 6/4) silt loam, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure parting to strong fine subangular blocky; hard, firm, sticky and plastic; common very fine and common medium decayed roots; many very fine, fine, medium, and coarse tubular pores; many thick clay films on ped faces and lining pores; about 10 percent krotovinas; neutral (pH 6.9); gradual smooth boundary.

Bt3--45 to 65 inches; light yellowish brown (10YR 6/4) silt loam, yellowish brown (10YR 5/4) moist; moderate coarse subangular blocky structure parting to strong medium subangular blocky; hard, firm, sticky and plastic; few very fine and common medium decayed roots; many very fine, fine, medium, and coarse tubular pores; many thick clay films on ped faces and lining pores; neutral (pH 7.0); gradual smooth boundary.

Bt4--65 to 88 inches; light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 4/3) moist; weak coarse subangular blocky structure; slightly hard, friable, sticky and slightly plastic; few very fine and common medium decayed roots; many very fine, fine, medium, and coarse tubular pores; common thick clay films lining pores and few moderately thick clay films on ped faces; neutral (pH 7.0); gradual smooth boundary.

C--88 to 95 inches; light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 4/3) moist; massive; soft, very friable, slightly sticky and slightly plastic; many very fine and fine tubular pores; neutral (pH 7.1).

Typical Pedon Location

Located in *Soil Survey of Fremont County, Idaho, Western Part.*
Legal description: about 980 feet east and 350 feet north of the southwest corner of section 35, T. 9 N., R. 44 E., Idaho

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 10 to 16 inches

Ap horizons
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 12 to 15 percent
Rock fragment content: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

BE horizon
Hue: 10YR
Value: 5 dry, 4 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam
Clay content: 12 to 15 percent
Rock fragment content: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bt horizons
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam or silty clay loam
Clay content: 18 to 35 percent
Rock fragment content: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Hapgood Series

Summary

Environmental Setting

Map Unit: 4057
Landform: fan remnants
Parent material: mixed alluvium
Slope: 15 to 45 percent
Elevation: 6700 to 7400 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: ustic

Soils

Name: Hapgood series
Taxonomic class: Loamy-skeletal, mixed, superactive Pachic Cryoborolls

Typical Pedon Description

Hapgood, rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 18 inches; very dark grayish brown (10YR 3/2) gravelly loam, black (10YR 2/1) moist; moderate fine and medium granular structure; slightly hard, friable, slightly sticky and slightly plastic; many fine and very fine roots; 15 percent pebbles; slightly acid; gradual smooth boundary.

C1-18 to 60 inches; grayish brown (10YR 5/2) very gravelly loam, very dark grayish brown (10YR 3/2) moist; weak coarse angular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common fine and very fine roots; 35 percent pebbles and 10 percent cobbles; neutral.

Typical Pedon Location

Located in *Soil Survey of Madison County Area, Montana.*
Legal description: about 2,500 feet west and 200 feet north of the southeast corner of section 20, T. 6 S., R. 2 W., Montana

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 16 to 60 inches

A horizon
Hue: 10YR
Value: 2, 3, 4 or 5 dry; 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 18 to 27 percent
Rock fragment content: 5 to 60 percent
Pebbles: 5 to 25 percent
Cobbles: 0 to 30 percent
Stones: 0 to 10 percent
Reaction: slightly acid (pH 6.1 to 6.5)

C horizon
Hue: 10YR
Value: 4, 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3, 4, 5 or 6 dry or moist
Texture: sandy loam or clay loam
Clay content: 18 to 32 percent
Rock fragment content: 35 to 60 percent
Pebbles: 25 to 45 percent
Cobbles: 10 to 20 percent
Stones: 0 to 5 percent
Reaction: neutral (pH 6.6 to 7.3)

Ike Series

Summary

Environmental Setting

Map Unit: 4301 and 4302
Landform: foothills
Parent material: local alluvium or residuum derived from limestone
Slope: 10 to 90 percent
Elevation: 5800 to 7200 feet
Average annual precipitation: 11 to 12 inches
Average annual air temperature: 40 degrees F
Soil temperature regime: frigid
Soil moisture regime: aridic

Soils

Name: Ike series
Taxonomic class: Loamy-skeletal, carbonatic, frigid Lithic Xeric Haplocalcids

Typical Pedon Description

Ike, rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 2 inches; pale brown (10YR 6/3) gravelly silt loam, brown (10YR 4/3) moist; weak medium subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine and fine roots; few very fine tubular pores; strongly effervescent (30 percent calcium carbonate equivalent); 25 percent pebbles, 5 percent cobbles and trace stones; moderately alkaline (pH 8.0); clear smooth boundary.

