Ecological site R043AX968MT
Montane Stable Colluvial Slope Saskatoon serviceberry-common snowberry/Sitka alder/ Rocky mountain maple/thimbleberry/mountain brome-Geyer's sedge

Last updated: 9/08/2023
Accessed: 05/03/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 043A–Northern Rocky Mountains

This MLRA is located in Montana (43 percent), Idaho (34 percent), and Washington (23 percent). It makes up about 31,435 square miles (81,460 square kilometers). It has no large cities or towns. It has many national forests, including the Okanogan, Colville, Kootenai, Lolo, Flathead, Coeur d'Alene, St. Joe, Clearwater, and Kaniksu National Forests.

This MLRA is in the Northern Rocky Mountains Province of the Rocky Mountain System. It is characterized by rugged, glaciated mountains; thrust- and block-faulted mountains; and hills and valleys. Steep-gradient rivers have cut deep canyons. Natural and manmade lakes are common.

The major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA are: Kootenai-Pend Oreille-Spokane (1701), 67 percent; Upper Columbia (1702), 18 percent; and Lower Snake (1706), 15 percent. Numerous rivers originate in or flow through this area, including, the Sanpoil, Columbia, Pend Oreille, Kootenai, St. Joe, Thompson, and Flathead Rivers.

This area is underlain primarily by stacked slabs of layered sedimentary or metasedimentary bedrock. The bedrock formations range from Precambrian to Cretaceous in age. The rocks consist of shale, sandstone, siltstone, limestone, argillite, quartzite, gneiss, schist, dolomite, basalt, and granite. The formations have been faulted and stacked into a series of imbricate slabs by regional tectonic activity. Pleistocene glaciers carved a rugged landscape that includes sculpted hills and narrow valleys filled with till and outwash. Continental glaciation over road the landscape in the northern half of the MLRA while glaciation in the southern half was confined to montane settings.

The average annual precipitation is 25 to 60 inches (635 to 1,525 millimeters) in most of this area, but it is as much as 113 inches (2,870 millimeters) in the mountains and is 10 to 15 inches (255 to 380 millimeters) in the western part of the area. Summers are dry. Most of the precipitation during fall, winter, and spring is snow. The average annual temperature is 32 to 51 degrees F (0 to 11 degrees C) in most of the area, decreasing with elevation. In most of the area, the freeze-free period averages 140 days and ranges from 65 to 215 days. It is longest in the low valleys of Washington, and it decreases in length with elevation. Freezing temperatures occur every month of the year on high mountains, and some peaks have a continuous cover of snow and ice.

The dominant soil orders in this MLRA are Andisols, Inceptisols, and Alfisols. Many of the soils are influenced by Mount Mazama ash deposits. The soils in the area have a frigid or cryic soil temperature regime; have an ustic, xeric, or udic soil moisture regime; and dominantly have mixed mineralogy. They are shallow to very deep, are very poorly drained to well drained, and have most of the soil texture classes. The soils at the lower elevations include Udivitrands, Vitrixerands and Haplustalfs. The soils at the higher elevations include Dystrocryepts, Eutrocryepts,

Vitricryands , and Haplocryalfs. Cryorthents, Cryepts, and areas of rock outcrop are on ridges and peaks above timberline

This area is in the northern part of the Northern Rocky Mountains. Grand fir, Douglas-fir, western red cedar, western hemlock, western larch, lodgepole pine, subalpine fir, ponderosa pine, whitebark pine, and western white pine are the dominant overstory species, depending on precipitation, temperature, elevation, and landform aspect. The understory vegetation varies, also depending on climatic and landform factors. Some of the major wildlife species in this area are whitetailed deer, mule deer, elk, moose, black bear, grizzly bear, coyote, fox, and grouse. Fish, mostly in the trout and salmon families, are abundant in streams, rivers, and lakes.

More than one-half of this area is federally owned and administered by the U.S. Department of Agriculture, Forest Service. Much of the privately-owned land is controlled by large commercial timber companies. The forested areas are used for wildlife habitat, recreation, watershed, livestock grazing, and timber production. Meadows provide summer grazing for livestock and big game animals. Less than 3 percent of the area is cropland.

LRU notes

This ecological site resides in MLRA 43A in the Livingston-Lewis-Apgar Mountains which includes the bulk of Glacier National Park (GNP) and the lower western valley portions along the Flathead River. The landscape is mountains and landforms include glaciated mountains with associated features such as U-shaped valleys, mountain slopes, alpine ridges, cirques, valley floors and moraines. Glaciation of this area was in the form of alpine, icecaps and valley outlet glaciers. It also includes associated alluvium and outwash features. This area includes low valleys to tall mountains with elevation ranging 989-2,762 m (3,250-9,050 ft.). The climate is cold and wet with mean annual air temperature of 3 degrees Celsius (37 degrees F)., mean frost free days of 65 days and mean annual precipitation of 1295 mm (51 in.) and relative effective annual precipitation is 169 cm (66 in.). The soil temperature regime is cryic and the soil moisture regime is udic. The geology of this area is dominated by metasedimentary rocks of the Belt Supergroup (Grinnell argillite and Siyeh limestone) with minor Tertiary sediments. Soils are generally weakly developed on mountain slopes within U-shaped valleys. Parent materials are commonly of colluvium, till, and residuum from metasedimentary rocks. Limestone bedrock within this part of the Belt Supergroup is not highly calcareous and due to high precipitation received in this area most carbonates at mid and upper elevations have been leached from the soil profiles. Bedrock depth varies greatly with location, landform and slope position. Volcanic ash is often found in the soil surface with various degrees of mixing. Thicker volcanic ash can be found on more stable positions on mid and upper elevation slopes that are protected from wind erosion. Volcanic ash is not typically found in low elevation areas on stream and outwash terraces associated with streams and rivers. There are numerous large lakes including St. Mary, Bowman, Kintla, Lake Sherburne, Logging, Upper Waterton and numerous creeks (

