

APPENDIX I:

LANDTYPE

I. Introduction

This landtype survey of the Blackleaf Unit is designed to describe soils, habitat types, and landforms found on this unit and their suitability for the more commonly applied land management practices.

The mapping unit boundaries were drawn by a reconnaissance survey technique which relies heavily on stereoscopic photo interpretations of landform properties such as low order stream spacing and relief. Field mapping was transferred to 1:24,000 scale USGS base maps.

The soils are classified at the family level of the soil taxonomy and representative soil profiles were described using standard soil survey procedures.

Habitat types were classified at all soil description sites. All habitat type nomenclature in this Appendix conforms to that in, "Forest Habitat Types of Montana, 1977" and "Grassland and Shrubland Habitat Types of Western Montana, 1977" published by the Intermountain Forest and Range Experiment Station. Habitat types which could not be classified were related to the most similar habitat types defined.

Mapping units may contain inclusions up to 160 acres in size of lands with management properties contrasting to those described for the unit, and the total area of contrasting inclusions within any delineation may not exceed 15% of the total area within that delineation. Inclusions of lands with similar management properties may occupy up to 50% of any delineation.

The level of reliability and accuracy of this mapping is considered adequate for most land use and functional planning currently being done. The mapping can be used for multiple use plans, transportation plans, timber compartment plans and other similar planning problems. Because of contrasting inclusions, it should not be used for specific projects such as road locations, timber sales and campground without field checking to determine its accuracy.

In the terms of the nomenclature used by the National Cooperative Soil Survey, this is a survey in which the mapping units are principally consociations and associations of phases of soil families.

II. Landtype Identification Legend

<u>Type</u>	<u>Landform</u>	<u>Habitat Type</u>	<u>Soil Class</u>	<u>Slope</u>	<u>Lithology</u>
13A	Glacial Drift Deposits	FESC/FEID POFR/FESC	Typic & Argic Cryoborolls	10- 25%	Undiff
14D	Rotational slumps & mud flows	DF/SYAL	Typic Cryochrepts	25- 40%	Shale
18	Steep west facing slopes	SCREE	Lithic Cryorthents	40- 60%	Limestone
21A	Steep, drift plastered trough walls	AF/LIBO	Andic Cryochrepts	25- 40%	Sandstone & Shale
23A	Steep, drift plastered trough walls	DF/SYAL, DF/CARU	Typic Cryoboralfs	25- 40%	Sandstone & Shale
23B	Steep upper valley sideslopes	AF/ARCO AF/CAGE	Typic Cryoboralfs	25- 40%	Slowly Permeable Limestone
25	Drift plastered trough walls	AF(WBP)VASC AF/XETE	Andic Cryochrepts	40- 60%	Sandstone & Shale
25C	Drift plastered trough walls	AF/LUHI MEFE ph.	Andic Cryochrepts	40- 60%	Sandstone & Shale
71	Steep glacial trough walls	AF(WBP)VASC AF/XETE	Typic & Andic Cryochrepts	40- 60%	Sandstone & Shale
72	Steep upper slopes	FESC/FEID	Typic Cryoborolls, Shallow	40- 60%	Sandstone & Shale
161	Low relief ridges & slopes	FESC/FEID PIFL/FEID	Argic Cryoborolls Typic Cryochrepts	10- 40%	Sandstone & Shale
161A	Low Relief ridges & low slopes	FESC/FEID ABLA/CLPS	Typic Haploborolls Typic Ustochrepts	1- 10%	Sandstone & Shale
161B	Low relief ridges & higher slopes	FESC/FEID ABLA/CLPS	Typic Haploborolls Typic Ustochrepts	2- 40%	Sandstone & Shale
171	High relief ridges & slopes	FESC/FEID, AF/XETE	Typis Cryoborolls Andic Cryochrepts	40- 60%	Sandstone & Shale
171A	Residual uplands- low relief	FESC/FEID PIFL/FESC	Typic Ustochrepts Typic Haploborolls	25- 60%	Sandstone & Shale
181	Glacial cirque headwalls	AF(WBP)/ VASC-SCREE	Typic Cryochrepts- rockland	60%+ 60%+	All non-carbonate rocks
182	Very steep glacial breaks	SCREE- DF/JUCO	Rockland- Typic Cryochrepts	60%+	Limestone
183	Very steep peaks- super slopes	SCREE- AF/WBP	Rockland- Typic Cryochrepts	60%	All non-carbonate rocks
200	Well drained floodplain	POTR/FESC- AF/LIBO	Fluvents & Borolls	0- 10%	Undifferentiated
201	Wetland	SEDGE- WILLOW	Aquepts & Aquolls	0- 10%	Undifferentiated
202	Fault escarpments and glacial cirque basins	Scree	Rockland	60%+	Limestone
204	Low Relief benches fans and terraces	FESC/AGSP	Calcic Cryoborolls Typic Calciborolls	0- 8%	Calcareous gravel alluvium
205	Interbedded residual uplands	FESC/FEDI FESC/AGSP	Typic Ustorthents Lithic Haploborolls	10- 40%	Sandstone, Shale & Mudstone
206	Footslopes & Fans - low relief	AGSM/DIST	Slickspots - Typic Haploborolls	0- 15%	Calcareous sand- stone & shale
207	Footslopes, swales & fans	FESC/FEID FESC/AGSP	Pachic Cryoborolls, Typic Haploborolls	2- 15%	Calcareous sand- stone & shale

III. Landtype Descriptions

13A

Low elevation, nearly level to hilly (0 to 25 percent slopes) glacial drift deposits supporting grassland vegetation. The unit occurs at elevations of 5,000 to 6,000 feet in 15 to 25-inch precipitation zone.

The soils are weakly developed grassland soils with a black loam topsoil 6 to 12 inches thick and brown loam subsoils continuing 35 to 50 percent rounded gravel and cobble. The soils are over 40 inches deep, well drained and are neutral to mildly alkaline in reaction. They contain no restrictions to water movement or root development. Some areas have shallow glacial deposit over shale and sandstone bedrock. Large limestone boulders are in the soil.

Vegetation is dominantly fescue grassland with some included aspen groves and scattered limber pine, Douglas-fir and Juniper on rocky ridge-crests and steep slopes. Habitat types are principally rough fescue/Idaho fescue and shrubby cinquefoil/rough fescue.

The major uses of this unit are grazing and wildlife habitat and there are no serious limitations for these uses. The scattered forested portions are non-commercial forest.

The unit is a major landtype in the Blackleaf Unit in the footslopes of the Rocky Mountain Front.

