# Ecological site R237XY212AK
# Western Alaska Maritime Scrubland Silty Flood Plains

Last updated: 7/23/2020
Accessed: 05/07/2024

## 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): 237X–Ahklun Mountains

The Ahklun Mountains Major Land Resource Area (MLRA 237) is in western Alaska (fig. 3). 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. 4). 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 R237XY212AK is on broad flood plains and stream terraces. The reference state has one distinct community phase, which is the reference plant community. This site is subject to flooding, but it does not surpass the resilience threshold for the community so an early disturbance sere is not required. No alternative states are recorded for this ecological site.

The reference plant community is a scrubland consisting of willow that is dense in some areas (fig. 2). Barclay's

willow (*Salix barclayi*), tealeaf willow (*S. pulchra*), greyleaf willow (S. glauca), feltleaf willow (S. alaxensis), and Bebb willows (S. bebbiana) are included. The understory is hydrophilic graminoids and forbs. Bluejoint (*Calamagrostis canadensis*) is common, and the myriad forbs include field horsetail (*Equisetum arvense*), Canadian burnet (*Sanguisorba canadensis*), fireweed (Chamerion angustifolium), and woolly geranium (Geranium erianthum).

## Associated sites

| | |
|---|---|
| R237XY210AK | **Western Alaska Maritime Scrubland Gravelly Flood Plains**<br>Ecological site R237XY212AK is on broad flood plains and terraces. Several other ecological sites are on flood plains in the Ahklun Mountains area. These sites are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. The associated sites on flood plains are R237XY210AK, R237XY211AK, and R237XY226AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut. |
| R237XY211AK | **Western Alaska Maritime Scrubland Loamy Flood Plains**<br>Ecological site R237XY212AK is on broad flood plains and terraces. Several other ecological sites are on flood plains in the Ahklun Mountains area. These sites are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. The associated sites on flood plains are R237XY210AK, R237XY211AK, and R237XY226AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut. |
| R237XY226AK | **Western Alaska Maritime Grassland Peat Flood Plains, Depression**<br>Ecological site R237XY212AK is on broad flood plains and terraces. Several other ecological sites are on flood plains in the Ahklun Mountains area. These sites are distinguished by differences in elevation, disturbance, landform, location, associated soils, and type and amount of plants. The associated sites on flood plains are R237XY210AK, R237XY211AK, and R237XY226AK. Site R237XY226AK is in depressions of flood plains. Ecotonal plant communities that have characteristics from more than one ecological site are in areas where these sites abut. |

## Similar sites

| | |
|---|---|
| R237XY210AK | **Western Alaska Maritime Scrubland Gravelly Flood Plains**<br>Ecological sites R237XY110AK and R237XY211AK are are on flood plains and are similar to site R237XY212AK. Each of these sites is subject to flooding and supports willow. Site R237XY210AK is on low flood plains. The frequency and duration of flooding on this site lead to unique plant communities. |
| R237XY211AK | **Western Alaska Maritime Scrubland Loamy Flood Plains**<br>Ecological sites R237XY110AK and R237XY211AK are are on flood plains and are similar to site R237XY212AK. Each of these sites is subject to flooding and supports willow. Site R237XY211AK in on mid flood plains. It is associated with well drained soils that support a distinctly different reference plant community. |


**Figure 1. The broad flood plains that support willow typically are distal from a major river. Smaller tributaries may flow through these areas.**

**Figure 2. Some areas of the reference plant community support dense willow.**

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | (1) *Salix barclayi*<br>(2) *Salix pulchra* |
| Herbaceous | (1) *Calamagrostis canadensis*<br>(2) *Sanguisorba canadensis* |