Classification relationships

NPS Plant Community Name:
Amelanchier alnifolia/(mixed grass, forb) Shrubland CEGL005885)
Physiognomic Class Shrubland (III)
Physiognomic Subclass Deciduous shrubland (III.B.)
Physiognomic Group Cold-deciduous shrubland (III.B.2.)
Physiognomic Subgroup Natural/Semi-natural cold-deciduous shrubland (III.B.2.N.)
Formation Temperate cold-deciduous shrubland (III.B.2.N.a.)
Alliance *Amelanchier alnifolia* Shrubland Alliance (A.913)
Alliance (English name) Saskatoon Serviceberry Shrubland Alliance
Association *Amelanchier alnifolia* / (Mixed Grass, Forb) Shrubland
Association (English name) Saskatoon Serviceberry / (Mixed Grass, Forb) Shrubland
ECOLOGICAL SYSTEM(S): Rocky Mountain Gambel Oak-Mixed Montane Shrubland (CES306.818)
Northern Rocky Mountain Montane-Foothill Deciduous Shrubland (CES306.994)

Amelanchier alnifolia/Pseudoroegneria spicata-Bunchgrass Shrubland (CEGL001065)
Physiognomic Class Shrubland (III)
Physiognomic Subclass Deciduous shrubland (III.B.)
Physiognomic Group Cold-deciduous shrubland (III.B.2.)
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Alliance (English name) Saskatoon Serviceberry Shrubland Alliance
Association *Amelanchier alnifolia* / Pseudoroegneria spicata - Bunchgrass Shrubland
Association (English name) Saskatoon Serviceberry / Bluebunch Wheatgrass - Bunchgrass Shrubland
ECOLOGICAL SYSTEM(S): Northwestern Great Plains Mixedgrass Prairie (CES303.674)
Northwestern Great Plains Shrubland (CES303.662)
Rocky Mountain Gambel Oak-Mixed Montane Shrubland (CES306.818)

Ecological site concept

This ecological site is found on steep slopes (35-60 percent), on back, foot and toeslope positions on glacial valley wall landforms at elevations ranging from 1,150-2,100 meters (3,775-6,900 feet). This site is defined by the stabilizing nature of the root system of the shrub species present and their resprouting capabilities after disturbance. The reference community is defined as a mixed composition of serviceberry, snowberry, Sitka alder, Rocky mountain maple and other shrub species. Woods rose and chokecherry appear in low to moderate cover values. The understory is diverse and can range from drier site species with Oregon creeping grape, Geyers sedge and bluebunch wheatgrass occurring frequently and in high cover to moister site species including thimbleberry and mountain brome. Though monocultures of one shrub do exist, i.e. Ceonothus after a severe fire, the core concept for this ecological site is a mix of shrubs at all canopy cover layers. This ecological site is found on steep slopes with vegetation cover ranging from impenetrable shrubs to open canopy of medium statured shrubs with lush understory of grass and forb species. The thick vegetative growth contributes to the dark surface horizon colors in these soils. Ash is not usually present in these soils or is not very pure in these sites due to continual mixing caused by disturbance. These are very deep and well drained soils from till or colluvium from metasedimentary rock parent material. There is a high volume of fragments (50 to 67 percent by volume) within the soil profile. The predominant texture in the surface is very gravelly sandy loam and the subsurface is sandy skeletal. There are no redoximorphic features in the soil and there is rarely an argillic or mollic layer. There is a thin organic layer, usually less than 5 cm thick. The soils are usually in the Typic Haplocryepts taxonomic subgroup, and diagnostic features include an ochric epipedon and a cambic horizon.

Associated sites

R043AX962MT	**Alpine Unstable Talus rocky ledge penstemon (Penstemon ellipticus)** The 43A alpine unstable talus ecological site resides on extensive talus slopes on very steep to steep slopes with a surface dominated by large rock fragments or talus. The landforms are cirque headwalls, colluvial aprons and glacial valley walls. The 43A alpine unstable talus ecological site has soils that are deep, well to somewhat excessively drained and have abundant rock fragments throughout. These soils are generally classified in the Entisols or Inceptisols soil orders, indicating that they have virtually no soil development because they are on active positions of the landscape or have only weakly developed soil diagnostic characteristics. The 43A alpine unstable talus ecological site has a reference vegetation community of Rocky ledge penstemon (Penstemon ellipticus), buttecandle (Cryptantha celosioides), silverleaf phacelia (Phacelia hastata) and alpine leafybract aster (Symphyotrichum foliaceum).
F043AX951MT	**Lower Subalpine Cool Dry Coniferous subalpine fir- Engelmann spruce/ Sitka alder/ thinleaf huckleberry/ common beargrass** The 43A Lower Subalpine Coniferous Cool Moderately Dry (ABLA/CLUN2-XETE) ecological site is found in cool, moderately dry mid-elevations that span the lower subalpine areas. It is found primarily on lateral moraine and glacial valley wall landforms, on back or footslope positions, at elevations ranging 1,000 to 2,100 meters (3,280-6,900 feet), on all aspects and on moderate to steep slopes ranging 10-35 percent.The 43A Lower Subalpine Coniferous Cool Moderately Dry, (ABLA/CLUN2-XETE) site has soils associated with this Ecological Site that are very deep and well drained. These soils have developed in glacial till or colluvium parent materials derived from metasedimentary rock that typically have varying amounts of influence of volcanic ash in the soil surface layers. The dominant taxonomic soil order associated with these soils is Inceptisols with Andic subgroups indicating that there is 18 to 37 centimeters (7-14.5 inches) of volcanic ash. The 43A Lower Subalpine Coniferous Cool Moderately Dry (ABLA/CLUN2-XETE) ecological site has a reference vegetation community with an overstory of subalpine fir and Engelmann spruce with an understory of Sitka alder, huckleberry, beargrass and queencup bead lily.

