Ecological site R058BY174WY
Subirrigated (Sb)
10-17” PZ

Last updated: 9/15/2024
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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): 058B–Northern Rolling High Plains, Southern Part

MLRA 58B is located in northeastern Wyoming (95 percent) and extreme southeastern Montana (5 percent). It is comprised of sedimentary plains, scoria hills, and river valleys. The major rivers include the Powder, Tongue, Belle Fourche, Cheyenne, and North Platte. Tributaries include the Little Powder River, Little Missouri River, Clear Creek, Crazy Woman Creek, and others. This MLRA is traversed by Interstates 25 and 90, and U.S. Highways 14 and 16. The extent of MLRA 58B covers approximately 12.3 million acres. Major land uses include rangeland (approximately 93 percent), cropland, pasture, and hayland (approximately 2 percent), and forest, urban, and miscellaneous uses (approximately 5 percent). Cities include Buffalo, Casper, Sheridan, and Gillette, WY. Land ownership is mostly private. Federal lands include the Thunder Basin National Grassland (U.S. Forest Service) and lands administered by the Bureau of Land Management. Areas of interest in MLRA 58B in Wyoming include Fort Phil Kearny State Historic Site, Glendo State Park, and Lake DeSmet. The elevations in MLRA 58B increase gradually from north to south and range from approximately 2,900 to 5,900 feet. A few buttes are higher than 6,800 feet. The average annual precipitation in this area ranges from 10 to 17 inches per year. Precipitation occurs mostly during the growing season, often during rapidly developing thunderstorms. Mean annual air temperature is 46 degrees Fahrenheit. Summer temperatures may exceed 100 degrees Fahrenheit. Winter temperatures may drop to below zero. Snowfall averages 45 inches per year, but varies from 25 to over 70 inches in some locales.

Classification relationships

USDA Natural Resources Conservation Service (NRCS): Land Resource Region?G Western Great Plains Range and Irrigation; Major Land Resource Area (MLRA)? 58B Northern Rolling High Plains, Southern Part (USDA, 2006). Relationship to Other Classifications: USDA Forest Service (FS) Classification Hierarchy: Province?331 Great Plains-Palouse Dry Steppe; Section?331G-Powder River Basin; Subsections?331Gb Montana Shale Plains, 331Ge Powder River Basin, 331Gf South Powder River Basin-Scoria Hills (Cleland et al, 1997) Environmental Protection Agency (EPA) Classification Hierarchy: Level III Ecoregion?43 Northwestern Great Plains; Level IV Ecoregion?43p Scoria Hills, 43q Mesic-Dissected Plains, 43w Powder River Basin (EPA, 2013) https://www.epa.gov/eco-research/ecoregions

Ecological site concept

The Subirrigated 10-17” Precipitation Zone (PZ) site occurs on sedimentary plains or lowlands, adjacent to streams, springs, and ponds. It is a cool-season mixed-grass prairie (bunch- and rhizomatous) tall- and midgrasses and grass-likes, with secondary warm-season mid- and shortgrasses (bunch- and rhizomatous), followed by a minor component of forbs and shrubs. The variability in water table provides a mosaic of drier and wetter areas on a meadow site.

Associated sites

R058BY128WY	**Lowland (LL) 10-14” PZ** Lowland 10-14 is generally higher on the landscape on floodplain steps or benches above the channel system.
R058BY178WY	**Wetland (WL) 10-17” PZ** Wetland 10-14 is generally the lowest point of the landscape and directly tied to the water table or channel.

Similar sites

R058BY128WY	**Lowland (LL) 10-14” PZ** Lowland has a water table for only a short period of time and it is deep in the soil profile. Lower productivity and a lower composition of hydrophytic plants.
R058BY178WY	**Wetland (WL) 10-17” PZ** Wetland has a water table to the surface or above the surface for an extended part of the growing season. Highest production and all hydrophytic plants.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Andropogon gerardii* (2) *Spartina pectinata*

Physiographic features

This site occurs on nearly level drainageways, flood plains, and stream terraces; and on sedimentary plains or lowlands, adjacent to streams, springs and ponds.

