USDA Natural Resources Conservation Service

Ecological site R025XY004OR
DRY MEADOW

Last updated: 4/24/2024
Accessed: 05/05/2024

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): 025X–Owyhee High Plateau

The Owyhee High Plateau, MLRA 25, lies within the Intermontane Plateaus physiographic province. The southern half is found in the Great Basin while the northern half is located in the Columbia Plateaus. The southern section of the Owyhee High Plateau is characterized by isolated, uplifted fault-block mountain ranges separated by narrow, aggraded desert plains. This geologically older terrain has been dissected by numerous streams draining to the Humboldt River. The northern section forms the southern boundary of the extensive Columbia Plateau basalt flows. Deep, narrow canyons drain to the Snake River across the broad volcanic plain.

This MLRA is characteristically cooler and wetter than the neighboring MLRAs of the Great Basin. Elevation ranges from 3,000 to 7,550 feet on rolling plateaus and in gently sloping basins. It is more than 9,840 feet on some steep mountains. The average annual precipitation in most of this area is typically 11 to 22 inches. It increases to as much as 49 inches at the higher elevations. Precipitation occurs mainly as snow in winter. The supply of water from precipitation and streamflow is small and unreliable, except along major rivers. Streamflow depends largely on accumulated snow in the mountains.

The dominant soil orders in this MLRA are Aridisols and Mollisols. The soils in the area dominantly have a mesic or frigid temperature regime and an aridic, arid bordering on xeric, or xeric moisture regime. Most of the soils formed in mixed parent material. Volcanic ash and loess mantle the landscape. Surface soil textures are loam and silt loam, and have ashy texture modifiers in some cases. Argillic horizons occur on the more stable landforms.

Ecological site concept

This site is on alluvial terraces and flood plains of ephemeral streams in high elevation plateaus and mountain valleys. Soils associated with this site formed in alluvium from volcanic rock. These soils are deep and very deep and somewhat poorly to poorly drained. Slopes are less than 5 percent and elevations range from 5,000-6,500 feet (1524-1981 meters). Important abiotic factors contributing to the presence of this ecological site include a seasonal water table within 9.8 inches (25 cm) of the soil surface and frequent flooding in spring and early summer. The reference plant community is dominated by a dense stand of Nevada bluegrass, sedges, and rushes.

Associated sites

R025XY003NV	**LOAMY BOTTOM 8-14 P.Z.**
R025XY005NV	**WET MEADOW**
R025XY046ID	**MEADOW**
R025XY014OR	**LOAMY 13-16 PZ**

Similar sites

R025XY039ID	**DRY MEADOW**
R025XY006NV	**DRY MEADOW**

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Poa nevadensis* (2) *Carex*

Physiographic features

This site is on alluvial terraces and flood plains of ephemeral streams in high elevation plateaus and mountain valleys. It is at the upper end of drainages occupying broad to narrow swale areas. Slopes range from 1 to 5 percent. Elevation varies from 5,000 to 7,000 feet (1,524 to 2,133 meters).

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Runoff class	High to very high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	5,000–7,000 ft
Slope	1–5%
Water table depth	6–12 in
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

The annual precipitation ranges from 13 to 16 inches (33 to 41cm), most of which occurs in the form of snow during the months of November through March. Ephemeral subsurface moisture flow augments the precipitation. Localized convection storms occasionally occur during the summer. The soil temperature regime is frigid with a mean annual air temperature of 44 degrees F. Temperature extremes range from 90 to -30 degrees F. The frost free period ranges from 30 to 90 days. The optimum growth period for native plants is from April through July.

Table 3. Representative climatic features

Frost-free period (characteristic range)	30-90 days
Freeze-free period (characteristic range)	40-120 days
Precipitation total (characteristic range)	13-16 in
Frost-free period (average)	32 days
Freeze-free period (average)	75 days
Precipitation total (average)	15 in