F043AX952MT	**Lower Subalpine Cool Moist Coniferous subalpine fir-Engelmann spruce/Rocky Mountain maple-thinleaf huckleberry/thimbleberry** The 43A Lower Subalpine Coniferous Cool Moist (ABLA/CLUN2-ARNU2) is found in cool, moister mid-elevations that span the lower subalpine to subalpine. This ecological site is found on back, foot and toeslope positions, on glacial valley wall and moraine landforms, on all slopes, at elevations ranging 1,000 to 2,100 meters (3,280-6,900 feet). The 43A Lower Subalpine Coniferous Cool Moist Ashy Very Deep, (ABLA/CLUN2-ARNU2) has soils associated with this Ecological Site that are very deep, well drained or somewhat excessively drained and have subsoils with abundant rock fragments. The parent material is volcanic ash over glacial till from metasedimentary rock. In Soil Taxonomy, these soils classify primarily as Inceptisols soil order and more specifically as the Andic Haplocryepts taxonomic subgroup. The 43A Lower Subalpine Coniferous Cool Moist (ABLA/CLUN2-ARNU2) has a reference vegetation community of Subalpine fir-Engelmann spruce overstory and an understory of Rocky Mountain maple, thinleaf huckleberry, thimbleberry, wild Sarsaparilla, threeleaf foamflower and queencup bead lily.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Amelanchier alnifolia* (2) *Alnus viridis ssp. sinuata*
Herbaceous	(1) *Bromus marginatus* (2) *Carex geyeri*

Physiographic features

This ecological site is found on steep slopes (35-60 percent), on back, foot and toeslope positions on glacial valley wall landforms at elevations ranging from 1150-2100 meters.

Figure 1. Landscape view showing some conifer encroachment of the site.

Figure 2. Landscape view of drier version of this site.

Table 2. Representative physiographic features

Landforms	(1) Mountains > Glacial-valley wall (2) Mountains > Cirque headwall (3) Mountains > Colluvial apron (4) Mountains > Mountain slope
Elevation	1,150–2,100 m
Slope	35–60%
Aspect	SE, S, SW

Climatic features

WEST GLACIER CLIMATE STATION:

Mean Annual Precipitation 33-85 inches
Mean Annual Air Temperature 32-43 degrees Fahrenheit
Frost Free Days 30-70 days

Table 3. Representative climatic features

Frost-free period (characteristic range)	17-57 days
Freeze-free period (characteristic range)	76-117 days
Precipitation total (characteristic range)	508-660 mm
Frost-free period (actual range)	6-68 days
Freeze-free period (actual range)	66-127 days
Precipitation total (actual range)	508-711 mm
Frost-free period (average)	37 days
Freeze-free period (average)	97 days
Precipitation total (average)	584 mm