Bkq1--2 to 7 inches; very pale brown (10YR 7/3) very gravelly silt loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and slightly plastic; many very fine, fine and common medium roots; common very fine tubular pores; violently effervescent (40 percent calcium carbonate equivalent); common carbonate coats, 1 to 3 mm thick, and silica pendants 3 to 5 mm thick, on underside of rock fragments; 40 percent pebbles, 15 percent cobbles and trace stones; moderately alkaline (pH 8.1); clear wavy boundary.

Bkq2--7 to 13 inches; very pale brown (10YR 7/3) extremely cobbly silt loam, yellowish brown (10YR 5/4) moist; moderate fine subangular blocky structure; slightly hard, very friable, nonsticky and nonplastic; many very fine, fine and common medium roots; common very fine tubular pores; violently effervescent (40 percent calcium carbonate equivalent); common carbonate coats, 1 to 2 mm thick, and silica pendants, 2 to 4 mm thick, on underside of rock fragments; 20 percent pebbles, 30 percent cobbles and trace stones; moderately alkaline (pH 8.2); clear wavy boundary.

Bkq3--13 to 18 inches; pale yellow (2.5Y 7/4) extremely cobbly silt loam, light olive brown (10YR 5/4) moist; weak medium subangular blocky structure; slightly hard, friable, nonsticky and nonplastic; common very fine, fine and medium roots; common very fine tubular pores; violently effervescent (40 percent calcium carbonate equivalent); common carbonate coats, 1 to 2 mm thick, and silica pendants, 1 to 2 mm thick, on underside of rock fragments; 30 percent pebbles, 30 percent cobbles and 5 percent stones; moderately alkaline (pH 8.4); abrupt wavy boundary.

R--18 inches; hard limestone bedrock.

Typical Pedon Location

Located in *Soil Survey of Butte County, Idaho.*
Legal description: about 1250 feet south and 1500 feet west of the northeast corner of section 24, T. 9 N., R. 27 E., Idaho
Latitude: 44 degrees, 05 minutes, 58 seconds, north
Longitude: 113 degrees, 11 minutes, 50 seconds, west

Range in Characteristics

Profile
Depth class: shallow (10 to 20 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained

A horizon
Hue: 10YR
Value: 5, 6 or 7 dry, 3 or 4 moist
Chroma: 3 dry or moist
Texture: silt loam
Clay content: 10 to 25 percent
Rock fragment content: 20 to 35 percent
Pebbles: 20 to 30 percent

Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 25 to 35 percent in the less than 2 mm size fraction
Effervescence: strongly effervescent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Bkq1 horizon
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: loam or silt loam
Clay content: 10 to 20 percent
Rock fragment content: 35 to 60 percent
Pebbles: 25 to 55 percent
Cobbles: 5 to 15 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 40 to 60 percent in the less than 2 mm size fraction
Effervescence: violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Bkq2 and Bkq3 horizons
Hue: 10YR or 2.5Y
Value: 6 or 7 dry, 4 or 5 moist
Chroma: 3 or 4 dry or moist
Texture: silt loam or sandy loam
Clay content: 10 to 20 percent
Rock fragment content: 60 to 80 percent
Pebbles: 15 to 75 percent
Cobbles: 5 to 35 percent
Stones: 0 to 25 percent
Calcium carbonate equivalent: 40 to 60 percent in the less than 2 mm size fraction
Effervescence: violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Jimbee Series

Summary

Environmental Setting

Map Unit: 4301 and 4302
Landform: foothills
Parent material: local alluvium, colluvium or residuum derived from limestone
Slope: 10 to 90 percent
Elevation: 5800 to 7200 feet
Average annual precipitation: 11 to 12 inches
Average annual air temperature: 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: xeric

Soils

Name: Jimbee series
Taxonomic class: Loamy-skeletal, carbonatic Lithic Cryoborolls

Typical Pedon Description

Jimbee, rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 7 inches; brown (10YR 5/3) gravelly loam, dark brown (10YR 3/3) moist; weak fine granular structure; slightly hard, very friable, slightly sticky and slightly plastic; many very fine, common fine and medium roots; few very fine tubular pores; strongly effervescent (25 percent calcium carbonate equivalent); 10 percent pebbles, 5 percent cobbles and 5 percent stones; moderately alkaline (pH 7.9); clear wavy boundary.