14D

Moderately steep (25 to 40 percent slopes) landforms formed by slumping supporting Douglas fir forest with some mixture of lodgepole pine or limber pine. Habitat types are predominantly Douglas-fir/snowberry at lower elevations and alpine fir/virgin's bower at higher elevations. Some delineations contain up to 15 percent of fescue grassland parks on rough fescue/Idaho fescue or shrubby cinquefoil/rough fescue habitat types. Areas of this unit along the east slope of the Rockies are in an exposed, windy topographic position and the trees take on a short wind deformed growth form.

The landtype occurs at elevations of 5,000 to 7,000 feet in a 15 to 30-inch precipitation zone.

The soils are weakly developed forest soils with surface layers of litter and duff underlain by brown silt loam or silty clay loam topsoils which form in 4 to 12-inch thick surface layers of wind deposited silt. The subsoil is a grayish-brown or brown clay loam to silty clay containing 50 to 75 percent angular cobble and boulders, usually of limestone bedrock. The soils range from 20 inches to over 60 inches deep and are underlain by clay shale bedrock. They are moderately well drained and seeps or springs are common features. They are mildly to moderately alkaline in reaction and the subsoil is calcareous when limestone is exposed up slope. The underlying shale bedrock restricts water movement and root penetration.

The most serious limitations to use of this landtype are a moderate slump hazard and a relatively warm, dry plant growth environment which may delay forest regeneration. The landtype is a major landtype on the east slopes of the Rocky Mountain Front in the Blackleaf Unit.

18

Moderately steep and steep (15 to 60 percent) west facing slopes which parallel the dip of underlying, highly permeable limestone beds. Weakly dissected landforms. The landform occurs in the glaciated landscapes of the Rockies, and the lower portions of these slopes are sometimes scoured by glaciers. The landtype occurs at elevations of 5,000 to 8,000 feet in a 15 to 30-inch precipitation zone.

The soils are very weakly developed forest soils forming in calcareous loamy material containing 75 to 90 percent flaggy pieces of limestone. They average less than ten inches deep, are excessively drained and moderately alkaline in reaction. There are areas of moderately deep to deep loamy soils over limestone that occur as inclusion in this type.

Vegetation consists of open-growing wind deformed stands of Douglas fir, limber pine and spruce on a scree habitat type. This landtype has very serious limitations to use because of steep slopes and a very droughty, poor quality plant growth environment.

The landtype is of moderate extent on west-facing slopes of limestone reefs in the Blackleaf Unit.

21A

Moderately steep (25-40%) slopes facing north or east. Thin deposits of loamy glacial drift mantling shale and sandstone bedrocks. The landtype occurs at 5,000 to 6,500 feet elevation in a 20 to 30-inch precipitation zone.

The soils are weakly developed forest soils with surface layers of litter and duff underlain by brown loam or silt loam topsoils four to eight inches thick which develop in surface deposits of wind deposited silt. The subsoil is brown clay loam or clay and contains 35 to 50 percent rounded to angular cobble and gravel. The soils average between 20 to 60 inches deep and are underlain by fractured sandstone bedrock. They are well drained and medium acid to neutral in reaction. They contain no restrictions to water movement or root development. Vegetation is mixed Douglas-fir and lodgepole pine forest on alpine fir/twinflower habitat type.

The most serious limitation to use of this unit is in the steepness of slope and shallow soils which limits vehicular travel and productivity on this type. This is a minor landtype in the Blackleaf Unit.

23A

Moderately sloping to steep (8 to 40 percent slope) glacial drift plastered slopes at elevations of 5,000 to 6,000 in a 15 to 25-inch precipitation zone. Vegetation is lodgepole pine or Douglas-fir forest on the drier habitat types in the Douglas-fir series. Major habitat types included are Douglas-fir/snowberry and Douglas-fir/pinegrass.

The soils are moderately developed forest soils with surface layers of litter and duff underlain by dark grayish-brown loam topsoils 6 to 12 inches thick. The subsoil is dark brown clay loam or clay containing 35 to 60 percent rounded gravel and cobble. The soils average between 40 to 60 inches deep and are underlain by frost-fractured sandstone or shale bedrock. The soil is well drained, slightly acid to neutral in reaction and occasionally has calcareous layers in the lower subsoil. It contains no restrictions to water movement or root development.

The most serious limitation to use is the relatively dry plant growth environment which may delay forest regeneration following fire or timber harvest.

The unit is of minor extent in the mountainous portion of the Blackleaf Unit.

23B

Moderately steep (25 to 40 percent) upper valley side slopes underlain by moderately permeable, shaly limestones or calcareous mudstones. The landtype occurs at elevations of 5,400 to 7,000 in a 15 to 25-inch precipitation zone.

Soils are moderately developed forest soils developing in four to eight inch thick surface layers of wind deposited silt overlying weathered bedrock. They have surface layers of litter and duff overlying grayish-brown silt loam topsoils four to eight inches thick. The subsoil is a dark brown, heavy silty clay loam or light silty clay containing 35 to 50 percent angular limestone cobble. The soil is 20 to 40 inches deep, well drained and has neutral reaction in the topsoil and moderately alkaline, calcareous subsoils. The underlying bedrock is slowly permeable to water and restricts root development.

Vegetation is typically mixed lodgepole pine, spruce and Douglas-fir forest on alpine fir/heartleaf arnica, alpine fir/elk sedge or alpine fir/grouse whortleberry habitat types.

The most serious limitation to use is a severe erosion hazard for subsoils exposed on roadcuts.

The unit is of minor extent in the mountainous portion of the Blackleaf Unit.

25

Steep (40 to 60 percent slope) glacially plastered trough walls supporting lodgepole pine forest on lower slopes and grading into mixed lodgepole pine and whitebark pine forest on upper slopes. Fifty to seventy-five percent of the unit is classified as alpine fir (whitebark pine)/grouse whortleberry habitat type occurring on the upper portions of the valley slope and 25 to 50 percent alpine fir/beargrass on the lower slopes. This landtype occurs at elevations of 5,500-6,500 feet in a 20 to 35-inch precipitation zone.

The soils are weakly developed forest soils forming in 4 to 8-inches of wind deposited silt overlying clay loam or clay glacial drift containing 35-50% gravel and cobble. They are deep, well drained, and medium to neutral in reaction. They contain no restrictions to root penetrations or water movement.

The most serious limitations to use are the steep slopes which restrict vehicle operation, avalanche chutes and a severe subalpine climate which delays forest regeneration following fire or timber harvest.