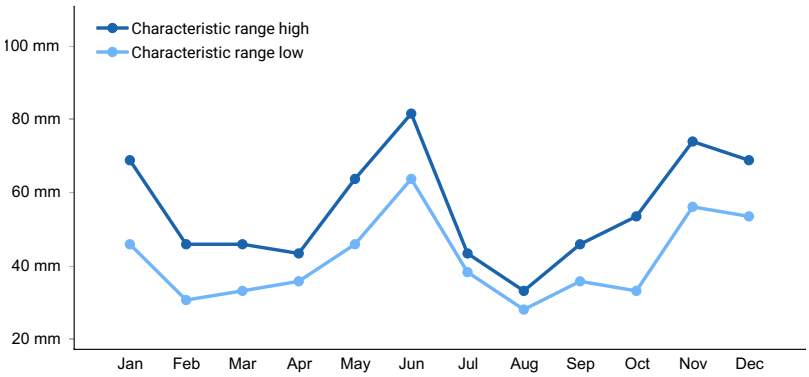


Figure 3. Monthly precipitation range

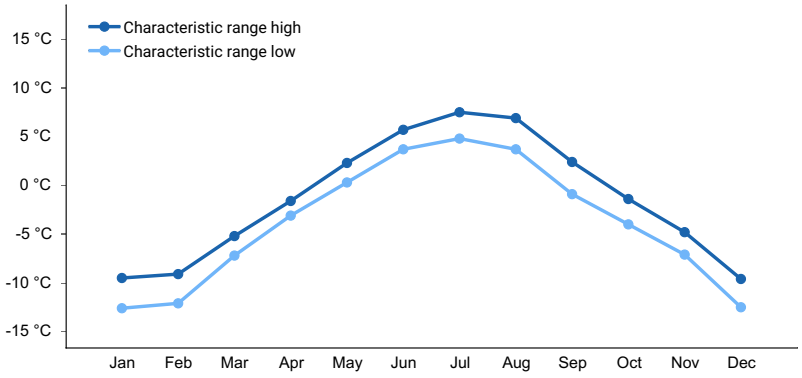


Figure 4. Monthly minimum temperature range

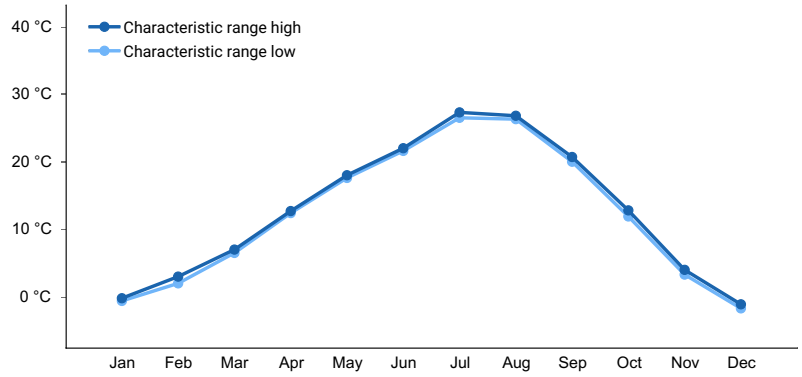


Figure 5. Monthly maximum temperature range

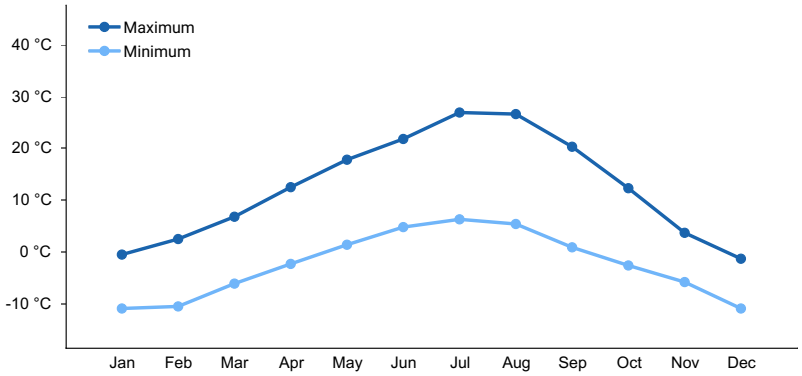


Figure 6. Monthly average minimum and maximum temperature

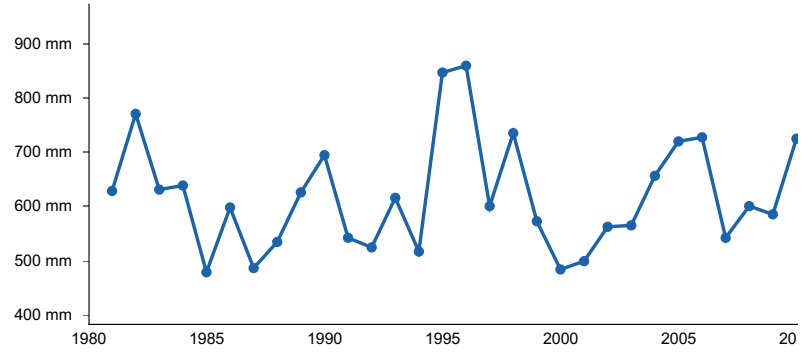


Figure 7. Annual precipitation pattern

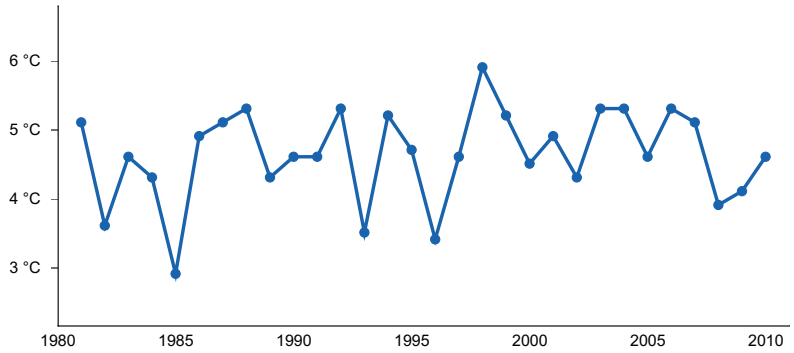


Figure 8. Annual average temperature pattern

Climate stations used

- (1) POLEBRIDGE 1 N [USC00246618], Essex, MT
- (2) POLEBRIDGE [USC00246615], Essex, MT
- (3) WEST GLACIER [USC00248809], Kalispell, MT

Influencing water features

Soil features

This ecological site is found on steep slopes with vegetation cover ranging from impenetrable shrubs to open canopy of medium statured shrubs with lush understory of grass and forb species. Steep sites on valley walls. The thick vegetative growth contributes to the dark surface horizon colors in these soils. Ash is not usually present in these soils or is not very pure in these sites due to continual mixing caused by disturbance. These are very deep and well drained soils from till or colluvium from metasedimentary rock parent material. There is a high volume of fragments (50 to 67 percent by volume) within the soil profile. The predominant texture in the surface is very gravelly sandy loam and the subsurface is sandy skeletal. There are no redoximorphic features in the soil and there is rarely an argillic or mollic layer. There is a thin organic layer, usually less than 5 cm thick. The soils are usually in the Typic Haplocryepts taxonomic subgroup, and diagnostic features include an ochric epipedon and a cambic horizon. (Soil Survey Staff, 2015). For more information on soil taxonomy, please follow this link: http://http://www.nrcs.usda.gov/wps/portal/nrcs/detail/soils/survey/class/?cid=nrcs142p2_053580

CORRELATED SOIL SERIES & TAXONOMIC CLASS NAME
Garlet Loamy-skeletal, mixed, superactive Typic Haplocryepts

Figure 9. Soil colors associated with this ecological site, noting darkness of the upper horizons.

Figure 10. Soils associated with this ecological site noting dark soil colors.

Figure 11. View of soil pit face associated with this ecological site.

Table 4. Representative soil features

Parent material	(1) Colluvium–metasedimentary rock (2) Till–metasedimentary rock
Surface texture	(1) Very gravelly sandy loam
Family particle size	(1) Sandy-skeletal
Drainage class	Well drained
Permeability class	Moderately rapid
Soil depth	152–254 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–5%
Available water capacity (4.3-9.1cm)	Not specified
Soil reaction (1:1 water) (11.4-16.5cm)	Not specified

Ecological dynamics

Ecological Dynamics of the Site
This ecological site is found on steep slopes (35-60 percent), on back, foot and toeslope positions on glacial valley wall landforms at elevations ranging from 1,150-2,100 meters (3,775-6,900 feet), along both sides of the Continental Divide. It is found in the lower subalpine life zone along with the coniferous ecological sites of 43A Subalpine Coniferous Cool Moderately Dry Ashy Very Deep, ABLA/CLUN2-XETE and
43A Subalpine Coniferous Cool Moist Ashy Very Deep, ABLA/CLUN2-ARNU2. At the upper elevational extent of this ecological site it is associated with 43A Upper Subalpine Unstable Talus Colluvial Apron (formerly Early

Colluvial Apron).

