USDA Natural Resources Conservation Service

Ecological site XA232X01Y207
Boreal Herbaceous Peat Flood Plain Depressions

Last updated: 5/18/2020
Accessed: 05/12/2025

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): 232X–Yukon Flats Lowlands

The Yukon Flats Lowlands MLRA is an expansive basin characterized by numerous levels of flood plains and terraces that are separated by minimal breaks in elevation. This MLRA is in Interior Alaska and is adjacent to the middle reaches of the Yukon River. Numerous tributaries of the Yukon River are within the Yukon Flats Lowlands MLRA. The largest are Beaver Creek, Birch Creek, Black River, Chandalar River, Christian River, Dall River, Hadweenzic River, Hodzana River, Porcupine River, and Sheenjek River. The MLRA has two distinct regions—lowlands and marginal uplands. The lowlands have minimal local relief and are approximately 9,000 square miles in size (Williams 1962). Landforms associated with the lowlands are flood plains and stream terraces. The marginal uplands consist of rolling and dissected plains that are a transitional area between the lowlands and adjacent mountain systems. The marginal uplands are approximately 4,700 square miles in size (Williams 1962).

This MLRA is bounded by the Yukon-Tanana Plateau to the south, Hodzana Highlands to the west, Porcupine Plateau to the east, and southern foothills of the Brooks Range to the north (Williams 1962). These surrounding hills and mountains partially isolate the Yukon Flats Lowlands MLRA from weather systems affecting other MLRAs of Interior Alaska. As a result, temperatures are generally warmer in summer and colder in winter than is characteristic in other areas at comparable latitude. There is a moisture and temperature gradient in which the lowlands region tends to be drier and colder and the surrounding marginal uplands region tends to be moister and warmer (PRISM Climate Group 2006).

The Yukon Flats Lowlands MLRA is mostly undeveloped lands that are sparsely populated and not accessible by a road system. A number of villages, including Beaver, Birch Creek, Chalkyitsik, Circle, Fort Yukon, Stevens Village, and Venetie, are adjacent to the Yukon River or one of its major tributaries. The largest village is Fort Yukon, which according to the 2010 U.S. Census has 583 residents that are dominantly Gwich'in Alaska Natives.

LRU notes

Alaska has no officially recognized LRU. However, there appear to be two distinct LRU in the Yukon Flats Lowlands MLRA. These LRU are thought to have differing climatic regimes, landforms, and soil types (STATSGO and Jorgensen and Meidinger 2015). The two LRU were previously discussed in the MLRA notes section above and are termed the lowlands LRU and the marginal uplands LRU.

This ecological site is associated with the lowlands LRU.

Classification relationships

Yukon Flats Lowlands MLRA.

Ecological site concept

This ecological site is associated with high pH floating mats in flood plain depressions in Yukon Flats Lowlands MLRA.. The reference plant community is associated with soils that both pond and flood. Ponding occurs frequently (greater than 50 times in 100 years) for very long durations of time (greater than 30 days). Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). Associated soils are considered very poorly drained. The reference state supports one documented community.

The reference plant community is characterized as wet forb herbaceous (Viereck et al. 1992) and is composed of various obligate wetland species. Commonly observed species include water sedge (Carex aquatilis), creeping sedge (Carex chordorrhiza), wheat sedge (Carex atherodes), mud sedge (Carex limosa), tall cottongrass (Eriophorum angustifolium), buckbean (Menyanthes trifoliata), marsh cinquefoil (Comarum palustre), and water horsetail (Equisetum fluviatile).