Bkq1--7 to 11 inches; pale brown (10YR 6/3) gravelly loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; many very fine, common fine and few medium roots; common very fine tubular pores; violently effervescent (40 percent calcium carbonate equivalent); common carbonate coats 1 to 3 mm thick, andsilica pendants, 3 to 5 mm thick, on underside of rock fragments; 15 percent gravel, 5 percent cobbles and 5 percent stones; moderately alkaline (pH 8.0); clear wavy boundary.

Bkq2--11 to 17 inches; very pale brown (10YR 7/3) very stony loam, brown (10YR 5/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine, few fine and medium roots; violently effervescent (45 percent calcium carbonate equivalent); common carbonate coats, 1 to 2 mm thick, and silica pendants, 1 to 3 mm thick, on underside of rock fragments; 25 percent pebbles, 10 percent cobbles and 20 percent stones; moderately alkaline (pH 8.1); clear wavy boundary.

R--17 inches; hard limestone bedrock

Typical Pedon Location

Located in *Soil Survey of Butte County, Idaho.*
Legal description: about 250 feet east and 2,250 feet north of the southwest corner of section 1, T. 9 N., R. 26 E., Idaho
Latitude: 44 degrees, 07 minutes, 46 seconds, north
Longitude: 113 degrees, 18 minutes, 53 seconds, west

Range in Characteristics

Profile
Depth class: shallow (10 to 20 inches)
Restrictive feature: unweathered bedrock (R horizon)
Drainage class: well drained
Mollic epipedon thickness: 7 to 9 inches
Rock fragment content in the particle-size control section: average 35 to 60 percent

A horizon
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 12 to 22 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 30 percent
Cobbles: 0 to 5 percent
Stones: 0 to 5 percent
Calcium carbonate equivalent: 25 to 55 percent in the less than 2 mm size fraction
Effervescence: strongly effervescent
Reaction: moderately alkaline (pH 7.9 to 8.4)

Bkq horizons
Hue: 10YR
Value: 6 or 7 dry, 4 or 5 moist

Chroma: 3 or 4 dry or moist
Texture: loam or sandy loam
Clay content: 12 to 22 percent
Rock fragment content: 15 to 60 percent
Pebbles: 15 to 60 percent
Cobbles: 0 to 10 percent
Stones: 0 to 15 percent
Calcium carbonate equivalent: 40 to 55 percent in the less than 2 mm size fraction
Effervescence: violently effervescent
Reaction: moderately alkaline or strongly alkaline (pH 7.9 to 9.0)

Lostine Series

Summary

Environmental Setting

Map Unit: 4046
Landform: dissected tablelands
Parent material: local alluvium derived from loess
Slope: 4 to 8 percent
Elevation: 5500 to 5720 feet
Average annual precipitation: 15 to 18 inches
Average annual air temperature: 41 to 44 degrees F
Soil temperature regime: frigid
Soil moisture regime: xeric

Soils

Name: Lostine series
Taxonomic class: Coarse-silty, mixed, superactive, frigid Pachic Haploxerolls

Typical Pedon Description

Lostine, cultivated. (Colors are for dry soil unless otherwise noted.)

Ap--0 to 9 inches; dark grayish brown (10YR 4/2) silt loam, very dark grayish brown (10YR 3/2) moist; weak medium subangular blocky structure; slightly hard, friable, slightly plastic; many very fine and fine roots; few very fine tubular pores; slightly acid (pH 6.4); clear smooth boundary.

A--9 to 20 inches; dark grayish brown (10YR 4/2) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly plastic; common very fine and fine roots; few very fine tubular pores; neutral (pH 6.8); clear wavy boundary.