State 1.0

This site is defined by the stabilizing nature of the root system of the shrub species and their resprouting capabilities after fire disturbance. The reference community is defined as a mixed composition of serviceberry, snowberry, Sitka alder, Rocky mountain maple and other shrub species. Wood's rose and chokecherry should appear in low to moderate cover values. The understory is diverse and can range from drier site species with Oregon creeping grape, Geyer's sedge and bluebunch wheatgrass occurring frequently and in high cover to moister site species including thimbleberry and mountain brome. Though monocultures of one shrub do exist, i.e. Ceonothus after a severe fire, the core concept for this ecological site is a mix of shrubs at all canopy cover layers. Scattered trees can be present including: subalpine fir (Abies lasciocarpa), lodgepole pine (*Pinus contorta*), Engelmann spruce (*Picea engelmannii*), ponderosa pine (*Pinus ponderosa*), quaking aspen (*Populus tremuloides*), and Douglas fir (*Pseudotsuga menziesii*). Other shrub species present are redstem ceanothus (*Ceanothus sanguineus*), snowbrush ceanothus (*Ceanothus velutinus*), Rocky mountain maple (*Acer glabrum*), thimbleberry (*Rubus parviflorus*), oceanspray (*Holodiscus discolor*), American red raspberry (*Rubus idaeus*), Scouler's willow (salix scouleriana), white spirea (*Spiraea betulifolia*), twinberry honeysuckle (*Lonicera involucrata*), alderleaf buchthorn (*Rhamnus alnifolia*), thinleaf huckleberry (*Vaccinium membranaceum*) and grouse whortleberry (*Vaccinium scoparium*). Forb species are diverse and occur in low cover individually and include: common yarrow (*Achillea millefolium*), woodland strawberry (*Fragaria vesca*), Virginia strawberry (fragaria virginiana), nineleaf biscuitroot (*Lomatium triternatum*), yellow penstemon (*Penstemon confertus*) and common cowparsnip (*Heracleum maximum*). These shrublands are considered to be self-sustaining and not seral to conifer species. The extremely thick shrub cover precludes invasion by conifer species to any large extent.
The disturbance factors for this ecological site are fire, minor avalanche activity, erosional tears, grazing, browsing, animal burrows, animal trails, bear and badger digging and tent caterpillars. The majority of the shrub species occurring in this ecological site respond well to these disturbances through resprouting or extensive seed banking. Ceanothus species can dominate a site after severe fire to the exclusion of other shrub species.

This ecological site is differentiated from its associated site Montane Meadows which is a grassland dominated by rough fescue (*Festuca campestris*) and Idaho fescue though it may have low cover of the following shrubs: Saskatoon serviceberry (*Amelanchier alnifolia*), shrubby cinquefoil (*Dasiphora fruticosa*), thimbleberry and kinnickinick (*Arctostaphylos uva-ursi*).

Species Descriptions
A brief description of the major shrub species that comprise the Shrubby Colluvial Apron ecological site follows. Five shrub species comprise the reference community including: Saskatoon serviceberry, common snowberry (*Symphoricarpos albus*), chokecherry (*Prunus virginiana*), ceanothus species, Rocky Mountain maple, thimbleberry and Wood's rose (the latter two species occur in less cover and frequency generally). All shrubs are members of the Rose family, except snowberry which is in the Honeysuckle family, redstem ceanothus which is in Rhamnaceae, and Rocky mountain maple in Aceraceae. Shrub species found at this ecological site are deciduous, with all having rhizomatous root structure. Saskatoon serviceberry has a massive root crown with rhizomes that are long and massive (Bradley, A.F. 1984). Chokecherry also has very long rhizomes, up to 35+ feet laterally and 6+ feet vertically (Wasser, 1982). Common snowberry has less developed rhizomes than other species of snowberry (Stubbendieck, 1992). Wood's rose has a relatively shallow root crown, though root points reach 3-6 feet deep (Nimlos, 1968). Redstem ceanothus has an adventitious root crown with growing points near the ground surface. Rocky mountain maple has wide spreading root system with a combination of deep and lateral woody roots. Thimbleberry is strongly rhizomatous.
They all have the ability to resprout after disturbance. In particular, chokecherry is a rapid and prolific resprouter. All five shrub species are at least moderately fire adapted. Snowberry is undamaged in low severity fires and after high severity fire will return to pre-fire cover within 15 years. Chokecherry is well adapted to fire (Volland, 1981) and Wood's rose is strongly tolerant. Serviceberry, snowbush and redstem ceonothus and Rocky mountain maple are fire dependent (Arno, 1986). Fire actually stimulates their production. Redstem ceonothus can develop large even aged stands after fire due to large reserves of dormant seed in the soil seed bank and fire stimulates germination. All of these shrub species withstand browsing and grazing to various degrees. Saskatoon serviceberry and common snowberry withstand browsing well and resprout after disturbance. Chokecherry has moderate browse tolerance, whereas Wood's rose has strong grazing tolerance. Redstem ceonothus is an important browse to Rocky Mountain elk, deer and snowshoe hares in winter. Rocky Mountain maple is an important browse species for domestic livestock and wildlife especially deer, moose, elk and bighorn sheep.

All of these shrub species are common after disturbance. Wood's rose is an aggressive pioneer. Chokecherry grows widely and at every sere of succession. Common snowberry establishes early after disturbance and coexists with later arrival species.
Of these shrub species, all prefer open sun to moderate shade. Chokecherry is tolerant of heavier shade. All of these shrubs prefer well drained soils. Chokecherry and Wood's rose are particularly intolerant of poor drainage conditions or high water tables. Chokecherry and Wood's rose are tolerant of moderate acid, alkali and weak or non-saline soils. Common snowberry is only moderately tolerant and serviceberry is weakly tolerant of those soil conditions. Saskatoon serviceberry (Agee, 1987) and chokecherry are adapted to grow on most soil textures (except for heavy clay for chokecherry). Common snowberry is best adapted to medium to fine textured soils and Wood's rose to loamy to sandy soils. Redstem ceonothus is shade intolerant and will disappear if tree canopy cover increases.
Hansen et. al (1995) found that Saskatoon serviceberry, common snowberry and shiny leaf spirea were fair to good forage palatability for sheep, cattle and horses. Saskatoon serviceberry was found to be good palatability for sheep. These species were considered medium in energy and protein values in fall and winter seasons. All were considered fair to poor value for elk, whitetail and mule deer for thermal or feeding cover value, but good value for bird species. Serviceberry was considered good food value for whitetail and mule deer and antelope, but fair for bird species. Common snowberry and shiny leaf spirea were fair food values for elk, deer, antelope and bird species.

