

Ecological site R043AP810MT Upland Grassland Group

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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 overrode 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 Dystrocrypts, Eutrocrypts, 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.

Ecological site concept

- Site does not receive additional water
- This site is generally more productive and has greater resistance and resilience to disturbance than the similar site, Shallow Grassland.
- Dominant Cover: Grassland; minimal shrubs including rose species, shrubby potentilla and common snowberry
- The production at this site is moderate to high, averaging 1378 dry pounds per acre (400-2000).
- Soils are
 - o Generally not saline or saline-sodic or limy (limited extent)
 - o Moderately deep, deep or very deep
 - o Not ashy or medial textural family
 - o Typically less than 5% stone and boulder cover (<15% max)
 - Soil surface texture gravelly loam, cobbly loam or silt loam in surface mineral 4"
 - Parent material is alluvium, colluvium, glacial till
 - Drainage class is well to excessively well drained; no flooding frequency
 - Site Landform: alluvial fans, hills, moraines, stream terraces
 - Moisture Regime: xeric
 - Temperature Regime: frigid
 - Elevation Range: 2700-4500 ft
 - Slope: 8-30%

Associated sites

R043AP807MT	Subirrigated Grassland Group R043AP810MT resides in landforms alluvial fans, hills, moraines, stream terraces. These sites are associated in that they reside within the larger landforms of alluvial fans and stream terraces. Site R043AP807MT are depressions, closed depressions, fens within fans and terraces. Both sites are found in elevations ranging 3300 to 4100 feet on low slopes.
R043AP805MT	Shallow Grassland Group R043AP810MT resides in landforms alluvial fans, hills, moraines, stream terraces. These sites are associated in that they both reside in hills at elevation range of 2700 to 5000 feet on moderate slopes of 10 to 30 percent. The reference community for both sites has the perennial bunchgrasses and well drained loamy soils, though 805 has shallow depth.

Similar sites

R043AP805MT	Shallow Grassland Group These sites are similar in that they both reside in hills at elevation range of 2700 to 5000 feet on moderate slopes of 10 to 30 percent. The reference community for both sites has the perennial bunchgrasses and well drained loamy soils, though 805 has shallow depth.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Symphoricarpos albus</i> (2) <i>Dasiphora fruticosa</i>

Herbaceous	(1) <i>Festuca campestris</i> (2) <i>Festuca idahoensis</i>
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Physiographic features

- Site Landform: alluvial fans, hills, moraines, stream terraces
- Elevation Range: 2700-4500 ft
- Slope: 8-30%

Table 2. Representative physiographic features

Landforms	(1) Mountains > Moraine (2) Valley > Stream terrace (3) Mountains > Hill (4) Valley > Alluvial fan
Elevation	823–1,372 m
Slope	8–30%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

- SOIL Moisture Regime: xeric
- SOIL Temperature Regime: frigid

Table 3. Representative climatic features

Frost-free period (characteristic range)	16-85 days
Freeze-free period (characteristic range)	75-130 days
Precipitation total (characteristic range)	483-635 mm
Frost-free period (actual range)	1-87 days
Freeze-free period (actual range)	46-132 days
Precipitation total (actual range)	457-787 mm
Frost-free period (average)	57 days
Freeze-free period (average)	106 days
Precipitation total (average)	584 mm

