Ecological site R237XY236AK
Western Alaska Maritime Graminoid Peat Plains

Last updated: 7/23/2020
Accessed: 05/11/2025

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): 237X–Ahklun Mountains

The Ahklun Mountains Major Land Resource Area (MLRA 237) is in western Alaska (fig. 1). This MLRA covers approximately 14,555 square miles, and it includes the mountains, hills, and valleys of the Kilbuck Mountains in the north and the Ahklun Mountains in the south. Except for the Kilbuck Mountains and the highest ridges of the Ahklun Mountains, the MLRA was extensively glaciated during the Pleistocene (Kautz et al., 2004). Today, a few small glaciers persist in mountainous cirques (Gallant et al., 1995). The present-day landscape and landforms reflect this glacial history; glacial moraines and glacial drift cover much of the area (USDA-NRCS, 2006). The landscape of the MLRA is primarily defined by low, steep, rugged mountains cut by narrow-to-broad valleys. Flood plains and terraces of varying sizes are common at the lower elevations in the valley bottoms. Glacially carved valleys host many lakes. Togiak Lake is one of the largest lakes in the region. It is 13 miles long and about 9,500 acres in size. Major rivers include the Goodnews, Togiak, Kanektok, Osviak, Eek, and Arolik Rivers. Where the Goodnews and Togiak Rivers reach the coast, the nearly level to rolling deltas support numerous small lakes.

This MLRA has two distinct climatic zones: subarctic continental and maritime continental (fig. 2). The high-elevation areas are in the subarctic continental zone. The mean annual precipitation is more than 75 inches, and the mean annual air temperature is below about 27 degrees F (-3 degrees C) in extreme locations. The warmer, drier areas at the lower elevations are in the maritime continental zone. The mean annual precipitation is 20 to 50 inches, and the mean annual air temperature is about 30 to 32 degrees F (-0.2 to 1.2 degrees C) (PRISM). This climatic zone is influenced by both maritime and continental factors. The temperatures in summer are moderated by the open waters of the Bering Sea, and the temperatures in winter are more continental due to the presence of ice in the sea (Western Regional Climate Center, 2017). The seasonal ice reaches its southernmost extent off the coast of Alaska in Bristol Bay (Alaska Climate Research Center, 2017). The western coast of Alaska is also influenced by high winds from strong storms and airmasses in the Interior Region of Alaska (Hartmann, 2002).

The Ahklun Mountains MLRA is principally undeveloped wilderness. Federally managed lands include the Togiak and Alaska Maritime National Wildlife Refuges. The MLRA is sparsely populated, but it has several communities, including Togiak, Manokotak, Twin Hills, and Goodnews Bay. Togiak is the largest village. It has a population of approximately 855, most of which are Yup’ik Alaska Natives (U.S. Census Bureau, 2016). Major land uses include subsistence activities (fishing, hunting, and gathering) and wildlife recreation (USDA-NRCS, 2006; Kautz et al., 2004).

Ecological site concept

Ecological site R237XY236AK is on mineral tidal flats and shore complexes intersected by tidal channels or sloughs. Changes in soil moisture result in one post-disturbance community phase. No alternate states are in this ecological site.

The reference plant community is a mesic graminoid herbaceous grassland (Viereck et al., 1992) that consists of a mix of facultative or obligate graminoids and forbs. Common graminoids include circumpolar reedgrass

(Calamagrostis deschampsioides), bluejoint (Calamagrostis canadensis), Lyngbye's sedge (*Carex lyngbyei*), and variegated sedge (Carex stylosa). Common forbs include purple marshlocks (*Comarum palustre*), silverweed cinquefoil (*Argentina anserina*), and marsh arrowgrass (Triglochin palustris).

Associated sites

R237XY208AK	**Western Alaska Maritime Scrubland Peat Depressions** Sites R237XY236AK, R237XY208AK, and R237XY223AK are on shore complexes. These ecological sites are differentiated by one or more criteria, including landform, landform position, associated soils, associated disturbance regimes, and the type and amount of plants. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.
R237XY223AK	**Western Alaska Maritime Graminoid Gravelly Plains, Berms** Sites R237XY236AK, R237XY208AK, and R237XY223AK are on shore complexes. These ecological sites are differentiated by one or more criteria, including landform, landform position, associated soils, associated disturbance regimes, and the type and amount of plants. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut.