Bw1--20 to 26 inches; brown (10YR 4/3) silt loam, dark brown (10YR 3/3) moist; weak medium subangular blocky structure; slightly hard, friable, slightly plastic; common very fine and fine roots; few very fine tubular pores; neutral (pH 7.0); clear wavy boundary.

Bw2--26 to 36 inches; brown (10YR 5/3) silt loam, dark brown (10YR 3/3) moist; weak coarse subangular blocky structure; slightly hard, friable, slightly plastic; few very fine and fine roots; few very fine tubular pores; neutral (pH 7.0); clear wavy boundary.

C--36 to 60 inches; pale brown (10YR 6/3) silt loam, brown (10YR 4/3) moist; massive; slightly hard, friable, slightly plastic; neutral (pH 7.0).

Typical Pedon Location

Located in *Soil Survey of Fremont County, Idaho, Western Part.*
Legal description: about 750 feet west and 2,480 feet south of the northeast corner of section 2, T. 8 N., R. 42 E., Idaho

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 20 to 36 inches

A horizons
Hue: 10YR
Value: 3 or 4 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 percent
Reaction: slightly acid to slightly alkaline (pH 6.6 to 7.8)

Bw horizons
Hue: 10YR
Value: 4 or 5 dry, 3 or 4 moist
Chroma: 3 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

C horizon
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Maxville Series

Summary

Environmental Setting

Map Unit: 4076
Landform: fan remnants
Parent material: mixed alluvium
Slope: 2 to 8 percent
Elevation: 6700 to 6900 feet
Average annual precipitation: 18 to 19 inches
Average annual air temperature: 37 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: ustic

Soils

Name: Maxville series
Taxonomic class: Fine-loamy over sandy or sandy-skeletal, mixed, superactive Typic Cryoborolls

Typical Pedon Description

Maxville, rangeland. (Colors are for dry soil unless otherwise noted.)

A--0 to 11 inches; dark grayish brown (10 YR 4/2) gravelly loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots and common medium roots; 15 percent pebbles; neutral; clear wavy boundary.

Bw--11 to 19 inches; grayish brown (10YR 5/2) loam, dark grayish brown (10YR 4/2) moist; weak medium prismatic structure parting to moderate medium subangular blocky; soft, very friable, slightly sticky and slightly plastic; many fine and very fine roots and common medium roots; 10 percent pebbles; neutral; abrupt wavy boundary.

Bk1--19 to 28 inches; pale brown (10YR 6/3) loam, brown (10YR 5/3) moist; massive; soft, very friable, sticky and slightly plastic; common medium, fine, and very fine roots; lime coatings on undersides of pebbles and disseminated lime; violently effervescent; 10 percent pebbles; moderately alkaline; clear wavy boundary.

Bk2--28 to 34 inches; pale brown (10YR 6/3) gravelly loam, brown (10YR 5/3) moist; massive; slightly hard, very friable, sticky and slightly plastic; common medium, fine, and very fine roots; lime coatings on pebbles and disseminated lime; violently effervescent; 25 percent pebbles; moderately alkaline; abrupt wavy boundary.

2C--34 to 60 inches; pale brown (10YR 6/3) very gravelly loamy sand, brown (10YR 5/3) moist; single grain; nonsticky and nonplastic; few medium and fine roots; strongly effervescent; 50 percent pebbles and 5 percent cobbles; moderately alkaline.

Typical Pedon Location

Located in *Soil Survey of Madison County Area, Montana.*

Legal description: about 1,900 feet east and 200 feet south of the northwest corner of section 10, T. 12 S., R. 2 E., Montana

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 7 to 14 inches
Depth to carbonates: 11 to 23 inches

A horizon
Hue: 10YR
Value: 4 or 5 dry, 2 or 3 moist
Chroma: 2 or 3 dry or moist
Texture: loam
Clay content: 15 to 25 percent
Rock fragment content: 15 to 35 percent
Pebbles: 10 to 25 percent
Cobbles and stones: 5 to 10 percent
Reaction: neutral (pH 6.6 to 7.3)

Bw horizon
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2 or 3 dry or moist
Texture: clay loam or loam
Clay content: 18 to 30 percent
Rock fragment content: 5 to 35 percent
Pebbles: 5 to 25 percent
Cobbles and stones: 0 to 10 percent
Reaction: neutral (pH 6.6 to 7.3)

