USDA Natural Resources
Conservation Service

Ecological site R008XY980WA
Wet Meadow

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

MLRA notes

Major Land Resource Area (MLRA): 008X–Columbia Plateau

MLRA 8 encompasses about 50,100 square kilometers mainly in Washington and Oregon, with a small area in Idaho. This MLRA is characterized by loess hills, surrounding scablands, and alluvial deposits. This MLRA consists mostly of Miocene Columbia River Basalt covered with up to 200 feet of loess and volcanic ash. The dominant soil order in this MLRA is Mollisols. Soils in this MLRA dominantly have a mesic temperature regime, a xeric moisture regime, and mixed minerology.

Classification relationships

Major Land Resource Area (MLRA): 8 – Columbia Plateau

Land Resource Unit (LRU) – Common Resource Areas (CRA):
8.1 - Channeled Scablands
8.2 - Loess Islands
8.3 - Okanogan Drift Hills
8.4 - Moist Pleistocene Lake Basins
8.5 - Moist Yakima Folds
8.6 - Lower Snake and Clearwater Canyons
8.7 - Okanogan Valley

Ecological site concept

In the upland setting ecological sites are often expansive, and thus, can be delineated and separated on aerial photos.

But in the landscape position of bottoms, basins and depressions this is rarely the case as small changes in soil chemistry, the water table and elevation or aspect results in significant changes in plant community composition. In short distances there are often big swings of available water holding capacity, and soils can go from hydric to non-hydric, or from saline-sodic to not. So, in bottoms, riparian areas and depressions, ecological sites and community phases occur as small spots, strips and patches, or as narrow rings around vernal ponds. And generally, in a matter of steps one can walk across several ecological sites. On any given site location, two or more of these sites often occur as a patchwork – Loamy Bottom, Alkali Terrace, Sodic Flat, Wet Meadow, Herbaceous Wetland and Riparian Woodland. These ecological sites may need to be mapped as a complex when doing resource inventory.

Diagnostics:
Wet Meadow sites have hydric soils and experience seasonal flooding. The water table drops 12 to 36 inches (approximation) during late spring and summer. Wet Meadow stands out because this ecological site is much wetter than adjacent upland sites. It is green in summer when the uplands are dry. This site is part of the lentic (standing water) ecosystem.

Wet Meadow occurs on non-saline or non-sodic bottoms, depressions, floodplains, channel shelves and terraces (first, stream, pond). This site also occurs as a zonal band near springs, lakes, perennial streams or intermittent streams with spring-fed reaches. Sites with perennial streams experience overbank flooding as a seasonal event in most years during late winter to early spring.

The soils are moderately deep to deep silt loam or sandy loam texture. Upper layer of soil profile is often deposited or captured from the current year’s flood. The soils have mottling or greying high in the profile, and thus, are hydric. There are also redoximorphic features (color patterns) in the upper 20 inches.

Loamy Bottom, Wet Meadow, and Wetland Complex ecological sites, all bottomland sites, are home to different groups of plant species. Upland and facultative upland species (UPL and FACU) are found on Loamy Bottom. Wet Meadow is largely facultative wetland species (FACW), while Wetland complex is dominated by obligate wetland species (OBL).

The reference community is largely grass-sedge-rush with a few forbs. Shrubs are virtually nonexistent. Tufted hairgrass, slender wheatgrass, northern reedgrass, bluejoint, clustered field sedge, smallwing sedge and Baltic rush are important grass and grass-like species. Cinquefoil, iris, camas and sagewort are common forbs.

Principle Vegetative Drivers:
The vegetative expression of Wet Meadow is driven by the magnitude and duration of flooding and groundwater discharge. The water table level during mid- and late-season determines the production potential. Wet Meadow is far more productive and any upland

site.

Associated Sites:
Wet Meadow is associated with other ecological sites in bottoms and basin areas of MLRA 8, including Loamy Bottom, Alkali Terrace, Sodic Flat, Wetland Complex, and Riparian Complex. Wet Meadow is also associated with upland sites such as Loamy, Stony, and Cool Loamy.

Similar Sites:
There is no similar ecological site at this time.