Similar sites

R237XY208AK	**Western Alaska Maritime Scrubland Peat Depressions** Ecological site R237XY208AK supports an early ponding community phase of hydrophilic graminoids and shrubs that are similar to species in the plant communities of site R237XY236AK. Both ecological sites support hydrophilic plant communities, but R237XY208AK typically is not influenced by tides. Differences in landform create unique early ponding and reference plant communities that require use of separate ecological sites.
R237XY223AK	**Western Alaska Maritime Graminoid Gravelly Plains, Berms** Site R237XY223AK is a coastal site that supports a grassland reference plant community. It is on sandy and gravelly beach berms. It supports a distinct reference plant community that includes American dunegrass (Leymus mollis) and is unlike either of the plant communities in site R237XY236AK.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Calamagrostis* (2) *Carex*

Physiographic features

Site characteristics specifically relate to the reference plant community phase. Each ecological site has a specific set of site characteristics and disturbance dynamics that results in a unique plant community composition, structure, and function. Site characteristics (climate, geology, topography, and soil characteristics) are dynamic across a landscape. Subtle changes in site characteristics can result in a different plant community phase or ecological site. Definitions of site characteristics are provided in the United States Department of Agriculture Handbook 296 (USDA-NRCS, 2006), Geomorphic Description System (Schoeneberger and Wysocki, 2012), Field Book for Describing and Sampling Soils (Schoeneberger et al., 2012), and Soil Survey Manual (Soil Science Division Staff, 2017).

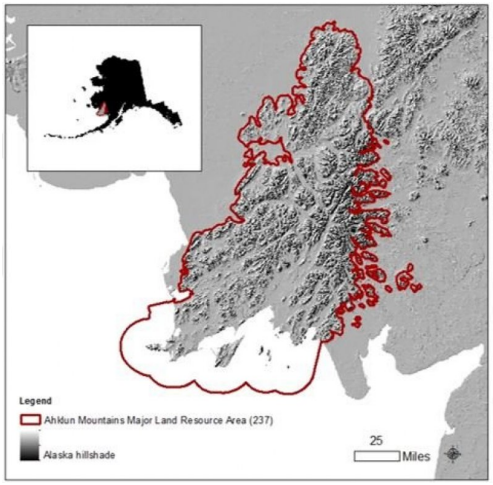

Figure 1. The Ahklun Mountains area (MLRA 237) is in western Alaska.

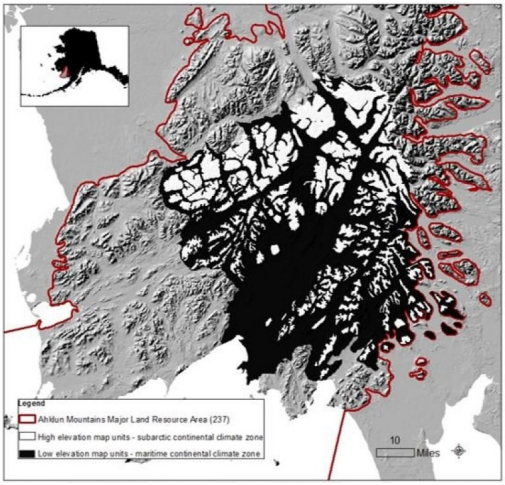

Figure 2. High-elevation and low-elevation map units in the area, which illustrate the primary climatic influence.

Table 2. Representative physiographic features

Geomorphic position, flats	(1) Talf
Slope shape across	(1) Linear
Slope shape up-down	(1) Linear (2) Concave
Landforms	(1) Coastal plain > Tidal flat
Flooding duration	Extremely brief (0.1 to 4 hours)
Flooding frequency	Very frequent
Ponding frequency	None
Elevation	0–50 ft
Slope	0–1%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Climate of land resource region (LLR): Maritime continental (Western Regional Climate Center, 2017); short, warm summers and long, cold winters (USDA-NRCS, 2006)

Climate of major land resource area (MLRA): Maritime continental in the lowlands and subarctic continental at higher elevations. The mean annual precipitation is 20 to 30 inches in the lowlands, and it increases to more than 45 inches at the higher elevations. The mean annual air temperature along the coast is about 34 degrees F (1 degree C) (PRISM, 2014). Strong winds are common throughout the year.