Bk horizons
Hue: 10YR
Value: 6 dry, 5 moist
Chroma: 3 dry or moist
Texture: clay loam or loam
Clay content: 18 to 30 percent
Rock fragment content: 10 to 35 percent
Pebbles: 10 to 25 percent
Cobbles and stones: 0 to 10 percent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

2C horizon
Hue: 10YR
Value: 6 dry, 5 moist
Chroma: 3 dry or moist
Texture: loamy sand or sand
Clay content: 0 to 10 percent
Rock fragment content: 50 to 70 percent
Pebbles: 40 to 60 percent
Cobbles and stones: 0 to 20 percent
Reaction: slightly alkaline or moderately alkaline (pH 7.4 to 8.4)

Sebud Series

Summary

Environmental Setting

Map Unit: 4057
Landform: fan remnants
Parent material: mixed alluvium
Slope: 15 to 45 percent
Elevation: 6700 to 7400 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: ustic

Soils

Name: Sebud series
Taxonomic class: Loamy-skeletal, mixed, superactive Typic Cryoborolls

Typical Pedon Description

Sebud, rangeland. (Colors are for dry soil unless otherwise noted.)

A1--0 to 6 inches; very dark grayish brown (10YR 3/2) very stony loam, black (10YR 2/1) moist; moderate medium subangular blocky structure parting to weak fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine and fine pores; 10 percent pebbles, 10 percent cobbles and stones; neutral; clear wavy boundary.

A2--6 to 14 inches; dark brown (10YR 3/3) stony loam, very dark brown (10YR 2/2) moist; moderate medium subangular blocky structure parting to moderate fine granular; soft, very friable, slightly sticky and slightly plastic; many very fine and fine roots and few medium roots; many very fine pores; 10 percent pebbles, 10 percent cobbles and stones; neutral; clear wavy boundary.

Bw1--14 to 30 inches; yellowish brown (10YR 5/4) very stony sandy clay loam, dark yellowish brown (10YR 4/4) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and slightly plastic; common very fine and fine roots; many very fine pores; 20 percent pebbles, 20 percent cobbles and stones; neutral; clear wavy boundary.

Bw2--30 to 46 inches; light yellowish brown (10YR 6/4) very stony coarse sandy loam, dark brown (10YR 4/3) moist; weak fine subangular blocky structure; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; many very fine pores; 20 percent pebbles, 20 percent cobbles and stones; neutral; clear wavy boundary.

C1--46 to 60 inches; pale brown (10YR 6/3) very stony coarse sandy loam, dark grayish brown (10YR 4/2) moist; massive; soft, very friable, slightly sticky and nonplastic; few very fine and fine roots; common very fine pores; 20 percent pebbles, 20 percent cobbles and stones; slightly alkaline.

Typical Pedon Location

Located in *Soil Survey of Madison County Area, Montana.*
Legal description: about 1,400 feet north and 2,600 feet west of the southeast corner of section 31, T. 1 S., R. 7 W., Montana

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained
Mollic epipedon thickness: 7 to 14 inches

A horizons
Hue: 10YR
Value: 3 or 4 dry, 2 or 3 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 15 to 27 percent
Rock fragment content: 20 to 45 percent
Pebbles: 10 to 20 percent
Cobbles and stones: 10 to 25 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Bw horizons
Hue: 10YR
Value: 5 or 6 dry, 3 or 4 moist
Chroma: 3 or 4 dry or moist
Texture: coarse sandy loam, sandy clay loam, clay loam or sandy loam
Clay content: 15 to 35 percent
Rock fragment content: 35 to 60 percent
Pebbles: 10 to 20 percent

Cobbles and stones: 20 to 45 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

C horizon
Hue: 10YR
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: coarse sandy loam, sandy clay loam, sandy loam or clay loam
Clay content: 15 to 35 percent
Rock fragment content: 35 to 60 percent
Pebbles: 10 to 20 percent
Cobbles and stones: 20 to 45 percent
Reaction: neutral or slightly alkaline (pH 6.6 to 7.8)

Stamp Series

Summary

Environmental Setting

Map Unit: 4120
Landform: outwash plains
Parent material: mixed alluvium
Slope: 0 to 4 percent
Elevation: 6280 to 6600 feet
Average annual precipitation: 28 to 35 inches
Average annual air temperature: 36 to 39 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Soils

Name: Stamp series
Taxonomic class: Coarse-loamy, mixed, superactive Aquic Cryochrepts

Typical Pedon Description

Stamp, wet meadow. (Colors are for dry soil unless otherwise noted.)