COMMUNITY PHASE 1.1:
This community nearly always occurs as a mixture of tall, medium and short statured shrubs with a diverse understory of grass and forb species. Sometimes one shrub species will have higher cover, but there will always be more than one species of shrub present at a site. The typical tall shrub species are over 2 m tall and can include: Sitka alder (*Alnus viridis*), red elderberry (*Sambucus racemosa*), Rocky mountain maple (*Acer glabrum*), American red raspberry (*Rubus idaeus*), Saskatoon serviceberry (*Amelanchier alnifolia*) and willow species (Salix species). The next layer of medium statured shrubs ranging from 0.5-2 m tall can include: thimbleberry (*Rubus parviflorus*), snowbrush ceanothus (*Ceanothus velutinus*), redstem snowbrush (*Ceanothus sanguineus*), thinleaf huckleberry (*Vaccinium membranaceum*), Scouler's willow (Salix scouleri), common snowberry (*Symphoricarpos albus*) and oceanspray (*Holodiscus discolor*). The lowest statured shrub layer is less than 0.5 m tall and can include: white spirea (Spirea betulifolia), grouse whortleberry (*Vaccinium scoparium*), rose species (Rosa species) and creeping barberry (*Mahonia repens*).

Community Phase Pathway 1.1.A: This pathway represents a disturbance such as fire or slope movement or tear and subsequent erosion that lowers the canopy cover of this community of shrubs, grasses and forbs.

Community Phase Pathway 1.1B: this pathway represents time after disturbance.

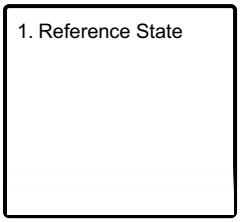
DRIER SITE SUMMARY:
Summarization of the canopy cover point data for community phase 1.1 including the constancy and average canopy cover per species at slightly drier sites, 6 NRCS (original NPS data included with revisit vegetation data) sites all located west of the continental divide. Species with high constancy occur often, those with low constancy are rare. The average canopy cover is the average of the values for which it occurred. Therefore, species that are rare (only occurred once) show the canopy cover value for the one time it was found. Minimum and maximum canopy cover show the range of cover that the species was found. Species that occur frequently and in moderate to high canopy cover include: yarrow, serviceberry, creeping barberry, common snowberry, thimbleberry, Geyer's sedge and white spirea. Infrequent but in moderate canopy cover species include Rocky mountain maple, snowbush ceanothus, bluebunch wheatgrass, poa species and oceanspray. These sites are distinguished from the slightly moister sites by the lack of Sitka alder, but they have the following species in common: serviceberry, common snowberry, thimbleberry and Rocky mountain maple. There are some higher elevation sites included, although these are rare for this ecological site and transitional to the Solifluction (tundra) ecological site and have the following representative species: Rainier pleated gentian, pink mountainheath, and arctic willow. There are some wetter sites included too (though rare and not dominated by Sitka alder like "true" wetter sites) that have the following species: Pacific oakfern, common ladyfern, variegated scouringrush, and elephanthead lousewort.

MOISTER SITE SUMMARY:
Summarization of canopy cover point data for community phase 1.1 including the constancy and average canopy cover per species at slightly moister sites, 7 NRCS sites all located east of the continental divide. Species with high constancy occur often, those with low constancy are rare. The average canopy cover is the average of the values for which it occurred. Therefore, species that are rare (only occurred once) show the canopy cover value for the one

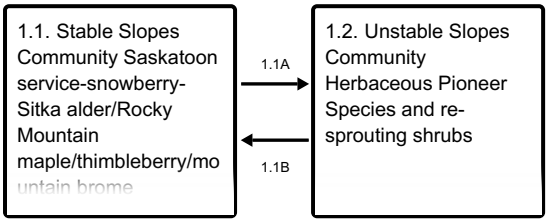
time it was found. Minimum and maximum canopy cover show the range of cover that the species was found. These sites are distinguished from the slightly drier sites by the frequent occurrence and high canopy cover of Sitka alder, but they have the following species in common: serviceberry, common snowberry, thimbleberry and Rocky mountain maple.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference State

This site is defined by the stabilizing nature of the root system of the shrub species and their resprouting capabilities after fire disturbance. The reference community is defined as a mixed composition of serviceberry, snowberry, Sitka alder, Rocky mountain maple and other shrub species. Wood's rose and chokecherry should appear in low to moderate cover values. The understory is diverse and can range from drier site species with Oregon creeping grape, Geyer's sedge and bluebunch wheatgrass occurring frequently and in high cover to moister site species including thimbleberry and mountain brome. Though monocultures of one shrub do exist, i.e. Ceonothus after a severe fire, the core concept for this ecological site is a mix of shrubs at all canopy cover layers. Scattered trees can be present including: subalpine fir (Abies lasciocarpa), lodgepole pine (*Pinus contorta*), Engelmann spruce (*Picea engelmannii*), ponderosa pine (*Pinus ponderosa*), quaking aspen (*Populus tremuloides*), and Douglas fir (*Pseudotsuga menziesii*). Other shrub species present are redstem ceanothus (*Ceanothus sanguineus*), snowbrush ceanothus (*Ceanothus velutinus*), Rocky mountain maple (*Acer glabrum*), thimbleberry (*Rubus parviflorus*), oceanspray (*Holodiscus discolor*), American red raspberry (*Rubus idaeus*), Scouler's willow (salix scouleriana), white spirea (*Spiraea betulifolia*), twinberry honeysuckle (*Lonicera involucrata*), alderleaf buchthorn (*Rhamnus alnifolia*), thinleaf huckleberry (*Vaccinium membranaceum*) and grouse whortleberry (*Vaccinium scoparium*). Forb species are diverse and occur in low cover individually and include: common yarrow (*Achillea millefolium*), woodland strawberry (*Fragaria vesca*), Virginia strawberry (fragaria virginiana), nineleaf biscuitroot (*Lomatium triternatum*), yellow penstemon (*Penstemon confertus*) and common cowparsnip (*Heracleum maximum*). These shrublands are considered to be self-sustaining and not seral to conifer species. The extremely thick shrub cover precludes invasion by conifer species to any large extent. The disturbance factors for this ecological site are fire, minor avalanche activity, erosional tears, grazing, browsing, animal burrows, animal trails, bear and badger digging and tent caterpillars. The majority of the shrub species occurring in this ecological site respond well to these disturbances through resprouting or extensive seed banking. Ceanothus species can dominate a site after severe fire to the exclusion of other shrub species. This ecological site is differentiated from its associated site Montane Meadows which is a grassland dominated by rough fescue (*Festuca campestris*) and Idaho fescue though it may have low cover of the following shrubs: Saskatoon serviceberry (*Amelanchier alnifolia*), shrubby cinquefoil (*Dasiphora fruticosa*), thimbleberry and kinnickinick (*Arctostaphylos uva-ursi*).