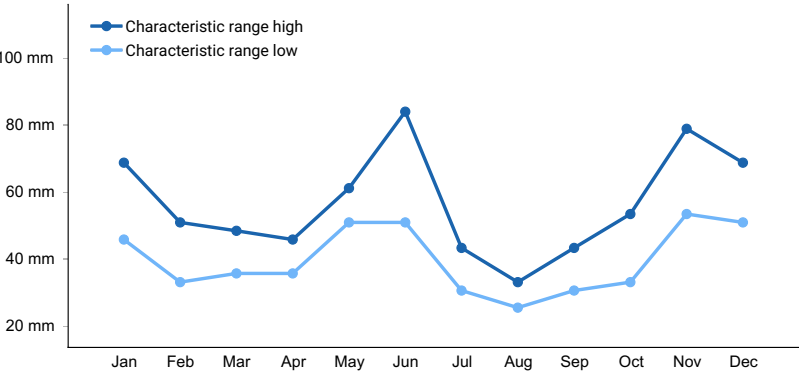


Figure 1. Monthly precipitation range

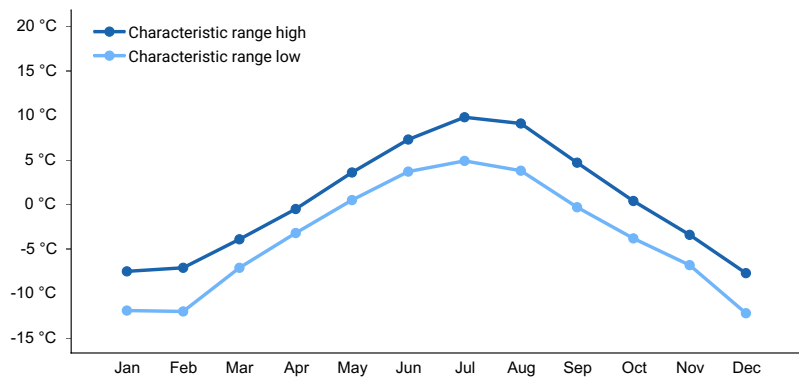


Figure 2. Monthly minimum temperature range

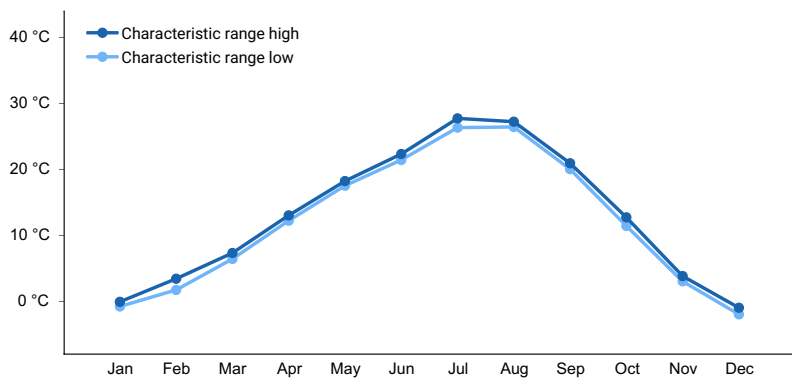


Figure 3. Monthly maximum temperature range

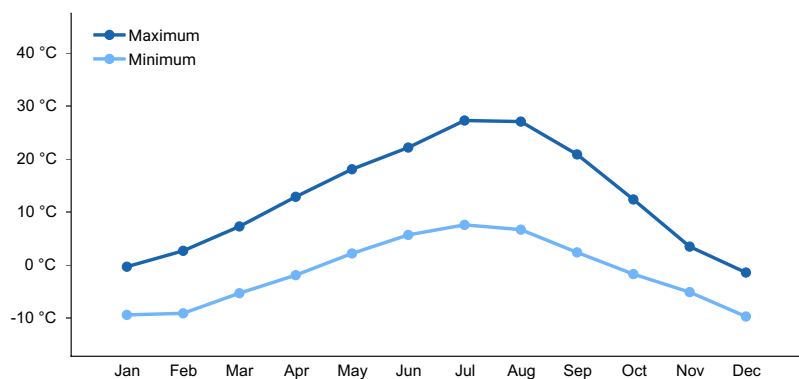


Figure 4. Monthly average minimum and maximum temperature

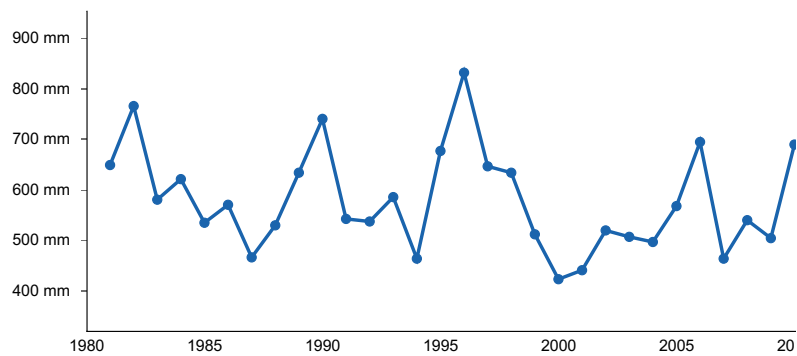


Figure 5. Annual precipitation pattern

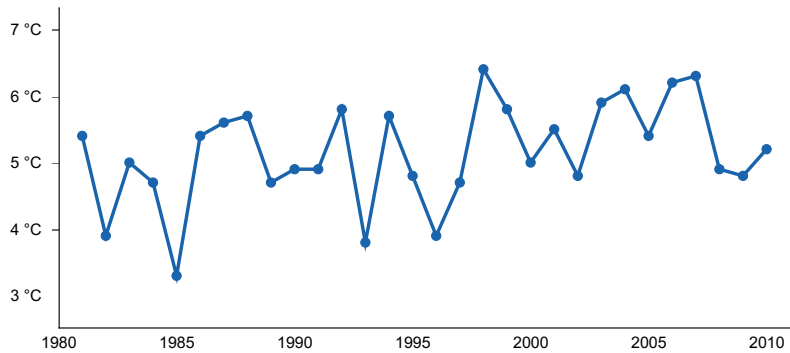


Figure 6. Annual average temperature pattern

Climate stations used

- (1) YAAK 9NNE [USC00249187], Troy, MT
- (2) POLEBRIDGE 1 N [USC00246618], Essex, MT
- (3) POLEBRIDGE [USC00246615], Essex, MT
- (4) WEST GLACIER [USC00248809], Kalispell, MT
- (5) HUNGRY HORSE DAM [USC00244328], Kalispell, MT
- (6) WHITEFISH [USC00248902], Whitefish, MT
- (7) LINDBERGH LAKE [USC00245043], Seeley Lake, MT
- (8) LIBBY 32 SSE [USC00245020], Libby, MT
- (9) LIBBY 1 NE RS [USC00245015], Libby, MT
- (10) PLEASANT VALLEY 5 SE [USC00246580], Marion, MT

Influencing water features

- Site does not receive additional water

NO WATER FEATURES

Wetland description

DOES NOT APPLY

Soil features

- Soils are
 - o Generally not saline or saline-sodic or limy (limited extent)
 - o Moderately deep, deep or very deep
 - o Not ashy or medial textural family
 - o Typically less than 5% stone and boulder cover (<15% max)
- Soil surface texture gravelly loam, cobbly loam or silt loam in surface mineral 4"
- Parent material is alluvium, colluvium, glacial till
- Drainage class is well to excessively well drained; no flooding frequency

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Colluvium (3) Till
Surface texture	(1) Gravelly loam (2) Cobbly loam (3) Cobbly silt loam
Drainage class	Well drained to excessively drained
Soil depth	51–254 cm

Ecological dynamics

1.1 Midstatured bunchgrasses dominant (bluebunch, rough fescue, Idaho fescue, green needlegrass, Richardson's needlegrass, Columbia needlegrass), limited needle and thread, Sandberg bluegrass, prairie junegrass, low but diverse forb component including blanketflower, yellow penstemon, yarrow, old man's whiskers, western stonecrop, rosy pussytoes). Shrubs are a relatively small component and include Wood's rose, common snowberry and lesser prairie sagebrush.