A--0 to 5 inches; light brownish gray (10YR 6/2) loam, very dark grayish brown (10YR 3/2) moist; moderate medium and fine granular structure; soft, friable, slightly sticky and slightly plastic; many very fine, fine and medium roots; moderately acid (pH 6.0); clear smooth boundary.

Bw1--5 to 11 inches; light brownish gray (10YR 6/2) loam, dark grayish brown (10YR 4/2) moist; moderate medium and fine subangular blocky structure; soft, friable, slightly sticky and slightly plastic; many very fine, fine and medium roots; slightly acid (pH 6.4); clear smooth boundary.

Bw2--11 to 20 inches; grayish brown (10YR 5/2) loam, brown (10YR 5/3) moist; weak coarse subangular blocky structure parting to moderate medium and fine subangular blocky; slightly hard, friable, slightly sticky and slightly plastic; common medium and fine roots; neutral (pH 6.6); gradual smooth boundary.

Cg1--20 to 29 inches; light brownish gray (10YR 6/2) coarse sandy loam, grayish brown (10YR 5/2) moist; weak coarse subangular blocky structure parting to moderate medium and fine subangular blocky; slightly hard, very friable, slightly sticky; common medium and fine roots; few fine distinct, brownish yellow (10YR 6/8), soft Fe accumulations in matrix; neutral (pH 6.8); gradual smooth boundary.

Cg2--29 to 36 inches; light gray (10YR 7/2) coarse sandy loam, grayish brown (10YR 5/2) moist; moderate coarse subangular blocky structure parting to moderate medium and fine subangular blocky; slightly hard, very friable; few fine and medium roots; common fine distinct, brownish yellow (10YR 6/8), soft Fe accumulations in matrix; neutral (pH 7.0); clear smooth boundary.

Cg3--36 to 38 inches; light gray (2.5Y 7/2) coarse sandy loam, grayish brown (2.5Y 5/2) moist; moderate medium and coarse subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common medium distinct, brownish yellow (10YR 6/8), soft Fe accumulations in matrix; neutral (pH 7.0); clear smooth boundary.

2C4--38 to 60 inches; variegated gravelly coarse sand; loose; neutral (pH 7.2).

Typical Pedon Location

Located in *Soil Survey of Fremont County, Idaho, Western Part.*
Legal description: about 2,140 feet east and 1,640 feet south of the northwest corner of section 26, T. 13 N., R. 43 E., Idaho

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: somewhat poorly drained
Water table, depth: 0 to 18 inches
Water table, kind: apparent
Water table, duration: spring and early summer
Depth to redoximorphic features: 2 to 25 inches

A horizon
Hue: 10YR
Value: 4, 5, 6 or 7 dry; 2, 3 or 4 moist
Chroma: 1, 2 or 3 dry or moist
Texture: loam
Clay content: 7 to 15 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles and stones: 0 percent

Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Bw horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 3, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: loam or coarse sandy loam
Clay content: 7 to 15 percent
Rock fragment content: 0 to 10 percent
Pebbles: 0 to 10 percent
Cobbles and stones: 0 percent
Reaction: moderately acid to neutral (pH 5.6 to 7.3)

Cg horizons
Hue: 10YR
Value: 6 or 7 dry, 5 or 6 moist
Chroma: 1or 2 dry or moist
Texture: sandy loam or coarse sandy loam
Clay content: 2 to 6 percent
Rock fragment content: 0 to 5 percent
Pebbles: 0 to 5 percent
Cobbles and stones: 0 percent
Soft Fe accumulations:
  Abundance - few to many
  Size - fine or medium
  Contrast - distinct or prominent
Reaction: moderately acid to mildly alkaline (pH 5.6 to 7.8)

2C horizon
Color: variegated
Texture: coarse sand
Clay content: 2 to 6 percent
Rock fragment content: 15 to 35 percent
Pebbles: 15 to 35 percent
Cobbles and stones: 0 percent
Reaction: moderately acid to mildly alkaline (pH 5.6 to 7.8)