Associated sites

XA232X01Y204	**Boreal Forest Loamy Flood Plain High** This ecological site occurs on the high flood plain of major tributaries in the Yukon Flats Lowlands MLRA. Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). The reference plant community is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of mature white spruce (Picea glauca).
XA232X01Y219	**Boreal Forest Loamy Terraces Moist** This ecological site is associated with somewhat poorly to moderately well drained soils on the treads of stream terraces in the Yukon Flats Lowlands MLRA. Flooding frequency ranges from rare to none. The reference plant community is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of mature white spruce (Picea glauca).
XA232X01Y221	**Boreal Forest Loamy Terraces** This ecological site is associated with moderately well to well drained soils on the tread of stream terraces in the Yukon Flats Lowlands MLRA. Flooding frequency ranges from rare to none. The reference plant community is characterized as an open needleleaf forest (25 to 60 percent cover) primarily composed of mature white spruce (Picea glauca).
XA232X01Y205	**Boreal Grass Loamy Flood Plain Depressions** This ecological site is associated with depressions on flood plains in the Yukon Flats Lowlands MLRA. The reference state plant communities are associated with soils that both pond and flood. Ponding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). Flooding occurs occasionally for brief durations of time. The reference plant community is characterized as open tall scrub (Viereck et al. 1992) and is primarily composed of willow (Salix spp.).
XA232X01Y206	**Boreal Scrub Loamy Frozen Flood Plain Depressions** This ecological site is associated with depressions on flood plains in the Yukon Flats Lowlands MLRA. The reference state plant communities are associated with soils that both pond and flood. Ponding occurs frequently (greater than 50 times in 100 years) for long durations of time (between 7 and 30 days). Flooding occurs occasionally (5 to 50 times in 100 years) for brief durations of time (between 2 and 7 days). The reference plant community is characterized as mesic graminoid herbaceous (Viereck et al. 1992) and is primarily composed of bluejoint (Calamagrostis canadensis).
XA232X01Y209	**Boreal Tussock Loamy Frozen Terraces** This ecological site occurs on stream terraces in the lowlands region of the Yukon Flats Lowlands MLRA. Soils commonly have permafrost at moderate depth (20 to 40 inches) and pond frequently for very long durations. The reference plant community is characterized as open low mixed shrub-sedge tussock bog (Viereck et al. 1992).
XA232X01Y280	**Boreal Scrub Loamy Flood Plain Wet** This ecological site occurs on the flood plain and adjacent terraces of minor, low-gradient tributaries in the lowlands region of the Yukon Flats Lowlands MLRA. The reference plant community is associated with soils that both pond and flood. The reference plant community phase is characterized as closed tall scrub (greater than 75 percent shrub cover; Viereck et al. 1992) primarily composed of a mixture of willow (Salix spp.).

Similar sites

XA232X01Y201	**Boreal Woodland Peat Frozen Terraces** XA232X01Y217 is associated with floating organic mats in acidic thermokarst bogs that are almost entirely composed of Sphagnum moss.

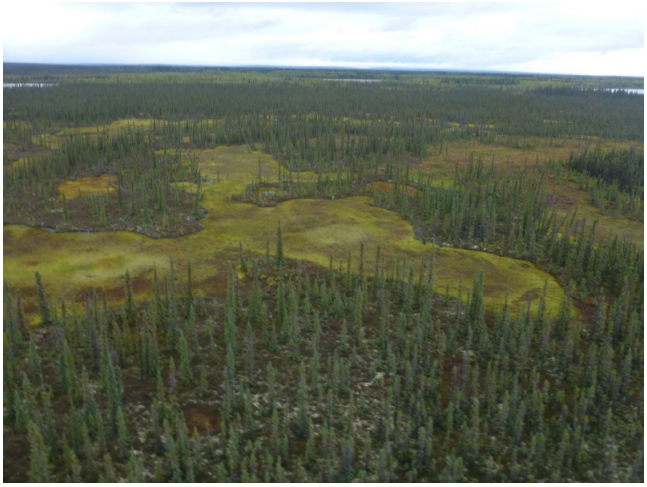

Figure 1. XA232X01Y217 has plant communities associated with thermokarst and floating mat bogs. These bogs are highly acidic and composed primarily of Sphagnum.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Menyanthes trifoliata* (2) *Equisetum fluviatile*

Legacy ID

R232XY207AK

Physiographic features

This ecological site is associated with floating mats in depressions throughout the Yukon Flats Lowlands MLRA. Floating mats were most commonly observed in flood plain depressions. Associated stream landforms include meander scrolls, abandoned channels, and oxbow lakes. This ecological site was rarely observed and is considered to have a limited spatial footprint in this MLRA.

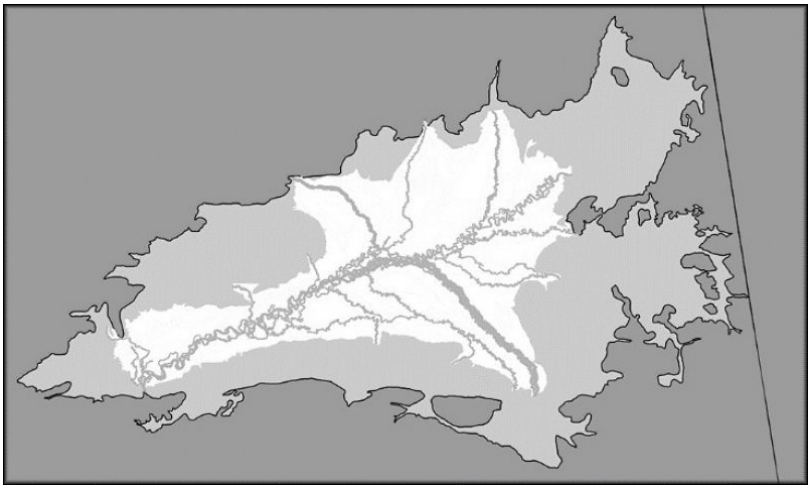

Figure 2. Lowlands region (white) and marginal uplands region (light gray) of the Yukon Flats Lowlands MLRA.