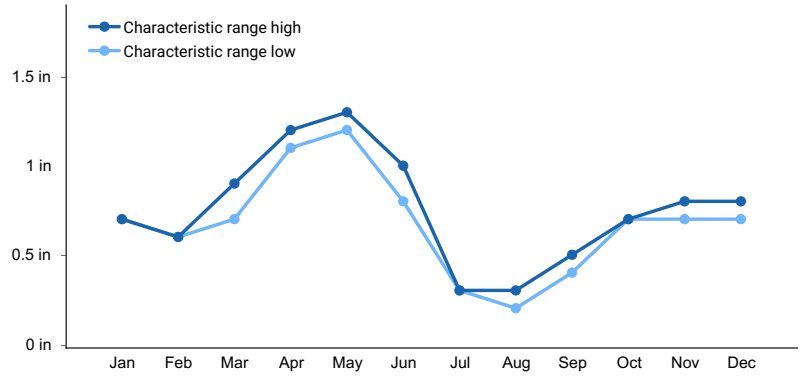


Figure 1. Monthly precipitation range

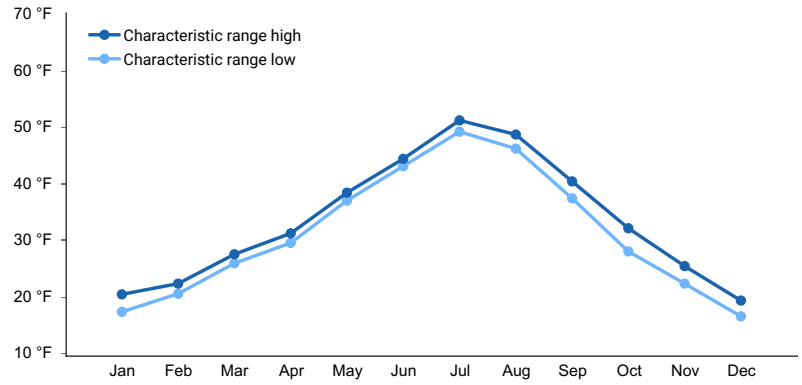


Figure 2. Monthly minimum temperature range

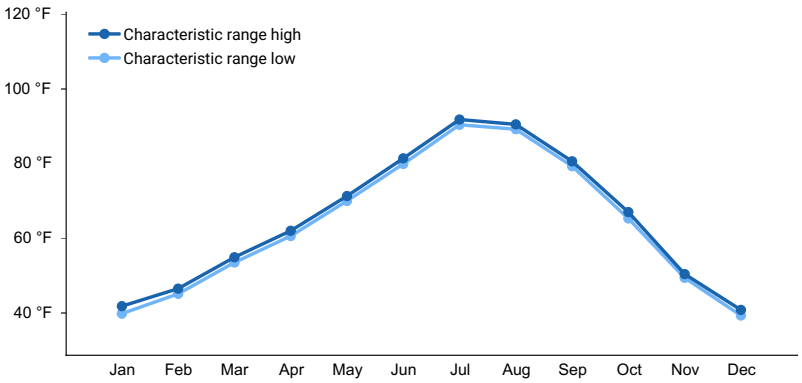


Figure 3. Monthly maximum temperature range

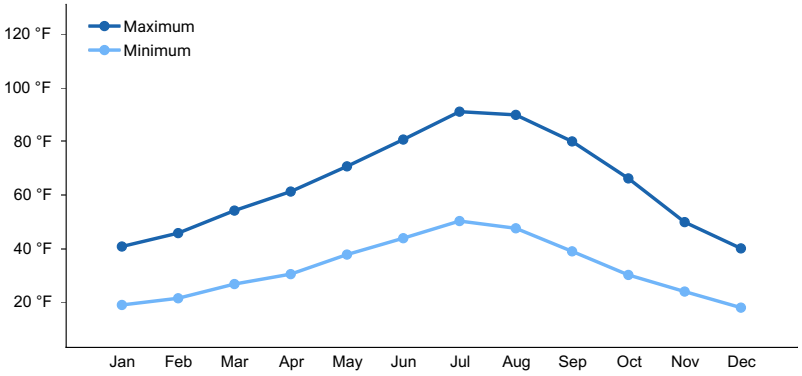


Figure 4. Monthly average minimum and maximum temperature

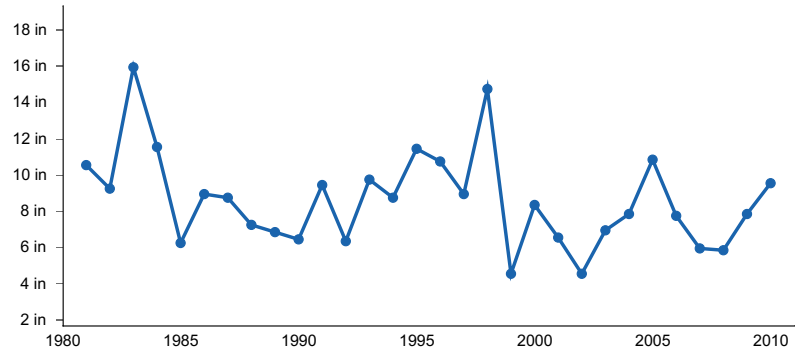


Figure 5. Annual precipitation pattern

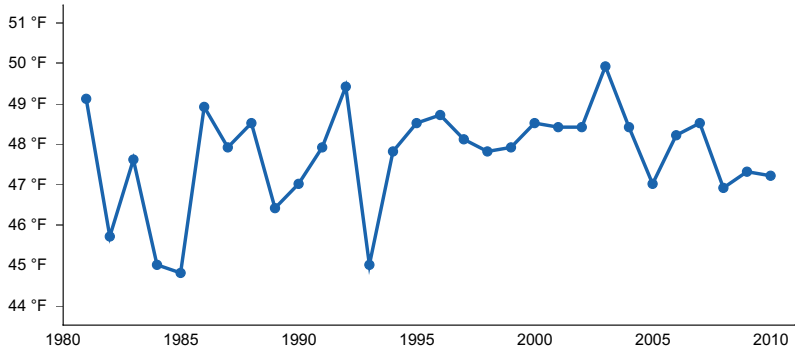


Figure 6. Annual average temperature pattern

Climate stations used

- (1) MCDERMITT [USC00264935], Jordan Valley, NV
- (2) MC DERMITT 26 N [USC00355335], Jordan Valley, OR

Influencing water features

Dry Meadow is influenced by adjacent streams and frequent flooding in the spring and early summer. The soil profile is characterized by a seasonal water table within 9.8 inches (25 cm) of the soil surface resulting from endo-saturation.

Soil features

The soils of this site are recent, deep to very deep and poorly drained. Typically the surface layer is a silt loam to silty clay loam. The subsoil is a silty clay loam to clay. The substratum varies from alluvium to bedrock. Permeability is slow to moderately slow. The available water holding capacity is about 4 to 7 inches (10 to 18cm) for the profile. Seasonal subsurface flows from adjacent slopes augment the available water.

Soil series correlated to this site include: Welch

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Fine-loamy
Drainage class	Poorly drained
Permeability class	Slow to moderately slow
Soil depth	40–60 in

Surface fragment cover <=3"	2–6%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	4–7 in
Soil reaction (1:1 water) (0-40in)	6–8