Table 3. Representative climatic features

Frost-free period (characteristic range)	85-140 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	

Influencing water features

Soil features

The Anchor soil is correlated to this ecological site. This soil has an organic upper layer of varying depths over silty marine deposits. The upper part is strongly acid (pH 4.5 to 5.0) to neutral (pH 6.6 to 7.3), and the silty marine material is slightly acid (pH 6.1 to 6.5) to slightly alkaline (pH 7.4 to 7.8). The organic layer generally is thinner in areas of community phase 1.2 and thicker in areas of community phase 1.1.

Table 4. Representative soil features

Drainage class	Very poorly drained

Ecological dynamics

Overview

Ecological site R237XY236AK is on tidal flats of shore complexes. Vegetation is shaped by a high water table that is impacted by flooding and ponding events. Shore complexes are dissected by tidally influenced channels and are susceptible to flooding by saltwater during high tides and storm surges. Brackish water affects the composition of the plant community. These tidal flats are connected through groundwater and overflow channels to the Togiak River and other smaller freshwater systems, which allows precipitation and spring snowmelt to affect soil moisture levels. Areas directly adjacent to a channel generally are more affected by hydrological influences than are distal areas.

Soil pH and wetness and hydrological disturbances restrict the species in this site. Soil wetness is a major driver of the plant community composition. The soils are influenced by the coastal environment. They are very frequently flooded by saltwater, are very poorly drained, and have a water table at the surface throughout the year; therefore, the reference plant community is comprised of resilient, obligate wetland species. The brackish water influences the plant community as exhibited by the presence of Lyngbye's sedge (*Carex lyngbyei*), an obligate sedge common in estuarine meadows and saltmarshes (Tande and Lipkin, 2003).

Disturbance Dynamics

Hydrological Influences
Temporal and spatial patterns to the high water table greatly influences the composition of the plant community. The effects of a high water table are similar to those in ponded areas. Ponding inhibits oxygen to susceptible plants (Hook and Crawford, 1978; Jackson et al., 1991). Hypoxic and anoxic conditions are major stressors that partially determine the presence or absence of vascular plants (Vartapetian and Jackson, 1996). The period of ponding that affects plants varies. Temporal tolerance to oxygen deprivation differs among plant species, ranging from many hours to several weeks (Vartapetian and Jackson, 1996).

Areas distal to tidal channels are more likely to support community phase 1.1. These areas are subject to less frequent flooding, less frequent ponding, and a lower water table. Areas proximal to channels are subject to more frequent flooding, more frequent ponding and a higher water table. These areas are typically correlated to community phase 1.2.

Fire
No incidence or evidence of fire was recorded in situ for this ecological site; however, previous wildfires have been

mapped in areas of the site. Historically, the two major causes of wildfires in the Ahklun Mountains are lightning strikes and human activity (AICC, 2017).

Other Observations
Shore complexes typically support various bird species, including seabirds and shorebirds. More than 35 species of shorebirds are in the Togiak National Wildlife Refuge, which is used for breeding in summer and as a stopping point for continuing migratory birds (U.S. Fish and Wildlife Service, 2017).

No evidence of grazing or browsing by moose was observed in this ecological site. This may be due to the proximity of the site to coastal villages rather than a lack of forage plants.

No alternative states have been observed in this ecological site.