Figure 3. Aerial image of a meander scroll and abandoned channels adjacent to the Yukon River in the Yukon Flats Lowlands MLRA.

Figure 4. Aerial image of depressions adjacent to the Yukon River in the Yukon Flats Lowlands MLRA. The depression with dark brown photo tones near the center of the image supports floating mat communities associated with XA232X01Y207.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain > Closed depression
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Occasional
Ponding duration	Very long (more than 30 days)
Ponding frequency	Frequent
Elevation	91–198 m
Slope	0–3%
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

Short, warm summers and long, very cold winters characterize the subarctic continental climate of the area. The surrounding hills and mountains of this MLRA partially isolate it from weather systems affecting other interior lowlands. As a result, temperatures are generally warmer in summer and colder in winter than is characteristic in other areas of comparable latitude. The average annual temperature ranges from about 20 to 25 degrees F (-7 to -4 degrees C). The freeze-free period averages 70 to 120 days. The temperature usually remains above freezing from early June through late August. The average annual precipitation ranges from about 6 inches (150 millimeters) in the central basin to 15 inches (380 millimeters) along the boundary with the surrounding highlands. The maximum precipitation occurs in late summer, mainly as a result of thunderstorms. The average annual snowfall is about 45 to 55 inches (115 to 140 centimeters) (USDA, NRCS 2006).

All of the tabular data below was calculated from the PRISM dataset (1971-2000) and is specific to the Lowlands LRU in the Yukon Flats Lowlands MLRA.

Table 3. Representative climatic features

Frost-free period (characteristic range)	45-97 days
Freeze-free period (characteristic range)	70-120 days
Precipitation total (characteristic range)	203-330 mm
Frost-free period (average)	75 days
Freeze-free period (average)	
Precipitation total (average)	254 mm