Table 2. Representative physiographic features

Landforms	(1) Drainageway (2) Flood plain (3) Stream terrace
Runoff class	Negligible to very high
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	1,070 – 1,830 m
Slope	0 – 10 %

Water table depth	0 – 90 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation ranges from 10 to 17 inches per year across MLRA 58B. There are two precipitation zones (PZ). The 10 to 14 inch precipitation zone is predominant across the MLRA, including portions of Sheridan, Johnson, and Natrona Counties; portions of Campbell and Converse Counties; and smaller portions of Weston and Niobrara Counties. The 15 to 17 inch precipitation zone occurs in northern and eastern portions of the MLRA, including portions of Sheridan, Campbell, and western Crook Counties. Wide fluctuations in precipitation may occur from year to year, and occasional periods of extended drought (longer than one year in duration) can be expected. Two-thirds of the annual precipitation occurs during the growing season from May through September. Mean Annual Air Temperature (MAAT) is 46 degrees Fahrenheit. Cold air outbreaks from Canada in winter move rapidly from northwest to southeast and account for extreme minimum temperatures. Chinook winds may also occur in winter and bring rapid rises in temperature. Extreme storms may occur during the winter, but most severely affect ranching operations during late winter and spring. High-intensity afternoon thunderstorms may occur during the summer. Annual wind speeds average about 5 mph. Daytime winds are generally stronger than nighttime winds. Occasional strong storms may bring brief periods of high winds with gusts of more than 75 mph. The average length of the freeze-free period (28 degrees Fahrenheit) is 125 days and generally occurs from May 16 to September 19. The average frost-free period (32 degrees Fahrenheit) is 101 days and generally occurs from June 1 to September 9.

The growth of native cool-season plants begins in late April to early May with peak growth occurring in mid to late June. Native warm-season plants begin growth in late May to early June and continue into August. Regrowth of cool-season plants occurs in September in most years, depending upon moisture.

Note: The climate described here is based on historic climate station data and is averaged to provide an overview of the annual precipitation, temperatures, and growing season. Future climate is beyond the scope of this document. However, research to determine the effects of elevated CO2 and heating on mixed-grass prairie ecosystems, and how it may relate to future plant communities, is ongoing.

For detailed information, or to find a specific climate station, visit the Western Regional Climate Center (WRCC) website: Western Regional Climate Center, Historical Data, Western U.S. Climate summaries, NOAA Coop Stations, Wyoming (Note: Montana climate stations are also listed under the Wyoming link).
https://wrcc.dri.edu/summary/Climsmwy.html

Wind speed averages can be found at the WRCC home page, under the Specialty Climate tab: https://wrcc.dri.edu/

The following tables represent area-wide climate data for the 10 to 14 inch precipitation zone:

Table 3 Representative climatic features

Frost-free period (characteristic range)	90-110 days
Freeze-free period (characteristic range)	120-130 days
Precipitation total (characteristic range)	330-380 mm
Frost-free period (actual range)	80-110 days
Freeze-free period (actual range)	120-130 days
Precipitation total (actual range)	250-430 mm

Frost-free period (average)	100 days
Freeze-free period (average)	130 days
Precipitation total (average)	360 mm

- (1) GLENROCK 5 ESE [USC00483950], Glenrock, WY
- (2) BUFFALO [USC00481165], Buffalo, WY
- (3) WRIGHT 12W [USC00489805], Gillette, WY
- (4) DULL CTR 1SE [USC00482725], Douglas, WY
- (5) MIDWEST [USC00486195], Midwest, WY
- (6) SHERIDAN CO AP [USW00024029], Sheridan, WY
- (7) LEITER 9N [USC00485506], Clearmont, WY
- (8) DOUGLAS 1 SE [USC00482685], Douglas, WY
- (9) GILLETTE 4SE [USC00483855], Gillette, WY
- (10) DILLINGER [USC00482580], Gillette, WY

Influencing water features

There is a seasonal water table that influences the vegetation and management of the Subirrigated 10 to 17 inch Precipitation Zone ecological site. The water table in some areas is anthropogenic, caused by seepage from nearby irrigation ditches, canals, and reservoirs. Map units in this ESD typically have hydric components for stream terraces and flood plains that have a water table.

Wetland description

Wetland Description (Cowardin System)

System - Palustrine
Subsystem - N/A
Class - Emergent Wetland

Soil features

The soils on this site are deep to very deep, very poorly to somewhat poorly drained, and formed in alluvium derived from sandstone or shale. The permeability class ranges from slow to rapid for the soils on this site. The available water capacity is typically moderate but may range to high or very high in some soils. The surface layer of the soils in this site are typically fine sandy loam or silty clay, but may include loam, silt loam, silty clay loam, clay loam, sandy loam, loamy sand, or clay. The surface layer ranges from a depth of 2 to 10 inches thick. The subsoil is stratified with thin to moderately thick, highly variable textural strata that when averaged is typically sandy loam, silty clay, clay, clay loam, or silty clay loam. The subsoil typically contains 0 to 5 percent rock fragments. Soils in this site are typically calcareous to the surface, but some pedons are leached as deep as 10 inches, depending upon the source material of the most recent deposition. These soils are susceptible to erosion by water and wind. The potential for water erosion accelerates with increasing slope.The soil moisture regime is typically aquic but may include aridic. The soil temperature regime is mesic.