Associated sites

R008XY930WA	**Loamy Bottom**
R008XY970WA	**Alkali Terrace**
R008XY978WA	**Sodic Flat**
R008XY720WA	**Riparian Complex**

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Betula occidentalis* (2) *Salix*
Herbaceous	(1) *Deschampsia cespitosa* (2) *Elymus trachycaulus*

Physiographic features

The landscape is part of the Columbia basalt plateau. This site is often associated with stream terraces and valleys having less than three percent gradient. Wet Meadow usually appears near bank full. This site also occurs as a zonal band near springs, lakes, perennial streams or intermittent streams with spring-fed reaches. Wet Meadow occurs on non-saline or non-sodic bottoms, depressions, floodplains, channel shelves and terraces (first, stream, pond). There are also Riparian Complex patches on draws, basins, depressions, and near ponds, lakes or springs. In the upland setting ecological sites are often expansive, and thus, can be delineated and separated on aerial photos. But in the landscape position of bottoms, basins and depressions this is rarely the case as small changes in soil chemistry, the water table and elevation or aspect results in significant changes in plant community composition. In short distances there are often big swings of available water holding capacity, and soils can go from hydric to non-hydric, or from saline-sodic to not. So, in bottoms, riparian areas and depressions, ecological sites and community phases occur as small spots, strips and patches, or as narrow rings around vernal ponds. Generally, in a matter of steps one can walk across several ecological sites.

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Physiographic Division: Intermontane Plateau
Physiographic Province: Columbia Plateau
Physiographic Sections: Walla Walla Plateau Section

Landscapes: Valleys, plateaus and hills
Landform: depressions, floodplains and drainageways

Table 2. Representative physiographic features

Landforms	(1) Valley (2) Plateau (3) Hills (4) Flood plain (5) Drainageway
Flooding frequency	Rare to frequent
Ponding frequency	None to frequent
Elevation	305–1,097 m
Slope	0–3%
Water table depth	13–102 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0–5%
Water table depth	Not specified

Climatic features

The climate is characterized by moderately cold, wet winters, and hot, dry summers, with limited precipitation due to the rain shadow effect of the Cascades. Taxonomic soil climate is either xeric (12 to 16 inches precipitation) or aridic moisture regimes (10 to 12 inches precipitation) with a mesic temperature regime.

Table 4. Representative climatic features

Frost-free period (characteristic range)	110-160 days
Freeze-free period (characteristic range)	
Precipitation total (characteristic range)	254-406 mm
Frost-free period (actual range)	90-200 days
Freeze-free period (actual range)	
Precipitation total (actual range)	

Influencing water features

A plant's ability to grow on a site and overall plant production is determined by soil-water-plant relationships:
1. Whether rain and melting snow run off-site or infiltrate into the soil
2. Whether soil conditions remain aerobic or become saturated and anaerobic
3. How quickly the soil reaches the wilting point

Wet Meadow experiences seasonal flooding and discharging groundwater from nearby uplands which creates saturated soil conditions in late winter to early spring. By late summer the water table may be as shallow as 12 inches or as deep as 36 inches. (approximated)

Soil features

This ecological site components are dominantly Cumulic, Typic and Fluvaquentic taxonomic subgroups of Haploxerolls, Endoaquolls and Vitraquands great groups of the Mollisols and Andisols taxonomic orders. Soils are dominantly very deep but can be as shallow as moderately deep. Average available water capacity of about seven inches (17.8 cm) in the zero to 40 inches (zero to 100 cm) depth range.

Soil parent material is dominantly mixed alluvium and loess with possible mixed ash.

The associated soils are Aquolls, Cocolalla, Haploxerolls, Konert, Munset, Toppenish and similar soils.

Dominate soil surface is silt loam to gravelly fine sandy loam, with ashy modifier sometimes occurring as well.

Dominant particle-size class is fine to fine-loamy but includes limited ashy.

Table 5. Representative soil features

Parent material	(1) Alluvium (2) Loess

Surface texture	(1) Silt loam (2) Gravelly fine sandy loam
Family particle size	(1) Fine-loamy
Drainage class	Very poorly drained to moderately well drained
Depth to restrictive layer	51–152 cm
Soil depth	152 cm
Surface fragment cover <=3"	5%
Surface fragment cover >3"	1%
Available water capacity (0-101.6cm)	17.78 cm
Calcium carbonate equivalent (Depth not specified)	0–5%
Electrical conductivity (Depth not specified)	0–10 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–10
Soil reaction (1:1 water) (0-25.4cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	10%
Subsurface fragment volume >3" (Depth not specified)	5%