State and transition model

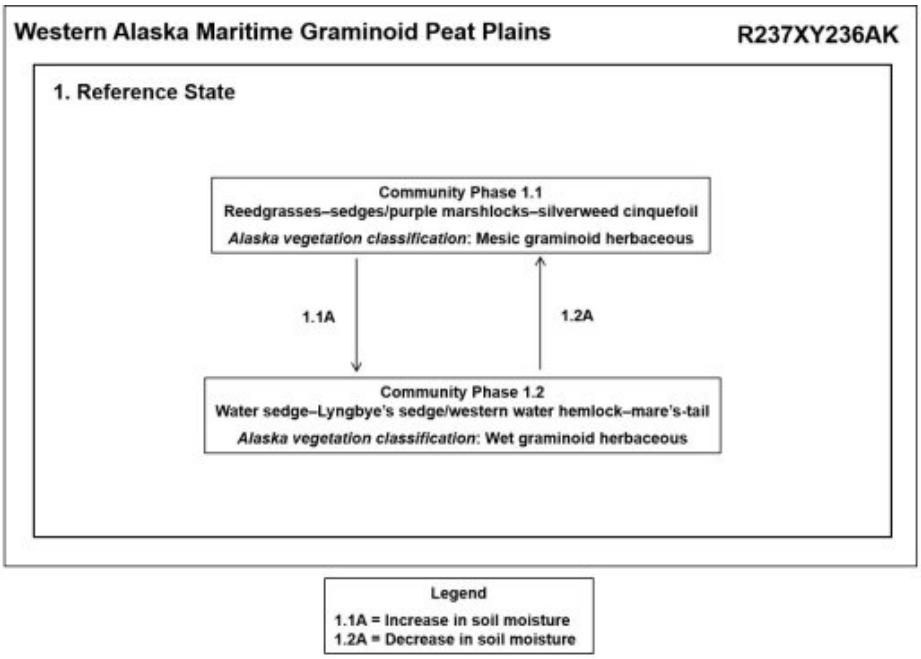

Figure 3. State-and-transition model.

State 1
Reference State

The reference state supports two community phases that are distinguished by the developed structure and dominance of the vegetation and the ecological function and stability of the community (fig. 3). The reference plant community is grassland consisting primarily of hydrophilic graminoids and forbs. This report provides baseline vegetation inventory data. Future data collection is needed to provide further information about existing plant communities and the disturbance regimes that would result in transitions from one community to another. Common and scientific names are from the USDA PLANTS database. All community phases are characterized by the Alaska Vegetation Classification System (Viereck et al., 1992).

Community 1.1
Reedgrasses-sedges/purple marshlocks-silverweed cinquefoil (Calamagrostis spp.-Carex spp./Comarum palustre-Argentina anserina)

Figure 4. This ecological site is in tidal marshes dissected by channels.

Community Phase 1.1 Canopy Cover Table

Vegetation data are aggregated across modal sample plots for this community phase and are provided as a frequency (percent) and mean canopy cover (percent) of the dominant and most ecologically relevant species. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
G	Reedgrasses^	*Calamagrostis* spp.	CALAM	100	55 (40-71)
G	Sedges^^	*Carex* spp.	CAREX	100	35 (25-45)
G	Circumpolar reedgrass	*Calamagrostis deschampsioides*	CADE3	100	20 (1-40)
G	Bluejoint	*Calamagrostis canadensis*	CACA4	50	35 (0-70)
G	Lyngbye's sedge	*Carex lyngbyei*	CALY3	50	15 (0-25)
G	Variegated sedge	*Carex stylosa*	CAST10	50	10 (0-20)
F	Purple marshlocks	*Comarum palustre*	COPA28	50	10 (0-20)
F	Silverweed cinquefoil	*Argentina anserina*	ARAN7	50	8 (0-15)
F	Arctic daisy	*Chrysanthemum arcticum*	CHAR13	50	2 (0-3)
F	Marsh arrowgrass	*Triglochin palustris*	TRPA6	50	1 (0-1)
F	Western dock	*Rumex aquaticus* var. *fenestratus*	RUAQF	50	0.1 (0-0.1)

^Reedgrass data includes the entire genus, including circumpolar reedgrass and bluejoint.

^^Sedge data includes the entire genus, including Lyngbye's sedge and variegated sedge.

This dataset includes data from two sample plots. The plots are distributed across the Ahklun Mountains area and are independent of one another. Due to the limited data available for this plant community phase, personal field observations were used to aid in describing the community.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, L = lichens

Canopy cover data are based on ocular estimates and rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover are rounded to the nearest integer. Data ranging from 10 to 100 percent cover are rounded to the nearest factor of 5.

Figure 5. Canopy cover and frequency of species in community 1.1.