Major soil series correlated to this ecological site include: Bigwinder, Boruff

The attributes listed below represent 0-40 inches in depth or to the first restrictive layer.

Table 4. Representative soil features

Parent material	(1) Alluvium – sandstone and shale

Surface texture	(1) Fine sandy loam (2) Silty clay (3) Loam (4) Silt loam (5) Silty clay loam (6) Clay loam (7) Sandy loam (8) Loamy sand (9) Clay
Drainage class	Somewhat poorly drained
Permeability class	Moderate to moderately slow
Soil depth	50 – 200 cm
Surface fragment cover <=3"	0 – 10 %
Available water capacity (Depth not specified)	9.14 – 21.34 cm
Calcium carbonate equivalent (Depth not specified)	0 – 10 %
Electrical conductivity (Depth not specified)	0 – 20 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0 – 30
Soil reaction (1:1 water) (Depth not specified)	6.6 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	0 – 20 %

Ecological dynamics

The Reference state is the plant community in which interpretations are primarily based and is used as a reference in order to understand the original potential of the site. The Reference state evolved under the combined influences of climatic conditions, periodic fire activity, grazing by large herbivores, and impacts from small mammals and insects. Changes may occur to the Reference state due to management actions such as continuous season-long or year-long grazing, increased stocking rates, climatic conditions such as drought, and natural events such as multiple fires in close succession. The Reference state is characterized by warm-season rhizomatous tall and midgrasses and cool-season rhizomatous grass. A minor component of sedge, rush, spikerush, and bulrush species; forbs and shrubs are also present (see the species composition list for more information). The Reference state is not necessarily the management goal, as other vegetative states may be considered desired plant communities as long as critical resource concerns are met.

In addition to the Reference state, other plant communities can occur on this site and are usually the result of historic management practices. Grazing practices such as continuous season-long or year-long grazing, heavier stocking rates, or a combination of these factors on this ecological site results in grasses such as big bluestem, prairie cordgrass, western wheatgrass, and slender wheatgrass decreasing in frequency and production. Species such as Baltic rush, scouring rush, and other grass-likes will increase to form a cool-season-dominated plant community. Eventually all tall- and midgrasses will be removed. Kentucky bluegrass will invade and eventually become sod-bound. Over the long-term, this continuous use in combination with high stocking rates will result in a broken sod appearance. Bare ground may increase depending upon water table depth. Noxious weeds will invade. Once these events have occurred, it is difficult for native perennial plants to reestablish. Trees such as Russian olive may also invade if a seed source is available. There are various transitional stages which may occur on this ecological site. The information presented is representative of a dynamic set of plant communities that illustrate the complex interaction of several ecological processes.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
Grass/Grasslike					
1	**Cool-Season Rhizomatous Grasses**			196-1009	
	thickspike wheatgrass	ELLAL	*Elymus lanceolatus ssp. lanceolatus*	196-1009	5-20
	western wheatgrass	PASM	*Pascopyrum smithii*	196-1009	5-20
2	**Cool-Season Bunchgrasses**			3923-5044	
	basin wildrye	LECI4	*Leymus cinereus*	588-757	5-15
	bearded wheatgrass	ELCA11	*Elymus caninus*	588-757	5-15
	bluejoint	CACA4	*Calamagrostis canadensis*	588-757	5-15
	Nebraska sedge	CANE2	*Carex nebrascensis*	588-757	5-15
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	588-757	5-15
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	588-757	5-15
	tufted hairgrass	DECE	*Deschampsia cespitosa*	588-757	5-15
3	**Warm-Season Tallgrass**			1345-2018	
	prairie cordgrass	SPPE	*Spartina pectinata*	588-1261	10-25
4	**Miscellaneous**			224-673	
	mat muhly	MURI	*Muhlenbergia richardsonis*	196-252	1-5
	arctic rush	JUAR2	*Juncus arcticus*	196-252	1-5
	Canada wildrye	ELCA4	*Elymus canadensis*	196-252	1-5
	Grass, perennial	2GP	*Grass, perennial*	196-252	1-5
	inland sedge	CAIN11	*Carex interior*	196-252	1-5
	spike sedge	CANA2	*Carex nardina*	196-252	1-5
Forb					
5	**Forbs**			588-757	
	American vetch	VIAM	*Vicia americana*	196-224	–