The landtype is of minor extent in the mountainous portion of the Blackleaf Unit.

25C

Steep (40 to 60 percent slopes) glacially plastered trough walls supporting mixed spruce, alpine fir and whitebark pine forest on an alpine fir/woodrush, menziesia phase habitat type. Some alpine fir/menziesia habitat types are included on lower elevation portions of the unit. The landtype occurs at elevations of 5,500 to 6,500 feet in a 20 to 35-inch precipitation zone.

The soils are similar to those described in 25 but differ by having thicker silt loam loess caps which average 12 to 24-inches thick in this unit.

The most serious limitations to use of this unit are a severe mass failure hazard for roadcuts, snowbanks which persist until mid-July in most years, avalanches, and very slow forest regeneration in burns or timber harvest areas.

This landtype is of very minor extent in the mountainous portion of the Blackleaf Unit.

71

Steep (40 to 60 percent) glacial scoured slopes underlain by interbedded sandstones, limestones and shales. The landtype occurs at elevations of 5,200 to 7,000 feet in a 15 to 30-inch precipitation zone.

The soils are weakly developed forest soils forming mostly in weathered bedrock, but surface layers of wind deposited silt occur on north or east-facing slopes. They have surface layers of litter and duff underlain by stony, brown, sandy loam or loam topsoils six to twelve inches thick. The subsoil is a brown sandy loam or clay loam containing 35 to 75 percent angular cobble. The soil ranges from 20 to 40-inches deep, is well drained and medium to slightly acid in reaction. Local areas have slightly or moderately alkaline calcareous subsoils when associated with limestone bedrock. It contains no restrictions to water movement or root development.

Vegetation is lodgepole pine forest on lower slopes grading into mixed lodgepole pine, whitebark pine and spruce forest on upper slopes. Habitat types are alpine fir/beargrass (25 to 75 percent) on lower slopes and alpine fir (whitebark pine) grouse whortleberry (50 to 75 percent) on upper slopes.

The most serious limitations to use are steep slopes which restrict vehicle operation and a severe subalpine climate which may delay forest regeneration after fire or timber harvest.

This landtype is of moderate extent in the Blackleaf Unit.

72

Steep (40 to 60 percent) ridge saddles and upper slopes underlain by steeply dipping interbedded sandstones and shales. The landtype occurs at elevations of 5,400 to 7,500 feet in a 15 to 30-inch precipitation zone.

The soils are weakly developed grassland soils forming in weathered bedrock. They have dark brown topsoils 4 to 10 inches thick generally underlain by bedrock. They average less than ten inches deep, are excessively drained and slightly acid in reaction. The underlying bedrock restricts water movement and root penetration. The unit commonly includes small areas of barren shale bedrock exposures.

Vegetation is fescue grassland on a rough fescue/Idaho fescue habitat type. Scattered whitebark pine and spruce often occur where fire has been excluded.

The most serious limitations to use are steep slopes, persistent snowbanks and severe soil erosion hazards. The unit is of minor extent and occurs as small, widely scattered areas in the Blackleaf Unit.

161

A complex of fescue grasslands (75%) and mixed limber pine and Douglas fir forest on gently sloping to moderately steep (0-40% slopes) mountain foothills. The underlying bedrock is interbedded sandstones and shales. The unit occurs at elevations of 5,000 to 6,000 feet in a 20 to 30-inch precipitation zone.

The soils are weakly to moderately developed grassland soils with very dark grayish-brown loam topsoils 8 to 16-inches thick underlain by brown loam subsoils containing 35 to 50 percent cobble. The soils are shallow to deep and well drained. They contain no restrictions to water movement or root development.

The forested portion contains stony loamy soils 20-40 inches deep over sandstone bedrock on ridge crests. The dominant texture is loamy in this unit, however narrow stringers of clayey soils occur associated with clayey shale outcrops. In this EIS area, limestone and calcareous shales are dominant in local areas.

Vegetation is fescue grassland on rough fescue/Idaho fescue habitat type. Some rough fescue/bluebunch wheatgrass or big sage/rough fescue habitat types are included on south facing slopes. The forested portion is non-commercial forest land.

The major uses are livestock grazing wildlife habitat and wildlife winter range. The major limitation to livestock grazing is included slopes too steep for primary range.

This landtype is of major extent, occurring widely in the foothills portion of the Blackleaf Unit.

161A

A complex of fescue grasslands (80%) and mixed limber pine and Douglas-fir forest (20%) on undulating to sloping mountain foothills. Slopes are mostly less than 10%. The underlying bedrock is interbedded sandstone, calcareous shales and limestone. The unit occurs at elevations of 4,800 to 6,000 feet in a 15 to 19-inch precipitation zone.

The grassland soils are weakly to moderately developed with very dark grayish-brown loam top soils 8 to 16 inches thick underlain by brown loam subsoils containing 35 to 50 percent cobble. The soils are mainly 20 to 40 inches deep and well drained. The forest soils are weakly developed with surface layers of litter and duff underlain by dark grayish-brown loam topsoils 6 to 16 inches thick. The subsoil is a pale brown loam containing 35 to 75 percent cobble. These soils contain no restrictions to water movement or root development.

Vegetation is mainly fescue grassland on rough fescue/Idaho fescue habitat type. Some rough fescue/bluebunch wheatgrass habitat types are included on south facing slopes. The forest part is dominantly Douglas-fir and lodgepole pine on subalpine fir/virgin's bower, subalpine fir/arnica and subalpine fir/grouse whortleberry dominant habitat types.

The major uses are livestock grazing, wildlife habitat and wildlife winter range. The forested portion is non-commercial forest.

The landtype is of minor extent, but well distributed in the foothills portion of the Blackleaf Unit.

161B

A complex of fescue grassland (80%) and mixed limber pine and Douglas fir forest (20%) on gently sloping to moderately steep (2 to 40% slopes) mountain foothills. The underlying bedrock is interbedded sandstone, calcareous shales and limestone. The unit occurs at elevations of 4,800 to 5,800 feet in a 15 to 19-inch precipitation zone.

The grassland soils are weakly developed with very dark grayish-brown loam topsoils 6 to 8 inches thick underlain by brown loam subsoils containing 35 to 50 percent gravel and cobble. The soils are mainly 20 to 60 inches deep and well drained. The small areas of forest soils are weakly developed with surface layers of litter and duff underlain by dark grayish brown loam topsoils 6 to 10 inches thick. The subsoil is a pale brown loam containing 35 to 75 percent cobble. These soils contain no restrictions to water movement or root development.