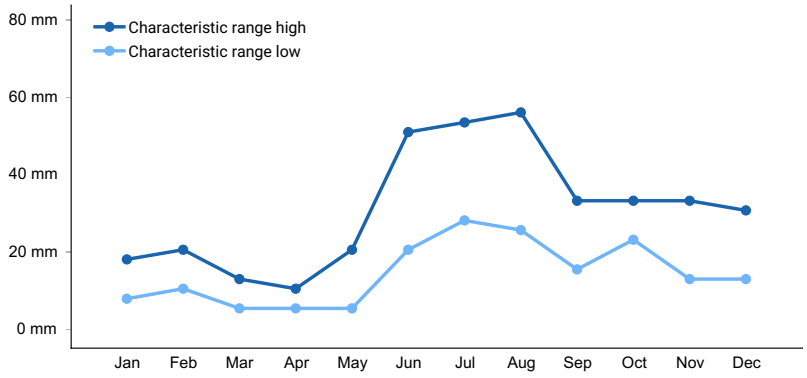

Figure 5. Monthly precipitation range

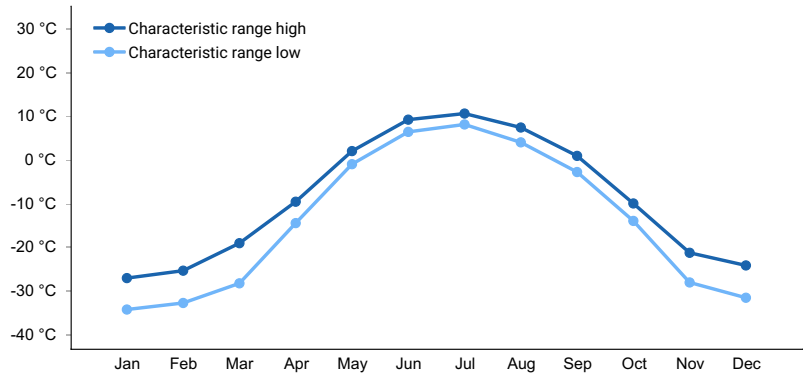

Figure 6. Monthly minimum temperature range

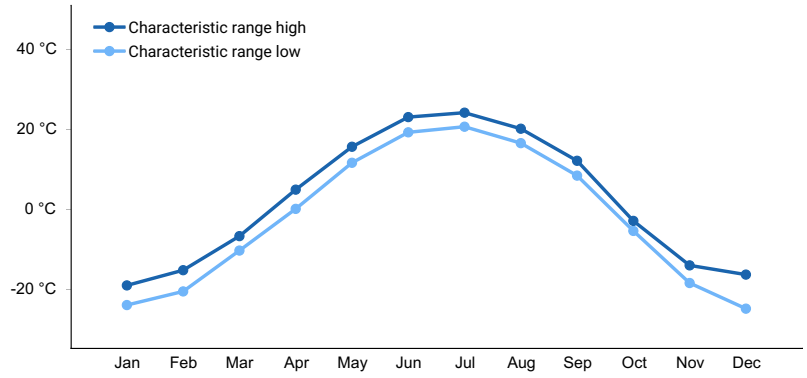

Figure 7. Monthly maximum temperature range

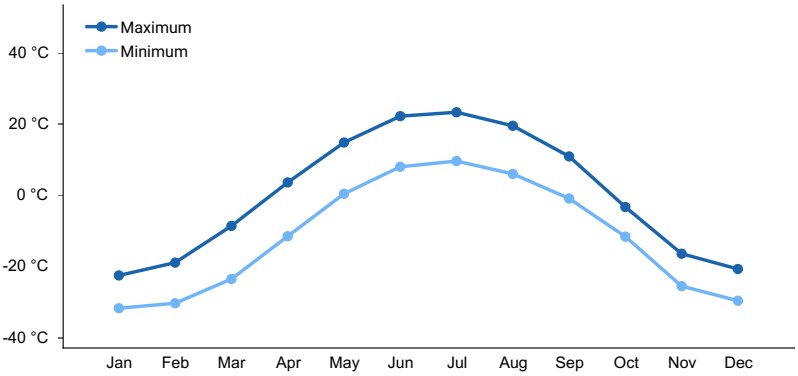

Figure 8. Monthly average minimum and maximum temperature

Influencing water features

During the growing season, a water table commonly occurs at very shallow depth (0 to 10 inches) in the soil profile. Throughout the growing season, ponding occurs frequently (5 to 50 times in 100 years) for very long durations of time (greater than 30 days). Ponding duration and the typical depth to the water table was determined through field observations.

Due to the depth and persistence of this water table, wetland indicator plants are commonly observed in the reference state.

Soil features

Correlated soil components for the Yukon Flats Area, Alaska soil survey (AK685): Hydric Cryofibrists, euic.

Figure 9. Typical soil profile associated with Hydric Cryofibrists soil component. The photo above shows a gap of soil between 50 and 100 cm which represents a water layer.

Table 4. Representative soil features

Parent material	(1) Organic material
Surface texture	(1) Peat
Drainage class	Very poorly drained
Soil depth	203 cm
Soil reaction (1:1 water) (0-132.1cm)	6–8

Ecological dynamics

Flooding

Associated soils are thought to flood occasionally for brief periods of time. Flooding is thought to occur during the months of May and June.

Other Observations

While considered a flood plain ecological site, similar floating mats also occur on terrace depressions. Floating mats sampled on terraces have similar kinds and amounts of vegetation as those on flood plains. Given the limited spatial distribution of this ecological site and the similarity between communities, a floating mat ecological site for terrace depressions went undeveloped.

Animal use (browsing and grazing) of this ecological site was typically not observed.

No alternative states for this ecological site were documented.

State and transition model

Ecosystem states

1. Reference

State 1 submodel, plant communities

1.1. Sedge-tall cottongrass / buckbean-water horsetail

State 1
Reference

Figure 10. Aerial image of the flood plain and terrace adjacent to the Porcupine River. This ecological site occurs in flood plain depressions.

The reference state has one associated community. Plant communities in the reference state appear to be largely controlled by the influences of ponding and flooding. This report provides baseline vegetation inventory data for the ecological site. More 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. The common and scientific

plant names are from the USDA PLANTS database. All community phases in this report are characterized using the Alaska Vegetation Classification (Viereck et al. 1992).

Community 1.1
Sedge-tall cottongrass / buckbean-water horsetail

Figure 11. Typical plant community associated with community 1.1.