## 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).

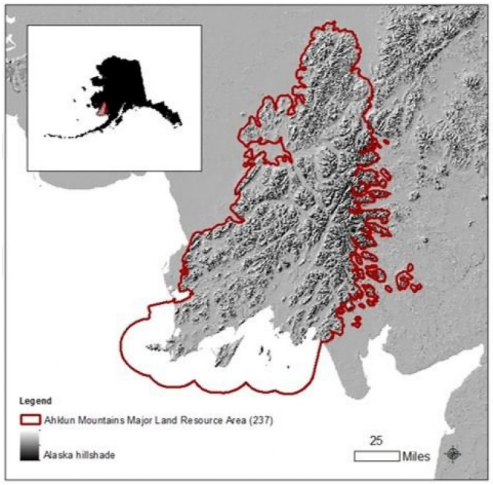


**Figure 3. The Ahklun Mountains (MLRA 237) are in western Alaska.**

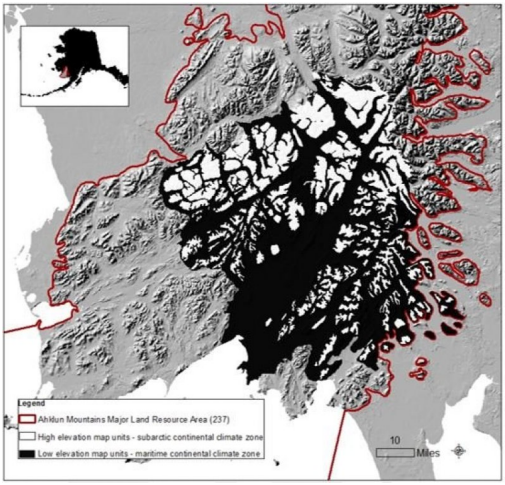


**Figure 4. High-elevation and low-elevation map units in the survey area, which illustrate the primary climatic influence.**

**Table 2. Representative physiographic features**

| | |
|---|---|
| Geomorphic position, terraces | (1) Tread |
| Slope shape across | (1) Linear |
| Slope shape up-down | (1) Linear |
| Geomorphic position, flats | (1) Talf |
| Landforms | (1) Mountain valleys or canyons > Flood plain<br>(2) Plains > Flood plain<br>(3) Plains > Stream terrace |
| Flooding duration | Brief (2 to 7 days) to long (7 to 30 days) |
| Flooding frequency | Rare to occasional |
| Ponding frequency | None |
| Elevation | 0–701 m |
| Slope | 0–3% |
| Water table depth | 3–76 cm |
| 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) | 75-140 days |
| Freeze-free period (characteristic range) | |
| Precipitation total (characteristic range) | |

## Influencing water features

## Soil features

The Longarm soils on flood plains and the Ongivinuck soils on stream terraces are correlated to this ecological site. The Longarm soils are poorly drained, and the Ongivinuck soils are well drained. Both soils have an organic layer at the surface that has very high saturated hydraulic conductivity, a loamy layer that has moderately high saturated hydraulic conductivity, and a sandy and gravelly layer that has high or very high saturated hydraulic conductivity. Both soils are strongly acid to slightly acid, and the pH increases as depth increases.

**Table 4. Representative soil features**

| | |
|---|---|
| Drainage class | Poorly drained to well drained |

## Ecological dynamics

Three major ecological sites are on flood plains throughout the Ahklun Mountains area, and a relatively minor woodland ecological site is on flood plains in the corridor of the Izavieknik River. The three major ecological sites are distinguished by landform and elevation above the associated source of floodwater. The sites are characterized as on low, mid, and high flood plains. Landform, flooding characteristics, and soil features primarily determine the vegetation in each ecological site.

Site R237XY212AK is on broad flood plains and lowland stream terraces throughout the Ahklun Mountains area (fig. 1). A similar single community is on both landforms. The site is subject to low-energy flooding that does not appear to result in a post-disturbance community.

Currently, site R237XY212AK is considered to be on both mid flood plains and stream terraces because of the similar disturbance regimes, vegetative communities, and lack of early disturbance phases on these landforms. Some species are more abundant on one landform, such as tealeaf willow on the poorly drained Longarm soils on flood plains and spirea (*Spiraea stevenii*), arctic raspberry (*Rubus arcticus*), and mosses on the well drained Ongivinuck soils on stream terraces; however, the overall vegetative communities are similar. Future investigation is needed to determine whether separate ecological sites are required because of differences in productivity or long-term disturbance patterns.

Disturbance Dynamics

No known disturbance regime that results in an early community phase is associated with this ecological site. The reference plant community is resilient to flooding. Anthropogenic disturbances that remove vegetation, such as construction of trails, may result in other disturbances such as erosion. These disturbances could alter the reference plant community and result in a different plant community; however, this was not recorded in situ.