Table 6. Representative soil features (actual values)

Drainage class	Not specified
Depth to restrictive layer	Not specified
Soil depth	Not specified
Surface fragment cover <=3"	0–30%
Surface fragment cover >3"	0–10%
Available water capacity (0-101.6cm)	6.6–24.38 cm
Calcium carbonate equivalent (Depth not specified)	Not specified
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified

Soil reaction (1:1 water) (0-25.4cm)	Not specified
Subsurface fragment volume <=3" (Depth not specified)	0–30%
Subsurface fragment volume >3" (Depth not specified)	0–30%

Ecological dynamics

Wet Meadow produces about 6,000 to 7,500 pounds per acre of biomass annually.

Regarding saline-alkali soils Daubenmire (page 50) wrote, “It seems impossible to find areas where one can be confident that the vegetation has not been somewhat altered by domesticated animals.” The same is also true of meadows, riparian areas and wetlands. Some areas were also manipulated by tillage or other farming practices.

Plant production at the site level and individual species level can vary greatly depending on soil properties (depth to permanent water table) and growing conditions (timing and amount of precipitation, temperature). This site, because of the permanent water table, provides a very favorable soil-water-plant relationship.

Northern reedgrass and bluejoint are perennial rhizomatous, cool season grasses of the Calamagrostis genus. Tufted hairgrass is a low, dense cool season bunchgrass that prefers poorly drained soil. Clustered field sedge plants are often dioecious, bearing male or female flowers but not both. Smallwing sedge has a dense cluster of green or brown spikes packed tightly. Baltic rush is the most common of the rushes found in the Intermountain West as it occurs in both salt and freshwater habitats.

Wet Meadow is dominated by grasses, sedges and rushes in the reference community. Wet Meadow remains green late into the season and rarely burns.

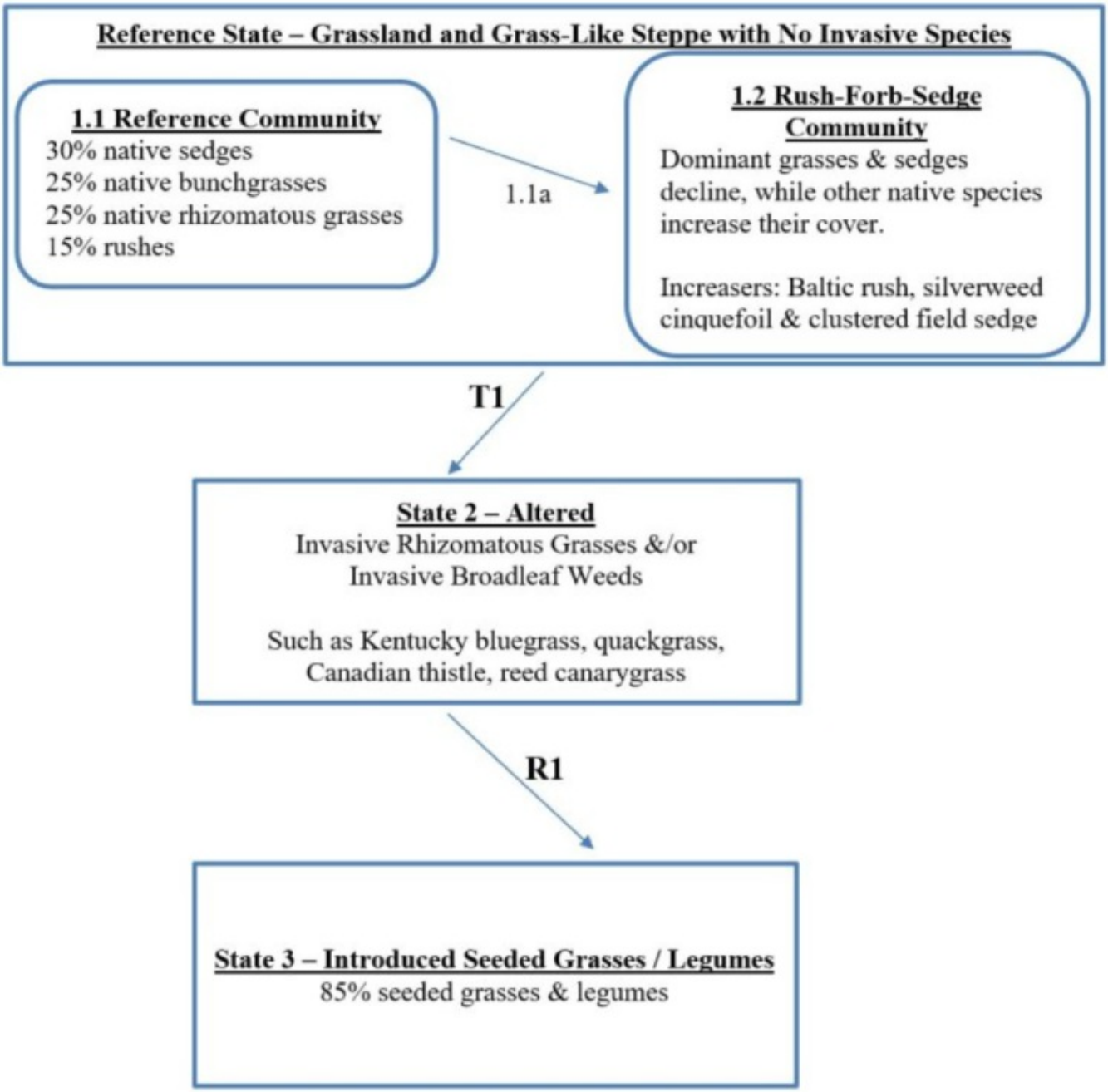
Grazing by big game and livestock is a common disturbance that occurs to this ecological site. Grazing pressure can be defined as heavy to severe grazing intensity, or frequent critical period (vulnerable time of reproductive growth) grazing, or season-long grazing. As grazing pressure increases the plant community unravels in stages:

1. Tufted hairgrass, bluejoint and other grasses decline while Baltic rush, silverweed cinquefoil and clustered field sedge increase.
2. With further decline, invasive species such as Kentucky bluegrass, Canada bluegrass, reed canarygrass, redtop, quackgrass and Canadian thistle increase and become co-dominant. Eventually these invasive species dominate the site.
3. Eventually all the reference state species are replaced by invasive species.

In Washington, Wet Meadow communities provide habitat for a variety of upland and

wetland wildlife species.

State and transition model



State 1
Reference Grassland or Grassland Steppe with No Invasive Species

There may be few examples of good condition Wet Meadow remaining in MLRA 8, as most sites have been converted to other land uses or altered by farming practices. State 1 Narrative: State 1 represents Wet Meadow with no invasive or exotic weeds species. This has been reconstructed because there are few to no examples of pristine Wet Meadow remaining. Reference Community 1.1 is dominated by native bunchgrasses, sodforming

grasses, and native sedges and rushes. Community 1.2 is mainly native increasers. Reference State Community Phases: 1.1 The main species are tufted hairgrass, slender wheatgrass, bluejoint, northern reedgrass, 1.2 the main species are Baltic rush, silverweed cinquefoil, clustered field sedge, Rocky Mtn. iris, and camas At-risk Communities: All communities in the reference state are at risk because of heavy grazing pressure, tillage, and other human manipulations to meadows.

Community 1.1
Reference

30% native sedges 25% native bunchgrasses 25% native rhizomatous grasses 15% rushes

Community 1.2
Rush, Forb, Sedge

Dominant grasses and sedges decline, while other native species increase cover. Increasers: baltic rush, silverweed, cinquefoil, and clustered field sedge.

Pathway 1.1A
Community 1.1 to 1.2

Heavy grazing has removed the dominant herbaceous species and have been replaced with increaser species that are less palatable. The transition from Community 1.1 to 1.2 is not reversible due to competitive nature of the plants in Community 1.2.