Vegetation is mainly fescue grassland on rough fescue/Idaho fescue habitat type. Some rough fescue/bluebunch wheatgrass habitat types are included on south facing slopes. The forest part is dominantly Douglas-fir and lodgepole pine forest on subalpine fir/virgin's bower, subalpine fir/arnica, and subalpine fir/grouse whortleberry habitat types.

The major uses of the unit are grazing and wildlife habitat. There are no serious limitations for these uses.

The unit is of minor extent but well distributed in the foothills portion of the Blackleaf Unit.

171

A complex of lodgepole pine forest (75%) and fescue grassland (25%) on high relief, steep (40 to 60% slopes) glacially scoured slopes underlain by interbedded sandstone and shale. The grasslands occur on shallow soils underlain by shale and the forest on deep soils underlain by sandstone. The unit occurs at elevations of 5,800 to 6,850 feet in the 20 to 35-inch precipitation zone.

The forest soils are weakly developed, forming mostly in weathered bedrock, but surface layers of wind deposited silt occur on north or east-facing slopes. They have surface layers of litter and duff underlain by stony, brown, sandy loam or loam topsoils six to twelve inches thick. The subsoil is a brown sandy loam or clay loam containing 35 to 75 percent angular cobble. The soil ranges from 20 to 40 inches deep, is well drained and medium to slightly acid in reaction. Local areas have slightly or moderately alkaline calcareous subsoils when associated with limestone bedrock. It contains no restrictions to water movement or root development.

The grassland soils are weakly developed, forming in weathered bedrock. They have dark brown topsoils 4 to 10 inches thick generally underlain by bedrock. They average less than ten inches deep, are excessively drained and slightly acid in reaction. The underlying bedrock restricts water movement and root penetration. The unit commonly includes small areas of barren shale bedrock exposures.

The major use is wildlife habitat. The major limitation to timber harvest and grazing is slopes too steep for primary range or the operation of vehicles.

This landtype is of minor extent in the steep mountainous portions of the Blackleaf Unit.

171A

A complex of fescue grassland (80%) and limber pine forest (20%) on moderately steep and steep (25 to 60% slopes) glacially scoured slopes underlain by interbedded sandstone, shale and limestone. The grasslands occur on shallow to deep loam soils underlain by shale and the forest on moderately deep and deep (20 to 60 inches) soils underlain by sandstone and limestone. The unit occurs at elevations of 4,800 to 5,500 feet in the 15 to 19-inch precipitation zone.

The major uses are grazing and wildlife habitat. The forest portion is non-commercial forest.

The soils are weakly developed grassland soils forming in weathered bedrock. They have dark brown topsoils 4 to 10 inches thick generally underlain by bedrock. The soils are well drained to excessively drained and slightly acid to slightly alkaline in reaction. The underlying bedrock restricts water movement and root penetration. The unit commonly includes small area of barren shale exposures. The dominant vegetation is fescue grassland on a rough fescue/Idaho fescue habitat type. The vegetation on the forest portions is dominantly limber pine forest on a limber pine/rough fescue - Idaho fescue phase habitat type.

The most serious limitations to use are steep slopes and soil erosion hazards.

The unit is of minor extent in the foothills portion of the Blackleaf Unit.

181

A complex of stable soils (80%) and rockland and scree (20%) on very steep (60%+ slope) slopes underlain by non-calcareous rocks. The unit occurs at elevations of 6,000 to 7,000 feet in a 20 to 35-inch precipitation zone.

Vegetation is mostly lodgepole pine, whitebark pine or Douglas fir forest. Subalpine fir/grouse whortleberry, blue huckleberry phase, or subalpine fir (whitebark pine)/ grouse whortleberry are the dominant habitat types on stable soils. Forested scree occupies 20% of the landtype.

The stable soils are deep, well drained, neutral to slightly acid soils forming in very gravelly or stony colluvial deposits.

The landtype sometimes supports commercial timber, but timber management is severely limited by steep, broken slopes, avalanche chutes and extensive areas of subalpine fir (whitebark pine)/grouse whortleberry habitat type which is difficult to regenerate following timber harvest.

The landtype is of very minor extent and in the mountainous portion of the Blackleaf Unit.

182

A complex of rock outcrop and talus (75%) and stable soils (25%) on very steep (60%) glacial break slopes underlain by limestone. The unit occurs at elevations of 5,400 to 6,800 feet in a 20 to 35-inch precipitation zone.

Vegetation is principally Douglas-fir, limber pine or ponderosa pine forest on forested scree or Douglas-fir/kinnikinnick or Douglas-fir/common juniper habitat types.

The stable soils are deep, well drained, calcareous soils forming in very gravelly colluvium.

The landtype has value principally as wildlife habitat and some areas provide deer winter range.

The landtype is of moderate extent on the Blackleaf Unit.

183

A complex of rock outcrop and talus (75%) and stable soils (25%) on very steep (60%+) slopes underlain by non-calcareous rocks. The unit occurs at elevations of 5,200 to 6,000 feet in a 20 to 35-inch precipitation zone.

Vegetation is principally lodgepole pine, whitebark pine, spruce and alpine fir forest on forested scree and cool dry habitat types in the alpine fir series.

The landtype has value principally for wildlife habitat and watershed.

The landtype is of minor extent in the Blackleaf Unit.

200

This landtype consists of floodplains and associated terraces and alluvial fans. The unit occurs at elevations of 4,800 to 5,400 feet in a 15 to 25-inch precipitation zone.

Vegetation is variable and ranges from spruce-fir forest to fescue grasslands. Cottonwood and aspen are often included.

The soils form in texturally stratified alluvial deposits. They are deep, well drained or moderately well drained and frequently calcareous. They contain deep, fluctuating water tables which subirrigate shrub and forest vegetation.

The landtype has value for timber production, livestock grazing, wildlife habitat and recreation. It is frequently used as a transportation corridor. The major limitation to use is flood hazard of variable frequency.

The landtype is of major extent and widely distributed along most major drainages in the Blackleaf Unit.

201

This landtype includes wetlands with water tables at or near the soil surface during the growing season. The unit occurs at elevations of 4,800 to 4,900 feet in a 15 to 25-inch precipitation zone.

Vegetation is variable and ranges from spruce forest to willow, bog birch or sedge and tufted hairgrass wet meadows.

The soils are deep, poorly drained and frequently have high organic surface layers.

The landtype has value for watershed and wildlife habitat. The soils are seldom dry enough to support grazing animals without trampling damage to soil and vegetation. Some areas have a flood hazard of variable frequency. Included are small beaver ponds and old stream meanders.