Subsurface fragment volume <=3" (0-40in)	0–10%
Subsurface fragment volume >3" (0-40in)	0–2%

Ecological dynamics

This ecological site occurs on the floodplain of a low gradient stream. Riparian areas differ from adjacent uplands in vegetative composition and structure, geomorphology, hydrology, microclimate, and fuel characteristics. Composition is complex and is tied closely to hydrologic processes, geomorphology, and use history. This site is highly productive and the vegetation is tolerant of saturation in the soil profile. Vegetation serves as an indicator of soil moisture gradient. Species classified as obligate or facultative wet occur closest to the stream channel. Moving perpendicular to the stream channel vegetation become more tolerant of dry soil conditions.

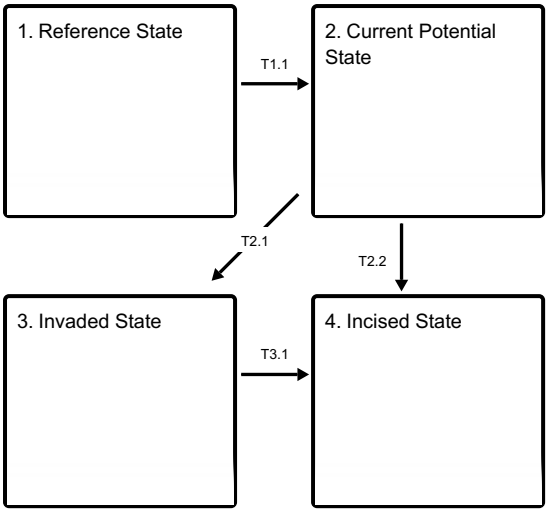
This site is characterized by a dominance of perennial bunchgrasses or grasslikes. Nevada bluegrass (*Poa secunda*) is dominant. Sedges and rushes are common. The amount of Nevada bluegrass in relation to sedge depends on the extent and duration of lateral subsurface water flows. Sedges increase on areas of meadows receiving subsurface flows late into the growing season. Conversely, Nevada bluegrass increases on areas of meadows with limited drainage areas.

This ecological site occupies a small percentage of the landscape, but provides critical habitat for a variety of wildlife. Ecological diversity of this system is maintained by natural disturbance regimes, including flooding and drought periods. Fire regimes in riparian areas are related to the fire regime of the adjacent upland community, although its suggested that fire frequency and severity was generally lower and than adjacent communities (Dwire and Kauffman 2003).