Dominant plant species

- Saskatoon serviceberry (*Amelanchier alnifolia*), shrub
- common snowberry (*Symphoricarpos albus*), shrub
- chokecherry (*Prunus virginiana*), shrub
- ceanothus (*Ceanothus*), shrub

- Rocky Mountain maple (*Acer glabrum*), shrub

Community 1.1
Stable Slopes Community Saskatoon service-snowberry-Sitka alder/Rocky Mountain maple/thimbleberry/mountain brome

Figure 12. Close up shot of this ecological site, moister version.

Figure 13. Landscape view of a drier version of this ecological site with moderate statured shrubs with high canopy cover late in the fall season.

Figure 14. Close up view from within this ecological site showing density of vegetation at a moister site location.

This community nearly always occurs as a mixture of tall, medium and short statured shrubs with a diverse understory of grass and forb species. Sometimes one shrub species will have higher cover, but there will always be more than one species of shrub present at a site. The typical tall shrub species are over 2 m tall and can include: Sitka alder (*Alnus viridis*), red elderberry (*Sambucus racemosa*), Rocky mountain maple (*Acer glabrum*), American red raspberry (*Rubus idaeus*), Saskatoon serviceberry (*Amelanchier alnifolia*) and willow species (Salix species).

The next layer of medium statured shrubs ranging from 0.5-2 m tall can include: thimbleberry (*Rubus parviflorus*), snowbrush ceanothus (*Ceanothus velutinus*), redstem snowbrush (*Ceanothus sanguineus*), thinleaf huckleberry (*Vaccinium membranaceum*), Scouler's willow (Salix scouleri), common snowberry (*Symphoricarpos albus*) and oceanspray (*Holodiscus discolor*). The lowest statured shrub layer is less than 0.5 m tall and can include: white spirea (Spirea betulifolia), grouse whortleberry (*Vaccinium scoparium*), rose species (Rosa species) and creeping barberry (*Mahonia repens*). This community has very high foliar cover (average 92%) and the ground cover is predominantly litter (73%) with soil underneath and moderate gravel cover (24%) and low bare soil (2%).

Community 1.2
Unstable Slopes Community Herbaceous Pioneer Species and re-sprouting shrubs

Pathway 1.1A
Community 1.1 to 1.2

This pathway represents a disturbance such as fire or slope movement or tear and subsequent erosion that lowers the canopy cover of this community of shrubs, grasses and forbs.

Pathway 1.1B
Community 1.2 to 1.1

This pathway represents time after disturbance.

Additional community tables

Table 5. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
bluegrass	POA	*Poa*	–	–	37.5
Geyer's sedge	CAGE2	*Carex geyeri*	–	–	2–30
bluebunch wheatgrass	PSSP6	*Pseudoroegneria spicata*	–	–	13–30
Idaho fescue	FEID	*Festuca idahoensis*	–	–	23
Canada bluegrass	POCO	*Poa compressa*	–	–	4
timothy	PHPR3	*Phleum pratense*	–	–	3
smooth brome	BRIN2	*Bromus inermis*	–	–	3
northwestern sedge	CACO11	*Carex concinnoides*	–	–	0.5
Forb/Herb					
common cowparsnip	HEMA80	*Heracleum maximum*	–	–	3–50
alpine bistort	POVI3	*Polygonum viviparum*	–	–	40
wild mint	MEAR4	*Mentha arvensis*	–	–	20
white spirea	SPBE2	*Spiraea betulifolia*	–	–	0.5–15
meadow deathcamas	ZIVE	*Zigadenus venenosus*	–	–	4
spreading dogbane	APAN2	*Apocynum androsaemifolium*	–	–	3–4
common yarrow	ACMI2	*Achillea millefolium*	–	–	0.5–3
milkvetch	ASTRA	*Astragalus*	–	–	3
woodland strawberry	FRVE	*Fragaria vesca*	–	–	0.5–3
Virginia strawberry	FRVI	*Fragaria virginiana*	–	–	0.5–3
northern bedstraw	GABO2	*Galium boreale*	–	–	3
hawksbeard	CREPI	*Crepis*	–	–	0.5–3
fireweed	CHAN9	*Chamerion angustifolium*	–	–	0.5–3
Canada thistle	CIAR4	*Cirsium arvense*			3