The landtype is of minor extent, but well distributed along major drainages in the Blackleaf Unit.

202

Very steep (60%+) limestone and scree on fault escarpments or glacial cirque headwalls. Active gravitational movement of loose rock and soil are common. On most areas active avalanche chutes are common. The unit occurs at elevations of 6,000 to 8,200 feet in a 15 to 35-inch precipitation zone.

Scree portions of the landtype support open growing stands of Douglas-fir, alpine fir, spruce and whitebark pine on forested scree habitat type. Large portion of the landtype contain bare rock and/or sparse vegetation.

Very steep slopes, barren rock and non-commercial forest preclude economic use of this landtype. However spectacular cliffs with occasional caves make this landtype a dominant visual feature in the landscape.

This landtype is of major extent in the mountainous portion of the Blackleaf Unit.

204

Gently sloping (0 to 8 percent) outwash benches and terraces. The landtype occurs at elevations of 4,800 to 5,200 feet in a 15 to 19-inch precipitation zone.

The soils are weakly developed grassland soils in loam or very cobbly loam materials weathered from interbedded limestone, sandstone and shale. The topsoil is dark grayish-brown loam 8 to 16 inches thick and underlain by pale brown very cobbly loam subsoils. They are deep, well drained soils that have calcareous subsoils with 35 to 50 percent rounded gravel and cobble. There are no restrictions to water movement or root development.

Vegetation is fescue and/or bluebunch wheatgrass grasslands on a rough fescue/Idaho fescue or rough fescue/bluebunch wheatgrass habitat type.

The major uses of the unit are grazing and wildlife habitat. Vehicular travel is common across this landtype due to the gentle slopes.

This landtype is extensive throughout the east half of the Blackleaf Unit.

205

Hilly and steep (15 to 40% slopes), shallow loamy and clayey soils underlain by interbedded shale, siltstone and sandstone. Frequently the faulting is such that the geologic formations are almost tilted on edge. The landtype occurs at elevations of 4,800 to 5,500 in a 15 to 19-inch precipitation zone.

The soils are mainly weakly developed grassland soils with local patches of Douglas-fir and limber pine forest soils. The topsoil is dark grayish-brown loamy or clayey soils 6 to 12 inches underlain by pale brown soils 10 to 24 inches over weathered bedrock in the grassland portion. The forested soils have surface layers of litter and duff underlain by brown or yellowish-brown loam or clay loam 20 to 60 inches deep to bedrock on steep slopes. Ten to 15% of area is nearly barren bedrock exposed along crests of hills. The grassland portion of this unit contains restrictions to water movement and to root development in local areas; however inclusions of deep and moderately deep soils are on lower slopes of hills. Vegetation is fescue grassland on a rough fescue/Idaho fescue or rough fescue/Bluebunch wheatgrass habitat types.

The major uses are grazing and wildlife habitat. The forested portion is non-commercial forest.

The landtype is of minor extent on the Blackleaf Unit.

206

This landtype consists of undulating and moderately sloping (0 to 15% slopes) upland slopes and swales that are wet and saline. The unit occurs at elevations of 4,800 to 5,000 feet in a 15 to 19-inch precipitation zone.

The soils are weakly developed saline-sodic clayey and loamy grassland soils weathered from interbedded calcareous shales and sandstone. The topsoil is dark grayish brown clay loam or loam 4 to 8 inches thick underlain by light brownish gray clayey subsoils. They are moderately deep and deep (200 to 60 inches) somewhat poorly drained soils that are saline and sodic. They are underlain by bedrock.

Vegetation is Inland saltgrass, Western wheatgrass, alkali sacaton, and other native perennial grasses.

The major uses are grazing and wildlife habitat. The major restrictions would be for roads or any kind of development.

The landtype is of very minor extent on the eastern portion of the Blackleaf Unit.

207

Deep loam alluvial deposits on gently sloping to moderately sloping (2 to 15%) fans and sideslopes in the foothill area. The origin of this transported material is from mixed rock sources of igneous rock, sandstone, shale and limestone. The unit occurs at elevations of 4,800 to 5,500 feet in about a 19-inch precipitation zone.

The soils are mainly deep, well drained, weakly developed grassland soils formed in material from mixed rock sources. They have dark gray to black loam topsoils 15 to 27 inches thick.

The subsoil is grayish-brown loam or light clay loam. Sandstone, quartzite or shale bedrock occur at depths of more than 40 inches in some places on upper sideslopes but does not limit vegetation production.

Vegetation is fescue grassland on a rough fescue/Idaho fescue or rough fescue/bluebunch wheatgrass habitat types. Native vegetation is rough fescue, Idaho fescue, bluebunch wheatgrass, Columbia needlegrass, bluegrass, lupine, shrubby cinquefoil, big sagebrush and sagewort.

The major uses are grazing and wildlife habitat. Vehicular travel is common across this landtype due to the gentle slopes. This landtype is of minor extent in the Blackleaf EIS area.

IV. Soil Stability Hazards Table

Use of the Table. Off-site pollution of surface waters is usually the most serious impact of soil erosion. The columns listing these hazards will therefore usually be the most limiting to land use. Deterioration of site quality due to accelerated soil erosion resulting from practices already lowered by mechanical disturbance or compaction from traffic, and the on-site erosion hazards by themselves are seldom limiting to land use. Their importance stems from their interaction with landform sediment delivery efficiency to determine off-site sediment pollution hazards.

Definition of Hazard Ratings

Low: If the hazard exists, it can be overcome with normally used management practices. No special treatment is required.

Moderate: The hazard can be overcome by special measures which are commonly available and economically feasible to apply, but which increase the cost of the use.

Severe: The hazard is difficult and costly to overcome; only land uses of exceptional high value should be considered.

SOIL STABILITY HAZARDS

Soil Land-type	On Site Erosion Hazard		Dry Creep	Sediment	Off Site Sediment Pollution Hazard		Compaction or Rutting
	Water Erosion ^{1/}	Compacted Road Cuts Slumping			Road Prisms ^{5/}	Primitive	
	2/	3/	4/	6/	7/	8/	
13A	L	L	L	L	L	L	M
14D	M	L	L	L	L	L	L
18	L	L	M	L	L	L	L
21A	M	L	L	L	L	M	M
23A	L	L	L	L	L	L	L
23B	M	M	L	L	L	M	M
25	M	M	L	M	L	S	S
25C	M	L	L	M	L	L	S
71	L	L	L	L	L	L	M
72	M	L	L	L	L	L	M
161	M	L	L	L	L	M	L
161A	L	L	L	L	L	L	L
161B	L	L	L	L	L	L	L
171	M	L	L	L	L	M	M
171A	M	L	L	M	M	M	M
181	L	L	M	L	M	L	L
182	L	L	M	M	M	L	L
183	L	L	M	M	M	L	L
200	M	L	L	L	L	L	M
201	M	L	L	L	L	L	S
202	L	L	S	L	L	L	L
204	L	L	L	L	L	L	L
205	M	M	L	M	M	M	M
206	M	M	L	L	L	L	S
207	L	L	L	L	L	L	L

Key: L = Low M = Moderate S = Severe
Footnotes:

1/ Water erosion is for soils bare of vegetation and compacted by traffic to the point that infiltration rates are very slow. This condition results from many land management practices such as: roads, skid trails and primitive wheel tracks.