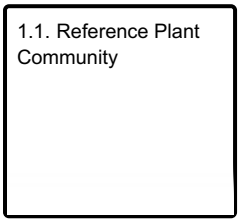
The presence of invasive species has the ability to significantly alter disturbance regimes from their natural range of variation. Precipitation patterns are highly variable and unpredictable throughout this area. Dryland riparian areas are tolerant of prolonged drought conditions, however decline in overall vegetative cover and production is expected during drought periods. Inappropriate management and upstream disturbance can lead to bank destabilization (Fleischner 1994) and soil erosion. Where stream channels become deeper and wider, causing water to flow faster (DJ Krueper, 1996), the water table is lowered, flooding is reduced, and a more drought tolerant plant community can invade. With time, the site can transition to sod forming bluegrasses such as Kentucky bluegrass.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference State

This represents the historical reference state in pristine conditions with no exotic species present. Variability in depth to water table and seasonal fluctuations support native facultative wetland vegetation and vegetated communities include all historical functional and structural groups. The historical disturbance regime is intact and driven primarily by climate which influences drought and flood cycles. The resilience and resistance of the site is bolstered by negative feedbacks between vegetation establishment and hydrologic processes that maintains a dynamic equilibrium with geomorphological processes.

Characteristics and indicators. Depth to water table and species composition with any complex of meadow sites can be highly variable. Conditions may vary within the site at a given location due to a minor changes in soils, flooding frequency and duration, seasonal water table fluctuations, and competition between plants that are mostly rhizomatous.

Dominant plant species

- bluegrass (*Poa*), grass
- sedge (*Carex*), grass
- rush (*Juncus*), grass

Community 1.1
Reference Plant Community

The reference plant community is dominated by Nevada bluegrass. Sedges, rushes, and a variety of other grasses are common. Proportion of the individual species shifts with drought and flooding cycles and proximity to a stream channel. An assortment of perennial forbs are present but do not account for a large part of the plant community by weight. Silver sagebrush and rose are present but are typically less than 5 percent by weight.

Dominant plant species

- bluegrass (*Poa*), grass
- sedge (*Carex*), grass
- rush (*Juncus*), grass

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1675	1860	2045
Forb	75	85	90
Shrub/Vine	50	55	65
Total	**1800**	**2000**	**2200**

State 2
Current Potential State

This state is similar to the reference state yet includes a component of non-native species such as Kentucky bluegrass (*Poa pratensis*), common timothy (Phleum pretense), and meadow foxtail (*Alopecurus pratensis*). Ecological process and function have not been altered fundamentally by this low level of invasion, yet resistance and resilience are decreased. Erosion processes are still within a historical range of variation, yet with continued vegetation loss the site risks a transition to an alternative state. Variability in depth to water table and seasonal fluctuations support native vegetation. Vegetated communities include all historical functional and structural groups, yet composition and richness may be reduced. This state is common due to widespread invasion of non-native meadow grasses in the Western US. Prolonged improperly managed grazing will promote the spread of Kentucky bluegrass and increase cover of shrubs (State 3). Further improperly managed grazing will increase bareground, increase erosion and risk a transition to a drained state (State 4).

State 3
Invaded State

Soil compaction, trampling and sustained overutilization has altered vegetated composition and increased bare ground. Relative to the current potential state, composition of wetland facultative species has been reduced and silver sage has increased. Much of the Nevada bluegrass, sedge, and rush cover has been replaced by Kentucky bluegrass. The state may also be invaded by exotic annual grasses and forbs and exotic tap rooted perennials. Soil erosion and vegetation pedestalling is often present. Banks are moderately stable, hydrology may be altered with somewhat lowered water tables.

State 4
Incised State

Sustained disturbance may lead to unstable stream banks, entrenched channels and headcuts. Active floodplains and primary terraces will become disconnected from the channel and evolve into high terraces with significantly lowered water tables. This will often lead to the replacement of facultative wetland communities with mountain big sagebrush communities. Plant community composition within this state will vary and may depend on adjacent vegetation types, water table levels, past disturbance history, drought and current management.

Transition T1.1
State 1 to 2

Invasion of non-native meadow grasses

Transition T2.1
State 2 to 3

Sustained improperly managed grazing during times of year when soils are most susceptible to compaction, and when graminoids are most prone to damage by trampling and over utilization.