Hydrological Influences
Flooding is the major disturbance regime, and it commonly is associated with snowmelt. This site is subject to low-energy flooding because floodwater dissipates slowly over the broad landforms, the site commonly is distal from a major river, and silty and loamy alluvium is in the soils. The upper organic layer of the soils has high water-holding capacity and high saturated hydraulic conductivity.

Flooding does not affect the composition of the reference plant community because of the characteristics of the vegetation and soils. Willows are adaptable, and many species can tolerate a variety of habitats and soil moisture conditions (Anderson and Welsh, 1974; Moore, 2003). Neither of the soils associated with this site is subject to ponding, so less hydrophilic species remain in the understory after periods of flooding.

Other Observations
Browsing on willow by moose, caribou, and hare has been documented in this ecological site. This browsing occurs throughout the year, but it is heaviest in summer and winter. Browsing does not alter the vegetative community significantly; thus, an early browse sere is not required.

No recorded alternate states are associated with this ecological site.

## State and transition model

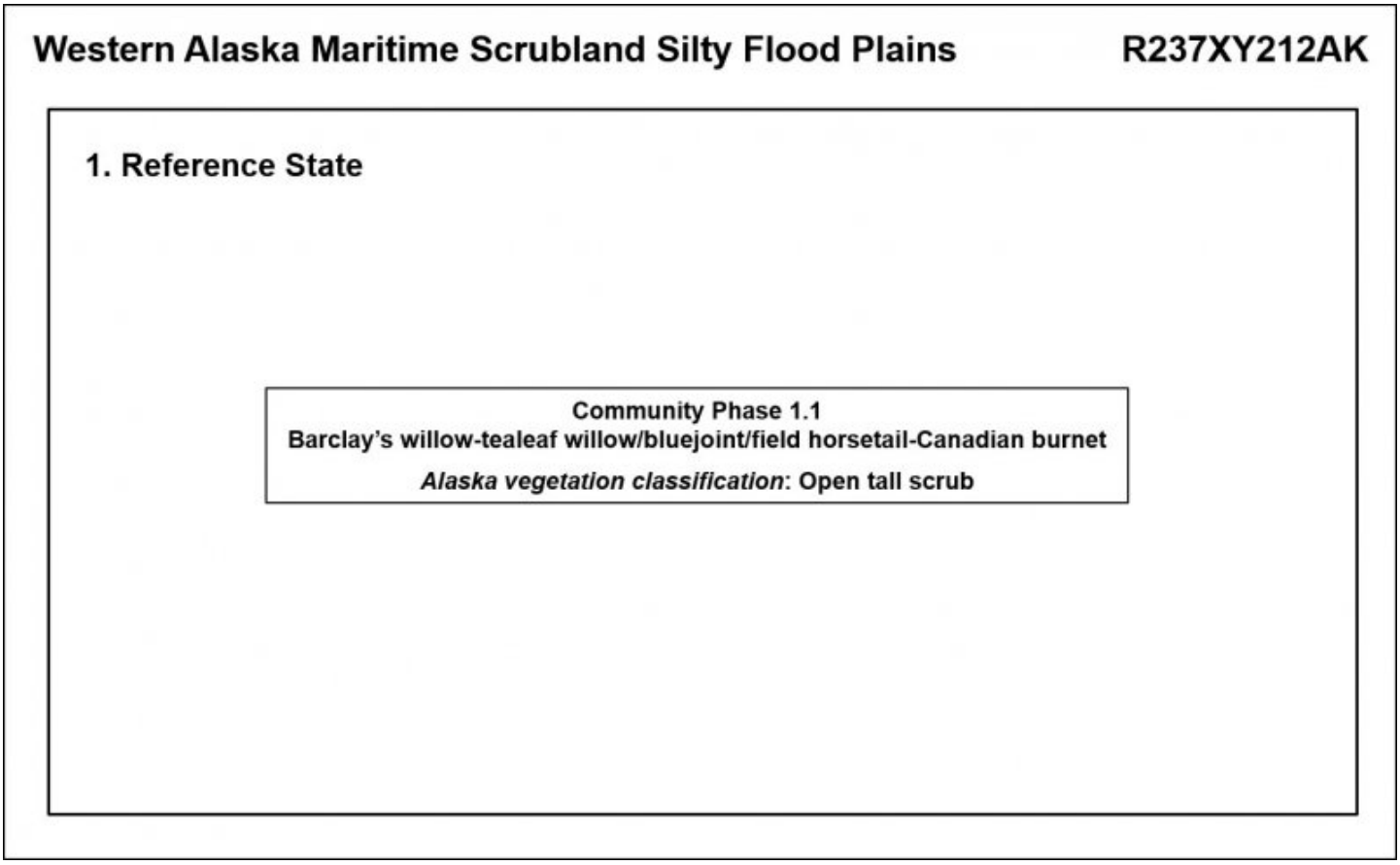


**Figure 5. State-and-transition model.**

### State 1
### Reference State

The reference state supports one community phase that is distinguished by the developed structure and dominance of the vegetation and the ecological function and stability of the community. The reference community phase supports willow (Salix spp.) and an understory of forbs and graminoids. The site is subject to flooding, but it does not result in a unique community phase. This report provides baseline vegetation inventory data. Future data collection is needed to provide further information about existing plant communities and to determine if any disturbance regimes will result in a transition of the reference plant community to another community. Common and scientific names in this report are from the USDA PLANTS database. Community phases are characterized by the Alaska Vegetation Classification System (Viereck et al., 1992).