The rating considers only resistance to detachment and movement of exposed soil material and the ease of establishment of erosion control seedlings as it effects the time the soil is susceptible to erosion. It does not consider climatic factors, cover or slope factors which are reduced to a common level by the nature of these practices.

Soils with clayey or loamy textures and more than 35% coarse fragment content in areas with little or no moisture stress to limit erosion control seedlings are rated low. Soils with loamy or clayey texture and less than 35% coarse fragment content in climates with little or no moisture stress to limit the erosion control seedlings were rated moderate. All soils with very sandy texture as well as all soils on dry sites with more than 60 days during the growing season at or below wilting point were rated high.

The roadcut rating assumes the qualities of the subsoil.

2/ Cutbank Slumping is a rating of the hazard of various kinds of gravitational erosional processes occurring. In this area the major processes are mass failure by rotational slumping and mud flows.

The factors used to arrive at the rating are average land slope, thickness of unconsolidated mantle, seeps and springs or other evidence of ground water concentration and lobate flows, slipscars, cracks, leaning trees, and other evidence of mass movement in the geologic past. The ratings are defined as follows:

Low: No evidence of past failure. Residual surfaces with unconsolidated mantles less than six foot thick, and no evidence of ground water concentration or more than 6 foot of unconsolidated mantle on slopes less than 25% with no evidence of ground water concentration or past mass movement.

Moderate: Thick unconsolidated mantles on slopes greater than 25% with low incidence of ground water concentration.

Severe: All slopes with evidence of mass failure in the geologic past and high incidence of ground water concentration.

3/ Dry Creep is a rating of the hazard of gravitational movement of individual soil and rock particles. The process requires steep slopes and exposure of bare soil or rock.

The ratings are defined as follows:

Low: All slopes less than 45% and north or east facing steeper slopes supporting continuous forest vegetation.

Moderate: All south or west facing slopes between 45 and 60% slope whose potential vegetative cover is grass or open growing forest.

Severe: All slopes greater than 60% whose potential vegetative cover is grass or open growing forest.

4/ Sediment Delivery Hazard is a rating of the hazard of eroded material becoming stream sediment. Assumed to be a function of slope and drainage density. The ratings were assigned using the following criteria:

SLOPE SEDIMENT DELIVERY HAZARD

Slope				
60% +	Severe	Severe	Moderate	Low
40-60%	Severe	Moderate	Low	Low
25-40%	Moderate	Moderate	Low	Low
10-25%	Moderate	Low	Low	Low
0-10%	Low	Low	Low	Low
	500-800	800-1200	1200-5000	5000

5/ Road Prisms: Assumes cut and fill construction, drainage installed at proper spacing for grades and soil conditions, seeding of cut and fill slopes, and surfacing of system roads when needed to prevent rutting. The construction hazard evaluates the sediment yield from construction activities and includes water erosion from new cut and fill slopes. The maintenance hazard assumes effective stabilization of water erosion by seeding and drainage. Only the continuing hazard from cutbank mass failures and cutbank raveling are evaluated.

6/ Fire: Evaluates the sediment hazard from recently burned areas before native vegetation effectively stabilizes the soil. Factors considered are: a) Time required for re-establishment of protective vegetation b) Probability of heat induced water repellency in the topsoil. c) Probability of accelerated slope mass failures due to the loss of the stabilizing effect of plant roots and reduced evapotranspiration rates. d) Probability of accelerated dry soil creep due to removal of the shading effect of the forest canopy.

7/ Primitive Roads and Trails: Logging skid trails, stock trails, system trails and primitive wheel track roads are the major practices evaluated. They all share the common properties of being bare of vegetation, having topsoils compacted by traffic to the point that infiltration and permeability rates are very slow and occurring on variable grades up to about 25 percent maximum. They are often nearly impossible to effectively drain because they are lower than the surrounding land surface.

8/ Soil compaction or Rutting: A rating based on an estimate of the length of time the soil is susceptible to damage from the operation of equipment. The rating considers soil moisture conditions, texture and coarse fragment content. The ratings were assigned using the following criteria:

Severe: Soils susceptible for 8 or more weeks per year. Includes all soils with shallow water tables and all loamy or clayey soils forming in transported sediments with rounded coarse fragments and classified in habitat types as moist as alpine fir/beargrass.

Moderate: Soils susceptible to damage for 4-8 weeks a year. All loamy or clayey residual soils with less than 35% coarse fragments in the topsoil classified in habitat types as moist as Douglas fir/pinegrass.

Low: All other soils.

V. Landtype Suitability Ratings

LIMITATIONS DEFINED

<u>Degree</u>	<u>Kind</u>	
I.	No limitation or limitations are effectively overcome by normally used practices. No special treatment required and no added cost.	C. Climatic Limitations 1. Plant moisture stress. 2. High elevation, short growing seasons, slow plant succession. 3. Winter snow depth.
II.	Limitations can be overcome by special design, location or practices which are commonly available and economically feasible to apply.	T. Travel: Vehicles, animals or people. 1. Steep slopes 2. Rock outcrop 3. Wet ground 4. Broken slopes
III.	Limitations are difficult and/or costly to overcome. Only practices of exceptionally high value should be considered.	S. Soil 1. Shallow, non-rippable hard rock. 2. Water erosion of compacted topsoils. 3. Water erosion of road cutbanks. 4. Slope mass failure. 5. Road cutbank mass failures. 6. Shallow concentrations of groundwater. 7. Cutbank raveling and rock failure. 8. Low subsoil bearing strength. 9. Frost heaving.
IV.	Limitation is so severe that the practice should not normally be considered. Either technology is not available to overcome the limitation or it is extremely economically impractical to apply it.	O. Other 1. Avalanches 2. Flooding 3. Understory competition for conifer regeneration. 4. Unpalatable vegetation and brushy increaser species. 5. Non-commercial forest.
NA	Not applicable. Little or no potential.	