Canada thistle	CIAR4	*Cirsium arvense*	–	–	3
bride's bonnet	CLUN2	*Clintonia uniflora*	–	–	3
roundleaf alumroot	HECY2	*Heuchera cylindrica*	–	–	3
nineleaf biscuitroot	LOTR2	*Lomatium triternatum*	–	–	0.5–3
western showy aster	EUCO36	*Eurybia conspicua*	–	–	3
varileaf cinquefoil	PODI2	*Potentilla diversifolia*	–	–	3
American bistort	POBI6	*Polygonum bistortoides*	–	–	3
darkwoods violet	VIOR	*Viola orbiculata*	–	–	3
clover	TRIFO	*Trifolium*	–	–	3
threeleaf foamflower	TITR	*Tiarella trifoliata*	–	–	3
wintergreen	PYROL	*Pyrola*	–	–	3
yellow penstemon	PECO6	*Penstemon confertus*	–	–	0.5–2
silky lupine	LUSE4	*Lupinus sericeus*	–	–	1–2
arrowleaf balsamroot	BASA3	*Balsamorhiza sagittata*	–	–	1–2
white penstemon	PEAL2	*Penstemon albidus*	–	–	1
spearleaf stonecrop	SELA	*Sedum lanceolatum*	–	–	0.5–1
goldenrod	SOLID	*Solidago*	–	–	0.5
yellow salsify	TRDU	*Tragopogon dubius*	–	–	0.5
American alpine speedwell	VEWO2	*Veronica wormskjoldii*	–	–	0.5
violet	VIOLA	*Viola*	–	–	0.5
mountain deathcamas	ZIEL2	*Zigadenus elegans*	–	–	0.5
smooth blue aster	SYLA3	*Symphyotrichum laeve*	–	–	0.5
silky phacelia	PHSE	*Phacelia sericea*	–	–	0.5
elephanthead lousewort	PEGR2	*Pedicularis groenlandica*	–	–	0.5
beardtongue	PENST	*Penstemon*	–	–	0.5
sticky cinquefoil	POGL9	*Potentilla glandulosa*	–	–	0.5
fringed grass of Parnassus	PAFI3	*Parnassia fimbriata*	–	–	0.5
nodding microseris	MINU	*Microseris nutans*	–	–	0.5
bog orchid	HABEN	*Habenaria*	–	–	0.5
yellow avalanche-lily	ERGR9	*Erythronium grandiflorum*	–	–	0.5
subalpine fleabane	ERPE3	*Erigeron peregrinus*	–	–	0.5
aspen fleabane	ERSP4	*Erigeron speciosus*	–	–	0.5
common St. Johnswort	HYPE	*Hypericum perforatum*	–	–	0.5
Scouler's St. Johnswort	HYSCS2	*Hypericum scouleri ssp. scouleri*	–	–	0.5
dotted blazing star	LIPU	*Liatris punctata*	–	–	0.5
fernleaf biscuitroot	LODI	*Lomatium dissectum*	–	–	0.5
pointedtip mariposa lily	CAAP	*Calochortus apiculatus*	–	–	0.5
nodding onion	ALCE2	*Allium cernuum*	–	–	0.5
heartleaf arnica	ARCO9	*Arnica cordifolia*	–	–	0.5
rayless arnica	ARDI7	*Arnica ×diversifolia*	–	–	0.5
Holboell's rockcress	ARHO2	*Arabis holboellii*	–	–	0.5
maiden blue eyed Mary	COPA3	*Collinsia parviflora*	–	–	0.5
giant red Indian paintbrush	CAMI12	*Castilleja miniata*	–	–	0.5
bluebell bellflower	CARO2	*Campanula rotundifolia*	–	–	0.5

fragrant bedstraw	GATR3	*Galium triflorum*	–	–	0.5
Rainier pleated gentian	GECA	*Gentiana calycosa*	–	–	0.5
Fern/fern ally					
Pacific oakfern	GYDI2	*Gymnocarpium disjunctum*	–	–	3
horsetail	EQUIS	*Equisetum*	–	–	3
common ladyfern	ATFI	*Athyrium filix-femina*	–	–	3
variegated scouringrush	EQVA	*Equisetum variegatum*	–	–	0.5
American rockbrake	CRAC3	*Cryptogramma acrostichoides*	–	–	0.5
Shrub/Subshrub					
thimbleberry	RUPA	*Rubus parviflorus*	–	–	3–62.5
arctic willow	SAAR27	*Salix arctica*	–	–	40
common snowberry	SYAL	*Symphoricarpos albus*	–	–	15–37.5
Saskatoon serviceberry	AMAL2	*Amelanchier alnifolia*	–	–	0.5–37.5
redstem ceanothus	CESA	*Ceanothus sanguineus*	–	–	2–15
creeping barberry	MARE11	*Mahonia repens*	–	–	0.5–15
oceanspray	HODI	*Holodiscus discolor*	–	–	2–15
chokecherry	PRVI	*Prunus virginiana*	–	–	2–7
alderleaf buckthorn	RHAL	*Rhamnus alnifolia*	–	–	3
rose	ROSA5	*Rosa*	–	–	3
Woods' rose	ROWO	*Rosa woodsii*	–	–	0.5–3
American red raspberry	RUID	*Rubus idaeus*	–	–	3
willow	SALIX	*Salix*	–	–	3
red elderberry	SARA2	*Sambucus racemosa*	–	–	3
thinleaf huckleberry	VAME	*Vaccinium membranaceum*	–	–	3
grouse whortleberry	VASC	*Vaccinium scoparium*	–	–	3
twinberry honeysuckle	LOIN5	*Lonicera involucrata*	–	–	3
snowbrush ceanothus	CEVE	*Ceanothus velutinus*	–	–	3
black hawthorn	CRDO2	*Crataegus douglasii*	–	–	3
Scouler's willow	SASC	*Salix scouleriana*	–	–	2
Greene's mountain ash	SOSC2	*Sorbus scopulina*	–	–	0.5
undergreen willow	SACO2	*Salix commutata*	–	–	0.5
shrubby cinquefoil	DAFR6	*Dasiphora fruticosa*	–	–	0.5
rosy pussytoes	ANRO2	*Antennaria rosea*	–	–	0.5
pink mountainheath	PHEM	*Phyllodoce empetriformis*	–	–	0.5
Tree					
ponderosa pine	PIPO	*Pinus ponderosa*	–	0–11.9	0.5–7
black cottonwood	POBAT	*Populus balsamifera ssp. trichocarpa*	–	0–11.9	3
Engelmann spruce	PIEN	*Picea engelmannii*	–	0–11.9	0.5–3
subalpine fir	ABLA	*Abies lasiocarpa*	–	0–11.9	0.5–3
Rocky Mountain maple	ACGL	*Acer glabrum*	–	–	0.5–3
Douglas-fir	PSME	*Pseudotsuga menziesii*	–	0–11.9	3
lodgepole pine	PICO	*Pinus contorta*	–	0–11.9	0.5
quaking aspen	POTR5	*Populus tremuloides*	–	–	0.5

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Approval

Kirt Walstad, 9/08/2023

Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	
Contact for lead author	
Date	12/18/2020
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

---

5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

---

7. **Amount of litter movement (describe size and distance expected to travel):**

---

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

---

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

---

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

---

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**