Community Phase 1.1 Canopy Cover Table

Vegetation data is aggregated from all sample plots for this community phase. The data is provided as frequency (percent) and mean canopy cover (percent) of the most dominant and 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	leatherleaf	*Chamaedaphne calyculata*	CHCA2	43	1 (0-7)
S	bog rosemary	*Andromeda polifolia*	ANPO	29	3 (0-15)
G	sedge	*Carex spp.*	CAREX	100	30 (20-45)
G	tall cottongrass	*Eriophorum angustifolium*	ERAN6	57	7 (0-30)
F	buckbean	*Menyanthes trifoliata*	METR3	100	15 (5-30)
F	marsh cinquefoil	*Comarum palustre*	COPA28	100	2 (0.1-7)
F	horsetail	*Equisetum spp.*	EQFL	100	20 (2-60)
F	seaside arrowgrass	*Triglochin maritimum*	TRMA4	43	1 (0-5)
F	sundew	*Drosera spp.*	DROSE	43	3 (0-20)
B	*Sphagnum* moss	*Sphagnum spp.*	SPHAG2	14	6 (0-40)

This dataset includes data from seven sample plots. The plots are distributed across the survey area and are independent of one another.

Values for tall, medium, regenerative, and stunted tree strata are used to calculate mean canopy cover and range values. Regenerative trees are not considered part of the overstory canopy.

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

Canopy cover data is rounded, except trace (0.1 percent) cover. Data ranging from 1 to 9 percent cover is rounded to the nearest integer. Data ranging from 10 to 100 percent cover is rounded to the nearest factor of 5.

Figure 12. Canopy cover table for community 1.1.

Reference plant community 1.1 is a floating mat composed of various obligate wetland species. Commonly observed species include water sedge, creeping sedge, wheat sedge, mud sedge, tall cottongrass, buckbean, marsh cinquefoil, and water horsetail. The vegetative strata that characterize this community are medium forbs (between 4 and 24 inches in height) and medium graminoids (between 4 and 24 inches in height). The entire soil surface is commonly covered by water.

Dominant plant species

- leatherleaf (*Chamaedaphne calyculata*), shrub

- bog rosemary (*Andromeda polifolia*), shrub
- water sedge (*Carex aquatilis*), grass
- creeping sedge (*Carex chordorrhiza*), grass
- wheat sedge (*Carex atherodes*), grass
- mud sedge (*Carex limosa*), grass
- Northwest Territory sedge (*Carex utriculata*), grass
- tall cottongrass (*Eriophorum angustifolium*), grass
- buckbean (*Menyanthes trifoliata*), other herbaceous
- purple marshlocks (*Comarum palustre*), other herbaceous
- water horsetail (*Equisetum fluviatile*), other herbaceous
- seaside arrowgrass (*Triglochin maritima*), other herbaceous
- sundew (*Drosera*), other herbaceous
- sphagnum (*Sphagnum*), other herbaceous

Additional community tables

Inventory data references

NASIS User Site ID / Modal Datasets
10BB01805 plant community 1.1
11BB05101 plant community 1.1
11SN03303 plant community 1.1
12BB00902 plant community 1.1
12NR00304 plant community 1.1
12NR00701 plant community 1.1
12TR00303 plant community 1.1

Other references

PRISM Climate Group. 2006. Climate data of United States, 1971-2000. Oregon State University, Corvallis.

Schoeneberger, P.J., and D.A. Wysocki. 2012. Geomorphic description system. Version 4.2. U.S. Department of Agriculture, Natural Resources Conservation Service, National Soil Survey Center, Lincoln, Nebraska.

Schoeneberger, P.J., D.A. Wysocki, E.C. Benham, and W.D. Broderson, editors. 2012. Field book for describing and sampling soils. Version 3.0. U.S. Department of Agriculture, Natural Resources Conservation Service.

Soil Survey Division Staff. 2017. Soil survey manual. Soil Conservation Service. U.S. Department of Agriculture Handbook 18.

United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.

Viereck, L.A., C.T. Dyrness, A.R. Batten, and K.J. Wezlick. 1992. The Alaska vegetation classification. U.S. Department of Agriculture, Forest Service, Pacific Northwest Forest and Range Experiment Station General Technical Report PNW-GTR-286.

Williams, J.R. 1962. Geologic reconnaissance of the Yukon Flats District, Alaska. U.S. Department of the Interior, Geologic Survey Bulletin 1111-H.

Contributors

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Approval

Michael Margo, 5/18/2020

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	05/11/2020
Approved by	Michael Margo
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:**

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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:**