1.1a extended drought, improper grazing, climate change, catastrophic fire (limited on this site)

1.2 Midstatured bunchgrasses subdominant to increaser bunchgrasses such as needle-and-thread or Idaho fescue. Shrubs increasing, clubmoss possible (limited extent), mat forming forbs increasing

1.2a proper grazing management, favorable growing conditions, time

T1A poor post settlement grazing (late 1800's), drought with improper grazing, multiple spring grazing, fire suppression

T1B sodbusting, introduction of tame pasture species and other invasive plants, overgrazing, drought, heavy human disturbance, extreme fire (multiple years or very intense)

T1C poor post settlement grazing (late 1800's), drought with improper grazing, multiple spring grazing and/or long term overgrazing, fire suppression

T3A sodbusting, invasive plants, overgrazing, extended drought, adjacent to construction or disturbance event

2.1 Mixed grass dominated site (needle-and-thread or Idaho fescue), midstatured bunchgrasses existent under shrub canopy, possible conifer encroachment, forbs, mat forming subshrubs and shrubs increase

2.1a improper grazing management, drought, fire, climate change

2.2 Needle-and-thread or Idaho fescue losing dominance to Sandberg bluegrass and prairie Junegrass. Decreaser bunchgrasses very rare and limited under shrub canopy. Broom snakeweed and Fringed sagebrush beginning to replace shrub component

2.2a proper grazing management, time, Integrated Pest Management, brush management

3.1 Shortgrass State lacks midstatured bunchgrasses. Sandberg bluegrass and prairie Junegrass dominant grasses, increaser shrubs nearly replace larger shrub species. Remaining larger shrub species heavily hedged.

T2A overgrazing, introduction of weeds, drought, heavy human disturbance

R2A fire, range seeding, timely moisture, proper grazing management, IPM

R3B Possibly not feasible, range seeding, time, proper grazing management, IPM

T2B sodbusting, introduction of tame pasture species and other invasive plants, overgrazing, extended drought, adjacent to construction or disturbance event, extreme fire (multiple years or very intense)

4.1 Invaded State may resemble reference however contains noxious or invasive weeds such as cheatgrass or knapweed. Conifer encroachment common.