The reference plant community is characterized as mesic graminoid herbaceous (fig. 4) (Viereck et al., 1992). The major plant strata are medium graminoids (4 to 24 inches in height), tall graminoids (more than 2 feet), medium forbs (4 to 24 inches), and mosses (fig. 5). Reedgrasses (Calamagrostis spp.) are the dominant graminoids, including bluejoint and circumpolar reedgrass. Common sedges (Carex spp.) include Lyngbye's sedge, variegated sedge, and lesser saltmarsh sedge (*C. glareosa*). Forbs can include purple marshlocks, silverweed cinquefoil, arctic daisy (*Chrysanthemum arcticum*), western dock (*Rumex aquaticus* var. fenestratus), and marsh arrowgrass. Shrubs such as Alaska bog willow (*Salix fuscescens*) and sweetgale (*Myrica gale*) may be present. The ground cover commonly is herbaceous litter, mosses, and water.

Community 1.2
Water sedge–Lyngbye's sedge/western water hemlock–mare's-tail (Carex aquatilis–Carex lyngbyei/Cicuta douglasii–Hippuris spp.)

Figure 6. Typical area of community 1.2.

Community Phase 1.2 Canopy Cover Table

Vegetation data are aggregated across modal sample plots for this community phase and are provided as a frequency (percent) and mean canopy cover (percent) of the dominant and most ecologically relevant species. Canopy cover is represented as a mean with the range in parentheses.

Plant group	Common name	Scientific name	USDA plant code	Frequency (percent)	Mean canopy cover (percent)
G	Lyngbye's sedge	*Carex lyngbyei*	CALY3	50	50 (0-95)
G	Water sedge	*Carex aquatilis*	CAAQ	50	50 (0-95)
F	Western water hemlock	*Cicuta douglasii*	CIDO	50	40 (0-75)
F	Mare's-tail	*Hippuris spp.*	HIPPU	50	3 (0-5)
F	Purple marshlocks	*Comarum palustre*	COPA28	50	3 (0-5)

This dataset includes data from two sample plots. The sample plots are distributed across the Ahklun Mountains area and are independent of one another. Due to the limited data available for this plant community phase, personal field observations were used to aid in describing the community.

Plant functional group classifications—T = trees, S = shrubs, G = graminoids, F = forbs, B = bryophytes, L = lichens

Canopy cover data are based on ocular estimates and rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover are rounded to the nearest integer. Data ranging from 10 to 100 percent cover are rounded to the nearest factor of 5.

Figure 7. Canopy cover and frequency of species in community 1.2.

This community is characterized as wet graminoid herbaceous (fig. 6) (Viereck et al., 1992). The major vegetative strata are medium graminoids (4 to 24 inches in height), tall forbs (more than 2 feet), and medium forbs (4 to 24 inches) (fig. 7). Obligate wetland sedges such as water sedge (*Carex aquatilis*) and Lyngbye's sedge typically are in mixed or monotypic stands. Forbs typically are obligate wetland species, including western water hemlock (*Cicuta douglasii*), mare's-tail (Hippuris spp.), and purple marshlocks. The ground cover commonly is herbaceous plants and water.

Pathway 1.1A
Community 1.1 to 1.2

Reedgrasses-sedges/purple marshlocks-silverweed cinquefoil (Calamagrostis spp.-Carex spp./Comarum palustre-Argentina anserina)

Water sedge–Lyngbye's sedge/western water hemlock–mare's-tail (Carex aquatilis–Carex lyngbyei/Cicuta douglasii–Hippuris spp.)

Increased soil moisture. Wetter areas are more likely to support community 1.2, and they commonly are adjacent to channels.

Pathway 1.2A
Community 1.2 to 1.1

Water sedge–Lyngbye's sedge/western water hemlock–mare's-tail (Carex aquatilis–Carex lyngbyei/Cicuta douglasii–Hippuris spp.)

Reedgrasses-sedges/purple marshlocks-silverweed cinquefoil (Calamagrostis spp.-Carex spp./Comarum palustre-Argentina anserina)

Decreased soil moisture. Drier areas are more likely to support community 1.1. These areas commonly are distal from channels.

Additional community tables

Other references

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Approval

Michael Margo, 7/23/2020

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	05/11/2025
Approved by	Michael Margo
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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

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

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

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

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

values):

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

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

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

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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:

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

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

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

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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:**