Landtype Suitability Ratings

Landtype	Logging ^{1/}	Reforestation	Livestock grazing ^{2/}	Game Range ^{3/}	Construction ^{4/}	Winter Maintenance ^{5/}	Road
13A	NA	NA	I	II C3	I	I	I
14D	I	II C1	IV T1	IV C3	II S6	III S5	III S5
18	NA	NA	IV T1	IV C3	II S1	II S7	II S7
21A	II T1	I	III T1	IV C3	I	III S5	III S5
23A	I	II C1	IV T1	II C3	I	II S5	II S5
23B	I	I	IV T1	IV C3	II S3	II S8	II S8
25	III S4	II C2	IV O4	IV C3	I	III S5	III S5
25C	IV S4	II C2	IV O4	IV C3	I	IV S5	IV S5
71	II T1	II C2	IV T1	IV C3	I	II S7	II S7
72	NA	NA	IV T1	IV C3	I	I	I
161	NA	NA	III T1	II C3	I	I	I
161A	NA	NA	I	II C3	I	I	I
161B	NA	NA	II T1	II C3	II T1	I	I
171	II T1	I	III T1	II C3	I	I	I
171A	NA	NA	III T1	I	I	I	I
181	III T1	II C2	IV T1	IV C3	I	II S7	II S7
182	III T1	II C1	IV T1	IV C3	III S1	II S7	II S7
183	IV O5	II C2	IV T1	IV C3	IV S1	IV S7	IV S7
200	I	I	I	IV C3	I	II O2	II O2
201	IV T3	I	IV T3	IV C3	IV S6	IV S8	IV S8
202	NA	NA	NA	IV T1	IV S1	IV O1	IV O1
204	NA	NA	I	I	I	I	I
205	NA	NA	II T1	I	III S8	II S8	II S8
206	NA	NA	II T3	I	IV S6	IV S8	IV S8
207	NA	NA	I	I	I	I	I

Footnotes: Suitability Table

1. Logging: A rating of the limitations to logging by machine or the various moderate to long line cable systems available. It is assumed that cable logging is more expensive than machine skidding and that landtypes on which only cable logging is adapted are less suitable than these on which machine skidding is possible.

This evaluation also assumes that the logging equipment will operate on the rated landtype and that logging will not be done by cable from adjacent landtypes. Conflicts of logging activity with other values are not considered.

The following limitations were considered.

Slope: Landforms which contain slopes less than 30 percent on more than 50 percent of the area were considered suitable for machines skidding. Others were considered cable logging chances and were given a moderate limitation. Landforms rated for cable logging may contain small areas suitable for machine skidding.

Rock Outcrop: Landforms containing cliffs and talus slopes were given a severe limitation for logging.

Slope Mass Failure: Landforms with a very severe or severe mass failure were considered to have a limitation for logging because removal of the forest canopy increases the risk of slope failure by decreasing evapotranspiration and removing the stabilizing effects of roots.

Wet Ground: Landtypes with shallow water tables on which the operation of logging equipment produces ruts were considered to have a limitation for logging because they require special seeding and erosion control structures to control sediment production from skid trails and landings.

Non-Commercial Forest: Landtypes were considered to have a limitation to reforestation following timber harvest or fire if the probability of achieving full stocking in a clearcut or burn within five years is low. Only limitations such as plant moisture stress, short growing seasons or competition from understory vegetation were considered. Lack of seed source, rodent populations and other similar limitations were not considered. These limitations can be overcome by practices such as shelterwood or selective harvest or by site preparation techniques which are in common useage and they impose a maximum "moderate" limitation to reforestation.

2. Livestock Grazing: Limitation to grazing by brood cows and calves using season-long, rest-rotation or deferred rotation grazing systems are rated. The following criteria were used to rate limitations:

a. Accessibility limitation due to slope: 25 percent slope was considered the maximum slope for primary range. Full utilization of forage on steeper slopes requires special practices such as drift fences.

I: 75 percent of the landtype has slopes less than 25 percent.

II: 50-75 percent of the landtype has slopes less than 25 percent.

III: 25-50 percent of the landtype has slopes less than 25 percent.

IV: Less than 25 percent of the landtype has slopes less than 25 percent; primary range is confined to narrow ridges and valley bottoms.

b. Accessibility limitation due to wet ground: Poorly drained soils on which grazing results in unacceptable trampling damage to soils and vegetation were given a very severe limitation.

c. Limitations related to properties of native plant communities and secondary plant succession:

A moderate limitation was given plant communities containing big sage because of its tendency to increase with grazing use and require mechanical treatment or herbicides to control its spread.

A moderate or severe limitation was given subalpine and alpine meadows because of their susceptibility to long term declines in productivity when overgrazed and the short season of use.

A very severe limitation was given forest understory plant communities in which less than 100 pounds per acre useable forage is produced. The grouse whortleberry and beargrass understory unions are typical of this limitation. Useable forage production does not justify stocking. This limitation was not applied to any plant community on which useable forage production justifies stocking.

The ratings of grazing suitability for forested lands assume the early stages of plant succession following a fire or timber harvest, and no access limitation due to down timber or logging slash.

3. Winter Game Range: The suitability for winter range for elk and deer is rated. The major limitation considered was the accessibility limitation of snow depth to forage availability. Both snow depth and duration of snow cover were considered. Species composition was not considered since these animals tend to use whatever plants are available in the winter. Ratings for forested landtypes assume unstocked or poorly stocked clearcuts or burns.

Very steep or nearly vertical rockland escarpments and cliffs were given a very severe access limitation due to slope.

The following criteria were used to assign suitability ratings for landtypes on which snow depth is limiting.

I: Vegetation is useable every winter except for brief periods after major storms.

II: Vegetation is usable during part of the winter every year and all winter most years. Occasional severe winters force migration to more dependable ranges.

III: Vegetation is useable during the early and late winter period, but game must migrate to more dependable range during the severe part of each winter.

4. Road Construction: Limitations to road construction considered include non-rippable hard rock or subsurface concentrations of groundwater at depths where they are likely to be encountered during construction. Both conditions require special location considerations to avoid the condition or increase expense of construction activities. The degree of limitation from these conditions is a function of the frequency with which the condition occurs.

Soils with a severe subsoil erosion hazard for road cutbanks were given a moderate limitation because special practices such as temporary seedings of annual grasses or temporary diversion structures are necessary to control sedimentation during and shortly after construction.