Transition T2.2
State 2 to 4

This transition may be the result of several disturbances that lower water tables beyond depths that support facultative wetland vegetation, alter sediment supply and transport leading to scouring and channel incision, or directly increase flow velocities or flashiness.

Transition T3.1
State 3 to 4

This transition may be the result of several disturbances that lower water tables beyond depths that support facultative wetland vegetation, alter sediment supply and transport leading to scouring and channel incision, or directly increase flow velocities or flashiness.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Dominant, perennial, deep rooted**			1000–1400	
	bluegrass	POA	*Poa*	1000–1400	–
2	**Sub-dominant, perennial**			460–960	
	sedge	CAREX	*Carex*	300–500	–
	rush	JUNCU	*Juncus*	100–300	–
	bluegrass	POA	*Poa*	60–160	–
3	**All other perennial grasses**			80–260	
	bluegrass	POA	*Poa*	60–160	–
	squirreltail	ELEL5	*Elymus elymoides*	10–40	–
	Idaho fescue	FEID	*Festuca idahoensis*	10–40	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	10–40	–
	bluebunch wheatgrass	PSSPS	*Pseudoroegneria spicata ssp. spicata*	10–40	–
Forb					
4	**Dominant perennial forbs**			40–80	
	common yarrow	ACMI2	*Achillea millefolium*	20–40	–
	cinquefoil	POTEN	*Potentilla*	20–40	–
5	**All other perennial forbs**			0–60	
	sticky purple geranium	GEVI2	*Geranium viscosissimum*	0–20	–
	lupine	LUPIN	*Lupinus*	0–20	–
	buttercup	RANUN	*Ranunculus*	0–20	–
Shrub/Vine					
6	**Dominant shrubs**			40–80	
	silver sagebrush	ARCA13	*Artemisia cana*	20–40	–
	rose	ROSA5	*Rosa*	20–40	–
7	**Dominant, perennial, deciduous shrubs**			20–40	

Animal community

This site offers food and cover for mule deer, antelope, rodents and a variety of birds. It is an important summer and fall use area for mule deer and antelope.

This dry meadow ecological site provides diverse habitat for wetland and upland wildlife species. The characteristic seasonal hydrology results in abundant forage attracting invertebrate and vertebrate animals to this site. Habitat is provided for resident and migratory animals including western toad, western rattlesnake, shrews, bats, jackrabbits, ground squirrels, mice, coyote, red fox, badger, sage-grouse, Ferruginous hawk, prairie falcon, grasshopper sparrow, horned lark, and western meadowlark. Large herbivore use of the ecological site is dominated by mule deer, pronghorn antelope, and elk. Native reptiles and amphibians are reliant on these dry meadow sites during the year. Loss of site hydrology significantly reduces the habitat value of this site and also adjacent ecological sites. Open water is seasonal, only being provided by seasonal runoff, ponding, flooding, seasonal high water table, and natural springs.

Grazing Interpretations.
This site is suitable for livestock grazing in late spring after soils have dried sufficiently to prevent trampling and in the summer and fall.

Other information

The soils in this site have excellent water holding capacities providing late season water for plant growth and slow water release to streams. When incised channels are present, rehabilitation will markedly improve production and restore good hydrologic characteristics. On altered sites, the reintroduction of desirable plants may be needed to fully restore the site potential.

Inventory data references

Vale District BLM Ecological Site Inventory
NASIS component and pedon data
Range Site Descriptions
Field knowledge of range-trained personnel

Type locality

Location 1: Malheur County, OR	
Township/Range/Section	TT27S RR45E S12
General legal description	Located in SW 1/4 of Sec 12 on upper South Fork of Carter Creek, north side of Spring Mountain (SI 40 with small areas of SI 70)

References

Dwire, K. and J. Kauffman. 2003. Fire and riparian ecosystems in landscapes in the western United States. Forest Ecology and Management. 178:61–74.

Other references

Fleischner, T.L., 1994. Ecological Costs of Livestock Grazing in Western North America. Conservation Biology Vol 8 No. 3 pp 629-644.

Krueper, D.J. 1996. Effects of livestock management on Southwestern riparian ecosystems. In: Shaw, Douglas W.; Finch, Deborah M., tech coords. Desired future conditions for Southwestern riparian ecosystems: Bringing interests and concerns together. 1995 Sept. 18-22, 1995; Albuquerque, NM. General Technical Report RM-GTR-272. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. p. 281-301.

Contributors

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Approval

Kendra Moseley, 4/24/2024

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	05/05/2024
Approved by	Kendra Moseley
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):**

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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:**