Turnerville Series

Summary

Environmental Setting

Map Unit: 4028, 4029, 4030, 4138, 4139 and 4140
Landform: dissected tablelands
Parent material: local alluvium derived from loess
Slope: 1 to 20 percent
Elevation: 5400 to 6840 feet
Average annual precipitation: 18 to 22 inches
Average annual air temperature: 37 to 40 degrees F
Soil temperature regime: cryic
Soil moisture regime: udic

Soils

Name: Turnerville series
Taxonomic class: Fine-silty, mixed, superactive Typic Cryoboralfs

Typical Pedon Description

Turnerville, woodland. (Colors are for dry soil unless otherwise noted.)

Oi--1 to 0 inches; slightly decomposed needles, twigs, bark and other plant remains.

A--0 to 5 inches; pale brown (10YR 6/3) silt loam, dark yellowish brown (10YR 3/4) moist; moderate fine granular structure; soft, very friable, nonsticky and slightly plastic; many very fine tubular pores; many very fine and fine roots; moderately acid (pH 5.6); clear smooth boundary.

E--5 to 15 inches; light yellowish brown (10YR 6/4) silt loam, dark brown (10YR 4/3) moist; moderate medium subangular blocky structure; slightly hard, friable, nonsticky and slightly plastic; many very fine tubular pores; many very fine and fine roots; moderately acid (pH 6.0); clear smooth boundary.

E/B--15 to 22 inches; light gray (10YR 7/2) E material, dark brown (10YR 4/3) moist, and yellowish brown (10YR 5/4) B material, dark yellowish brown (10YR 3/4) moist that mix to a silt loam; strong medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; common very fine tubular pores; common very fine and fine roots; moderately acid (pH 6.0); clear wavy boundary.

Bt1--22 to 33 inches; brown (10YR 5/3) silt loam, dark yellowish brown (10YR 3/4) moist; strong medium subangular blocky structure; hard, firm, sticky and plastic; few very fine tubular pores; few very fine and fine roots; many moderately thick clay films on ped faces and lining pores; uncoated silt grains on ped faces; slightly acid (pH 6.2); abrupt smooth boundary.

Bt2--33 to 42 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 3/4) moist; moderate medium subangular blocky structure; hard, firm, sticky and plastic; few very fine tubular pores; few very fine and fine roots; common thin clay films on ped faces and lining pores; uncoated silt grains on ped faces; slightly acid (pH 6.2); clear smooth boundary.

Bt3--42 to 54 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 4/4) moist; moderate medium subangular blocky structure; slightly hard, friable, slightly sticky and slightly plastic; few very fine tubular pores; few very fine roots; few thin clay films on ped faces and lining pores; uncoated silt grains on ped faces; slightly acid (pH 6.4); clear smooth boundary.

Bt4-54 to 63 inches; light yellowish brown (10YR 6/4) silt loam, dark yellowish brown (10YR 3/4) moist; weak medium subangular blocky structure; slightly hard, very friable, slightly sticky and slightly plastic; few very fine tubular pores; few very fine roots; few thin clay films on ped faces; slightly acid (pH 6.4).

Typical Pedon Location

Located in *Soil Survey of Fremont County, Idaho, Western Part.*
Legal description: about 50 feet west and 2,100 feet south of the northeast corner of section 16, T. 9 N., R. 44 E., Idaho

Range in Characteristics

Profile
Depth class: very deep (greater than 60 inches)
Drainage class: well drained

A horizon
Hue: 10YR
Value: 4,5 or 6 dry; 3 or 4 moist
Chroma: 2, 3 or 4 dry or moist

Texture: silt loam
Clay content: 10 to 15 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

E and E/B horizons
Hue: 10YR
Value: 5, 6 or 7 dry; 4, 5 or 6 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam
Clay content: 10 to 18 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 6.5)

Bt horizons
Hue: 10YR
Value: 5 or 6 dry, 4 or 5 moist
Chroma: 2, 3 or 4 dry or moist
Texture: silt loam or silty clay loam
Clay content: 18 to 30 percent
Rock fragment content: 0 percent
Reaction: moderately acid or slightly acid (pH 5.6 to 7.8)

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