	sunflower	HELIA3	*Helianthus*	196-224	–
	white prairie clover	DACA7	*Dalea candida*	196-224	–
	milkvetch	ASTRA	*Astragalus*	196-224	–
	aster	ASTER	*Aster*	196-224	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	196-224	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	196-224	–
	purple prairie clover	DAPU5	*Dalea purpurea*	196-224	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	196-224	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	196-224	–
	bluebells	MERTE	*Mertensia*	196-224	–
	goldenrod	SOLID	*Solidago*	196-224	–
	seaside arrowgrass	TRMA20	*Triglochin maritima*	196-224	–
	textile onion	ALTE	*Allium textile*	196-224	–
	Forb, perennial	2FP	*Forb, perennial*	196-224	–
Shrub/Vine					
6	**Shrubs**			392-504	
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	392-504	5-10
	willow	SALIX	*Salix*	392-504	1-5
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	392-504	1-5

Table 6. Community 1.2 plant community composition

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

Table 7. Community 1.3 plant community composition

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

Table 8. Community 2.1 plant community composition

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

Table 9. Community 3.1 plant community composition

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

Animal community

Animal Community – Wildlife Interpretations (from 2001 ESD; will be revised in future updates) Nebraska sedge/basin wildrye/prairie cordgrass (Reference): The predominance of grasses in this plant community favors grazers and mixed-feeders, such as bison, elk, and antelope. Suitable thermal and escape cover for deer may be limited due to the low quantities of woody plants. However, topographical variations could provide some escape cover. This plant community may provide brood-rearing and foraging areas for sage grouse. Other birds that would frequent this plant community include western meadowlarks, horned larks, and golden eagles. Many grassland-obligate small mammals would occur here. Western wheatgrass/Kentucky bluegrass: This plant community may be useful for the same large grazers that would use the Historic Climax Plant Community. However, the plant community composition is less diverse, and thus less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat equals good foraging for birds. Kentucky bluegrass/dandelion: This plant community may be useful for the same large grazers that would use the Reference Plant Community. However, the plant community composition is less diverse, and thus less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat also is good foraging for birds. Dry, western wheatgrass/Cheatgrass: This plant community may be useful for the same large grazers that would use the Reference Plant Community. However, the plant community composition is less diverse, and thus, less apt to meet the seasonal needs of these animals. It may provide some foraging opportunities for sage grouse when it occurs proximal to woody cover. Good grasshopper habitat also is good foraging for birds. Animal Community – Grazing Interpretations (updated in the 2019 Provisional revision) The following table is a guide to stocking rates for the plant communities described in the Subirrigated 10 to 17 inch Precipitation Zone ecological site. These are conservative estimates for initial planning. On-site conditions will vary, and stocking rates should be adjusted based on range inventories, animal kind and class, forage availability (adjusted for slope, distance to water), and the type of grazing system (number of pastures, planned moves, etc.), all of which is determined in the conservation planning process. The following stocking rates are based on the total annual forage production in

a normal year multiplied by 25 percent harvest efficiency of preferred and desirable forage species, divided by 912 pounds of ingested air-dry vegetation for an animal unit per month (National Range and Pasture Handbook, 1997). An animal unit month is defined as the amount of forage required by one livestock animal, with or without one calf, for one month, and is shortened to AUM. Example: 4,000 lbs. per acre X 25% Harvest Efficiency = 1,000 lbs. forage demand for one month. 1,000 lbs. per acre/912 demand per AUM =1.1 Plant Community (PC) Production (total lbs./acre in a normal year) and Stocking Rate (AUM/acre) are listed below: Reference Plant Community 3500-4500 2.0 Western wheatgrass/Kentucky bluegrass 1800-2500 1.2 Kentucky bluegrass/dandelion 900-1500 1.0 Dry, western wheatgrass/Cheatgrass 600-900 .25 Increased Bare Ground PC (*) (*) * Highly variable stocking rates must be determined on-site. Grazing by domestic livestock is one of the major income-producing industries in the area. Rangelands in this area provide year-long forage under prescribed grazing for cattle, sheep, horses, and other herbivores. During the dormant period, livestock may need supplementation based on reliable forage analysis.