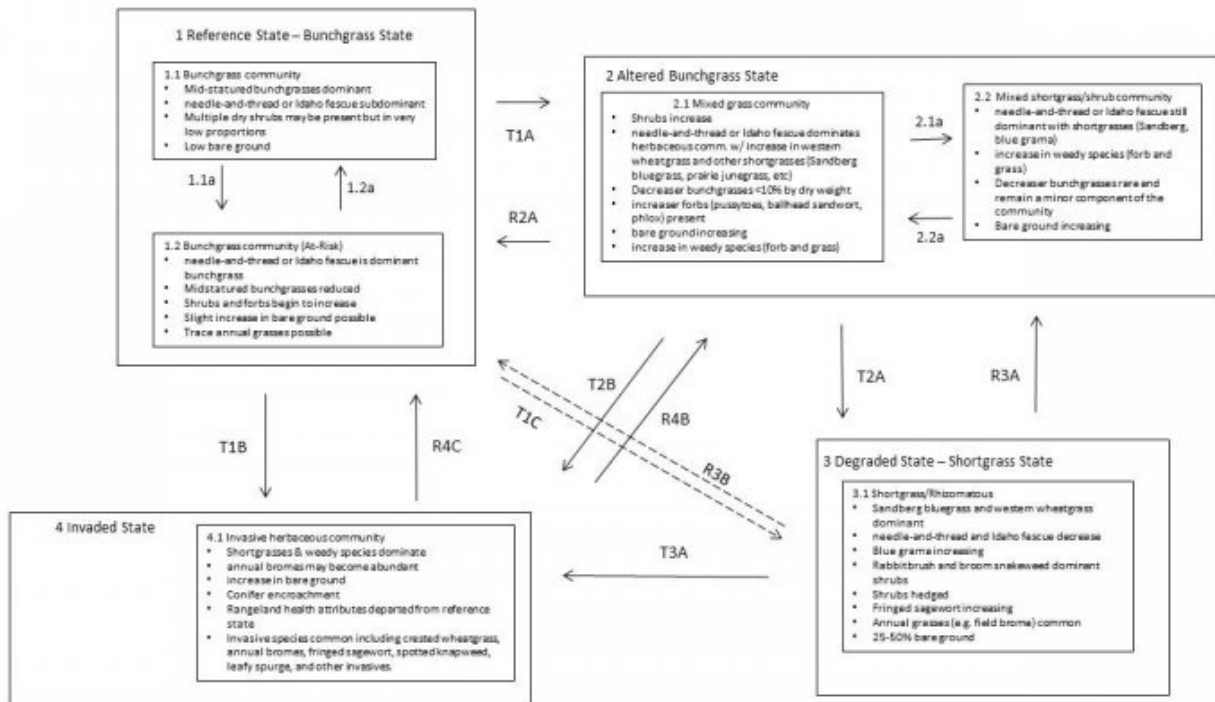
R3A range seeding, time, proper grazing management, IPM

R4A IPM, timely moisture, grazing management, brush management, range seeding

R4B IPM, range seeding, timely moisture, grazing management, brush management, range seeding

State and transition model

Upland Grassland R043AP810MT



Animal community

Livestock

This community generally occurs where proper grazing management practices have been implemented over a long period, which provides adequate growing-season deferment to allow establishment of taller grass propagules and recovery of vigor in stressed plants. This community is generally resistant to change with proper grazing management and near normal precipitation. However, rough fescue and bluebunch wheatgrass lack resistance to grazing during the spring growing season. Subdominant species, such as Idaho fescue and needleandthread, tolerate higher grazing pressure and may increase in cover under prolonged drought conditions. This increase drives the community shift to the Mixed Bunchgrass Plant Community (1.2). It is also moderately resilient, as it will return to dynamic equilibrium (1.2A) following a relatively short period of stress, such as drought or short-term overgrazing, provided the return of favorable or normal growing conditions occurs along with implementation of proper grazing management. This equilibrium will occur if canopy cover did not fall below 50%, and rough fescue did not fall below 10% of species composition.

Rough fescue and bluebunch wheatgrass lack resistance to grazing during the critical growing period of spring. These bunchgrass species may decline in vigor and production if grazing in the spring more than one year in three (Mengli et al. 2005, McLean and Wikeem 1985, Wilson et al 1960).

Recreational uses

HIKING, BIKING, PHOTOGRAPHY

Wood products

NONE

Other information

This grassland is threatened by various factors including farmland conversion, noxious species invasion, fire suppression, heavy and/or improper grazing and oil and gas development.

Other references

Rocky Mountain Lower Montane, Foothill, and Valley Grassland — Northern Rocky Mountain Lower Montane, Foothill and Valley Grassland. Montana Field Guide. Montana Natural Heritage Program Retrieved on April 11, 2019, from http://FieldGuide.mt.gov/displayES_Detail.aspx?ES=7112

Contributors

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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:**

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:**
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17. **Perennial plant reproductive capability:**