5. Road Maintenance: Limitations to maintaining the serviceability of cut and fill construction roads were considered. These ratings do not apply to temporary roads which are used for short periods of time and then returned to production of vegetation.

The limitations considered are:

1. Cutbank slumping: A severe or very severe limitation. The estimated frequency of groundwater concentrations was used as criteria for assigning the different ratings.
2. Cutbank ravelling: Landtypes with slopes so steep that cutbanks cannot be laid back to stable angles were given a moderate limitation due to the added expense of cleaning the debris from the drainage system.
3. Subsoil bearing Strength: Soils with low subsoil bearing strength were given a moderate limitation because they require surfacing to prevent rutting from wet weather travel.
4. Frost Heaving: A limitation imposed by soils with shallow water tables, high silt and clay contents and exposure to freezing temperatures. The limitation is overcome by building a subgrade of freely drained, coarse aggregate. A moderate limitation.

APPENDIX J:
Rare Plants that Could Exist in the EIS Area

Scientific Name/Common Name	Ranking: Global-State*
<u>Antennaria pulcherrima</u> (Hook.) Green showy pussy-toes	G3G4 S1
<u>Astragalus molybdenus</u> Barneby Leadville milkvetch	G3 S1
<u>Botrychium minganense</u> Vict. Mingan Island moonwort	G4 S1
<u>Botrychium paradoxum</u> Wagner Peculiar moonwort	G1 S1
<u>Cardamine rupicola</u> (Rydb.) Hitchcock cliff toothwort	G2 S2
<u>Carex crawei</u> Dewey Craw's sedge	G5 S1
<u>Carex livida</u> (Wahl.) Wahl. pale sedge	G5 S1
<u>Carex maritima</u> Gunn. (+ <u>C. incurviformis</u> var. <u>danaensis</u>) Maritime sedge	G4G5 S1
<u>Carex paupercula</u> Michx. poor sedge	G5 S1
<u>Cypripedium calceolus</u> L. var. <u>parviflorum</u> (Sasisb.) Fern. Yellow lady's-slipper	G4T3 S2
<u>Cypripedium passerinum</u> Richards bird's egg or Franklin's lady's-slipper	G4G5 S1
<u>Drosera linearis</u> Goldie linear-leaved sundew	G4 S1
<u>Elymus innovatus</u> Beal Northern wild-rye	G4 S1
<u>Epipactis gigantea</u> Dougl. ex Hook Giant helleborine	G4 S1
<u>Erigeron lackschewitzii</u> Nesom and Weber Lackschewitz's fleabane	G2Q S2
<u>Eriophorum viridicarinatum</u> (Engelm.) Fern. green-keeled cottongrass	G5 S1

<u>Gentianopsis macounii</u> (T.H. Holm) Iltis smaller fringed gentian	G5	S1
<u>Juncus acuminatus</u> Michx. tapered rush	G5	S1
<u>Juncus hallii</u> Engelm. Hall's rush	G4G5	S1
<u>Orchis rotundifolia</u> Banks small roundleaved orchis	G5	S1
<u>Oxytropis lagopus</u> Nutt. var. <u>conjugens</u> Barneby rabbit-foot crazy-weed	G4T2	S2
<u>Oxytropis podocarpa</u> Gray stalked-pod crazywed	G4	S1
<u>Physaria saximontana</u> Rollins var. <u>dentata</u> Rollins mountain twinpod	G2T2	S1
<u>Potamogeton obtusifolius</u> Mert. & Kock Blunt-leaved pondweed	G5	S1S2
<u>Salix barrattiana</u> Hook. Barratt's willow	G5	S1
<u>Scirpus caespitosus</u> L. tufted clubrush	G5	S1
<u>Thalictrum alpinum</u> L. Alpine meadowrue	G4G5	S1
<u>Triglochin concinnum</u> Davy var. <u>debile</u> (Jones) Howell graceful arrow-grass	G5T4	S1
<u>Viola renifolia</u> Gray Kidney-leaved violet	G5	S1

The global and state rankings are from the Montana Natural Heritage Inventory. This inventory includes plant species which are rare, endemic, disjunct, threatened, or endangered throughout Montana, or in need of further research. Plant taxa are ranked, in this inventory, by a standardized procedure used in 35 other heritage programs. They are ranked on the basis of their range-wide or global rarity, and on their rarity within the specific state, using these ranking categories:

Montana Heritage Global and State Ranking Definitions

This inventory includes plant species which are rare, endemic, disjunct, threatened, or endangered throughout Montana, or in need of further research. Plant taxa are ranked, in this inventory, by a standardized

procedure used in 35 other heritage programs. They are ranked on the basis of their range-wide or global rarity, and on their rarity within the specific state, using these ranking categories:

<u>Global Rank</u>	<u>Definition</u>
G1	Critically imperiled globally because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction. (Critically endangered throughout range).
G2	Imperiled globally because of rarity (6 to 20 occurrences) or because of other factors demonstrably making it very vulnerable to extinction throughout its range. (Endangered throughout range).
G3	Either very rare and local throughout its range or found locally (even abundant at some of its locations) in a restricted range, or because of other factors making it vulnerable to extinction throughout its range: in the range of 21 to 100 occurrences. (Threatened throughout range).
G4	Apparently secure globally, though it may be quite rare in parts of its range, especially at the periphery.
G5	Demonstrably secure globally, though it may be quite rare in parts of its range, especially at the periphery.
GU	Possibly in peril range-wide, but status uncertain: more information needed.
GH	Historically known: may be rediscovered.
GX	Believed to be extinct throughout range: historical records only, continue search.

<u>State Rank</u>	<u>Definition</u>
S1	Critically imperiled in Montana because of extreme rarity (5 or fewer occurrences, or very few remaining individuals), or because of some factor of its biology making it especially vulnerable to extinction from the state. (Critically endangered in state).
S2	Imperiled in Montana because of rarity (6 to 20 occurrences), or because of other factors demonstrably making it very vulnerable to extirpation from the state. (Endangered in state).

- S3 Rare in Montana (on the order of 20+ occurrences).
(Threatened in state).
- S4 Apparently secure in Montana.
- S5 Demonstrably secure in Montana.
- SU Possibly in peril in Montana, but status uncertain;
more information needed.
- SH Historically known in Montana; may be rediscovered.
- SX Apparently extirpated from Montana.

Other Codes

- Q Taxonomic questions or problems involved: more
information needed.
- T Rank for a subspecific taxon (subspecies or variety):
appended to the global rank for the full species.

It should be emphasized that many of the global and state ranks are currently being reviewed and are subject to revision.