Hydrological functions

Climate is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic groups B and C, with localized areas in hydrologic group D. Infiltration ranges from moderately slow to moderately rapid. Runoff potential for this site varies from moderate to high, depending upon soil hydrologic group and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where short-grasses form a strong sod and dominate the site. Areas where ground cover is less than 50 percent have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook for detailed hydrology information). Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable, if at all present. Pedestals should not be present. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent. Cryptogamic crusts are present, but only cover 1 to 2 percent of the soil surface.

Recreational uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

None noted.

Other information

Site Development & Testing Plan General Data (MLRA and Revision Notes, Hierarchical Classification, Ecological Site Concept, Physiographic, Climate, and Water Features, and Soils Data): Updated. All “Required” items complete to Provisional level. Community Phase Data (Ecological Dynamics, STM, Transition & Recovery Pathways, Reference Plant Community, Species Composition List, Annual Production Table): Updated. All “Required” items complete to Provisional level. Annual Production Table is from the “Previously Approved” ESD (2001). The Annual Production Table and Species Composition List will be reviewed for future updates at the Approved level. Each Alternative State/Community: Complete to Provisional level. Supporting Information (Site Interpretations, Assoc. & Similar Sites, Inventory Data References, Agency/State Correlation, References): Updated. All “Required” items complete to Provisional level. Wildlife Interpretations: Narrative is from “Previously Approved” ESD (2001). Wildlife species will need to be updated at the next Approved level. Livestock Interpretations: Plant community names and stocking rates updated. Hydrology, Recreational Uses, Wood Products, and Other Products carried over from previously “Approved” ESD (2001). Existing NRI Inventory Data References updated. More field data collection is necessary to support this site concept. Reference Sheet: Rangeland Health Reference Sheet carried over from previously “Approved” ESD (2005). It will be updated at the next “Approved” level. “Future work, as described in a project plan, to validate the information in this provisional ecological site description is needed. This will include field activities to collect low and medium intensity sampling, soil correlations, and analysis of that data. Annual field reviews should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.” (NI 430_306 ESI and ESD, April 2015)

Inventory data references

Inventory data has been collected on private and federal lands by the following methods: • Double Sampling (Determining Vegetation Production and Stocking Rates, WY-ECS-1) • Rangeland Health (Interpreting Indicators of Rangeland Health, Version 4, 2005) • Soil Stability (Interpreting Indicators of Rangeland Health, Version 4, 2005) • Line Point Intercept (Monitoring Manual for Grassland, Shrubland, and Savanna Ecosystems, Volume II, 2005) • Soil Pedon Descriptions (Field Book for Describing and Sampling Soils, Version 3, 2012) • SCS-RANGE-417 (Production & Composition Record for Native Grazing Lands) National Resources Inventory (NRI) Number of Records: 1 Sample Period: 2005-2017 Counties: Converse Additional data collection includes ESI data collection in conjunction with

Soil Surveys conducted within MLRA 58B; ocular estimates; rangeland vegetative clipping for NRCS program support; field observations from experienced rangeland personnel Data collection for this ecological site was done in conjunction with the progressive soil surveys within MLRA 58B Northern Rolling High Plains (Southern Part) Note: Revisions to soil surveys are on-going. For the most recent updates, visit the Web Soil Survey, the official site for soils information: http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx

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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	04/01/2005
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** Rills should not be present.

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

3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is less than 5%.

5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None

7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 95% or greater of soil surface and maintains soil surface integrity. Soil Stability class is anticipated to be 5 or greater.

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

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Grass canopy and basal cover should reduce raindrop impact and slow overland flow providing increased time for infiltration to occur. Healthy deep rooted native grasses enhance infiltration and reduce runoff. Infiltration is moderately slow to moderately rapid.

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** No compaction layer or soil surface crusting should be present.

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: Tall and Mid stature Grasses/grasslikes > Short stature Grasses/Grasslikes Forbs Shrubs

    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):** **Very Low**

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14. **Average percent litter cover (%) and depth (in):** **Average litter cover is 50-55% with depths of 0.75 to 1.5 inches.**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** **4,000 lbs./ac**

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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:** **Smooth Brome, Kentucky Bluegrass, Russian Olive, and Species found on Noxious Weed List.**

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17. **Perennial plant reproductive capability:** **All species are capable of reproducing.**