### Community 1.1
### Barclay's willow-tealeaf willow/bluejoint/field horsetail-Canadian burnet (Salix barclayi-Salix pulchra/Calamagrostis canadensis/Equisetum arvense-Sanguisorba canadensis)

**Figure 6. Typical area of plant community 1.1 that includes dense, patchy willow and graminoids and forbs throughout.**

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) |
|---|---|---|---|---|---|
| S | Willow^ | *Salix* spp. | SALIX | 100 | 70 (45-95) |
| S | Barclay's willow | *Salix barclayi* | SABA3 | 91 | 50 (0-90) |
| S | Tealeaf willow | *Salix pulchra* | SAPU15 | 55 | 15 (0-45) |
| S | Arctic raspberry | *Rubus arcticus* | RUAR | 91 | 1 (0-5) |
| G | Bluejoint | *Calamagrostis canadensis* | CACA4 | 100 | 40 (10-80) |
| F | Field horsetail | *Equisetum arvense* | EQAR | 100 | 6 (1-15) |
| F | Canadian burnet | *Sanguisorba canadensis* | SACA14 | 100 | 6 (0.1-20) |
| F | Fireweed | *Chamerion angustifolium* | CHAN9 | 91 | 6 (0-30) |
| F | Woolly geranium | *Geranium erianthum* | GEER2 | 73 | 2 (0-5) |
| B | Schreber's big red stem moss | *Pleurozium schreberi* | PLSC70 | 46 | 4 (0-20) |
| B | Splendid feather moss | *Hylocomium splendens* | HYSP70 | 36 | 3 (0-10) |

^Willow (*Salix spp.*) includes all willow species, including Barclay's and tealeaf willow.

This dataset includes data from 11 sample plots. The plots are distributed across the Ahklun Mountains area and are independent of one another.

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 1.1.**

The reference plant community is characterized as open tall scrub (fig. 6) (Viereck et al., 1992). The dominant vegetative strata are medium shrubs (3 to 10 feet in height), tall graminoids (more than 2 feet), and medium forbs (4 to 24 inches) (fig. 7). Willows commonly occur as a mix of two or more species, but monotypic stands are in some areas. The primary willows are tealeaf willow and Barclay's willow. Greyleaf willow and Bebb willow are less common. Understory species include fireweed, Canadian burnet, woolly geranium, field horsetail (*Equisetum arvense*), bluejoint, fowl bluegrass (*Poa palustris*), and arctic bluegrass (*Poa arctica*). Ground cover typically is herbaceous litter and moss and smaller areas of woody litter and water. Some areas are bare soil.

## 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 | 05/07/2024 |
| 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:**

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