State 2
Altered

State 2 represents communities of invasive species that have crossed a biological threshold. Virtually all the native functional, structural groups have been replaced. Common invasive grass species for State 2 include Kentucky bluegrass, Canada bluegrass, quackgrass, redtop and reed canarygrass. Invasive broadleaf weeds include Canada thistle, bull thistle, houndstongue. Community Phases for State 2: there is only one community in State 2

Community 2.1
Invasive Rhizomatous Grasses and Broadleaf Weeds

Kentucky bluegrass, quackgrass, Canadian thistle, reed canarygrass

State 3
Seeded Grasses

State 3 represents a site that has been seeded to desirable grasses &/or legumes. Common seeded species include orchard grass, tall fescues, smooth brome, intermediate wheatgrass, and legumes Pathways within State 3: there is only one community in State 3

Community 3.1
Introduced Seeded Grasses and Legumes

85% seeded grasses and legumes

Transition T1A
State 1 to 2

Result: Shift from Reference state with native species and no invasive species to State 2 which is dominated by invasive species. The plant community that has crossed a biological threshold. Virtually all the native functional, structural groups are missing. Primary Trigger: tillage, other farming practices and grazing pressure (heavy grazing or season-long grazing) to native grasses. The transition from State 1 to State 2 occurs as Community 1.2 declines until it crosses the biological threshold. Ecological process: with continued defoliation pressure native species have low vigor, shrinking crowns and mortality. This gives invasive species the opportunity to invade, then expand its cover and eventually become dominant. Indicators: the presence of invasive species where none has existed before. Declining cover for native species and increasing cover for invasive species.

Restoration pathway R2A
State 2 to 3

Transition from State 2 (a community dominated by invasive rhizomatous grasses and broadleaf weeds) to State 3, which is predominately introduced grasses and legumes. This restoration transition does not occur without significant time and inputs to control weeds, prepare a seedbed, seed desirable species, and post-seeding weed control and management. This can require a commitment of two years or more for weed control. Care must be taken to maintain soil structure. Seed placement must be managed to achieve seed-soil contact at very shallow depth (about 1/8-1/4 inch is desired). Proper grazing management is essential to maintain the stand post-seeding. Species such as orchardgrass, tall fescue, intermediate wheatgrass and clovers are highly adapted to the Wet Meadow ecological site. The actual transition occurs when the seeded species have successfully established and are outcompeting the invasive species for cover and dominance of resources.

Additional community tables

Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)

Group	Common Name	Symbol	Scientific Name	(Kg/Hectare)	(%)
Shrub/Vine					
1	**Native Shrubs - Minor**			841–	
	water birch	BEOC2	*Betula occidentalis*	–	–
	Woods' rose	ROWO	*Rosa woodsii*	–	–
	willow	SALIX	*Salix*	–	–
Tree					
2	**Trees - Trace**			–	
	quaking aspen	POTR5	*Populus tremuloides*	–	–
Grass/Grasslike					
3	**Dominant Bunchgrasses**			2130–	
	tufted hairgrass	DECE	*Deschampsia cespitosa*	–	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	–	–
4	**Native Annual Grasses - Trace**			–	
	meadow barley	HOBR2	*Hordeum brachyantherum*	–	–
	foxtail barley	HOJU	*Hordeum jubatum*	–	–
5	**Dominant Rhizomatous Grasses**			1681–	
	bluejoint	CACA4	*Calamagrostis canadensis*	–	–
	slimstem reedgrass	CAST36	*Calamagrostis stricta*	–	–
6	**Dominant Native Sedges**			2130–	
	clustered field sedge	CAPR5	*Carex praegracilis*	–	–
	smallwing sedge	CAMI7	*Carex microptera*	–	–
7	**Native Rushes - Subdominant**			1289–	
	swordleaf rush	JUEN	*Juncus ensifolius*	–	–
	longstyle rush	JULO	*Juncus longistylis*	–	–
	poverty rush	JUTE	*Juncus tenuis*	–	–
	arctic rush	JUAR2	*Juncus arcticus*	–	–
Forb					
8	**Native Forbs - Minor**			841–	
	silverweed cinquefoil	ARAN7	*Argentina anserina*	–	–

	Rocky Mountain iris	IRMI	*Iris missouriensis*	–	–
	small camas	CAQU2	*Camassia quamash*	–	–
	rough bugleweed	LYAS	*Lycopus asper*	–	–
	slender cinquefoil	POGR9	*Potentilla gracilis*	–	–
	willow dock	RUSA	*Rumex salicifolius*	–	–
	willowherb	EPILO	*Epilobium*	–	–
	bedstraw	GALIU	*Galium*	–	–
	seep monkeyflower	MIGU	*Mimulus guttatus*	–	–

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Acknowledgments

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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	05/13/2025
Approved by	Kirt Walstad
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

   _____

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

   _____

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

   _____

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

   _____

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

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

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

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

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

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

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

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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

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

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

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

17. **Perennial plant reproductive capability:**