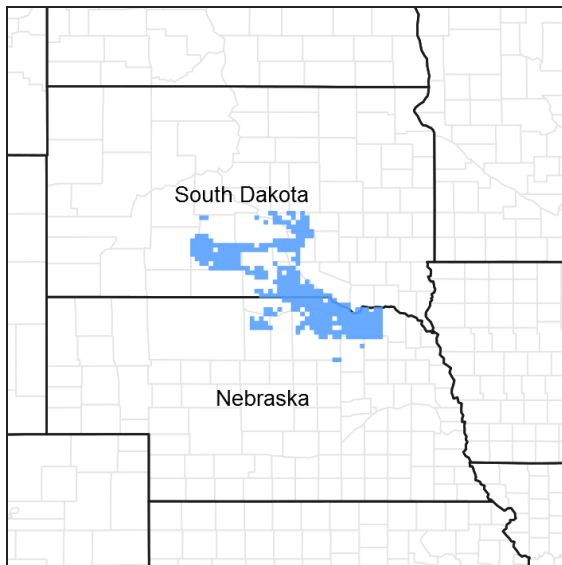


# Ecological site R066XY066NE Loamy Terrace

Accessed: 05/06/2024

## General information

**Approved.** An approved ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model, enough information to identify the ecological site, and full documentation for all ecosystem states contained in the state and transition model.



**Figure 1. Mapped extent**

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

## Classification relationships

Level IV Ecoregions of the Conterminous United States: 43i – Keya Paha Tablelands.

## Associated sites

R066XY026NE	<b>Loamy Overflow</b> Loamy Overflow
R066XY036NE	<b>Loamy 18-22 P.Z.</b> Loamy 18-22" P.Z.
R066XY046NE	<b>Subirrigated</b> Subirrigated
R066XY058NE	<b>Loamy 22-25 P.Z.</b> Loamy 22-25" P.Z.

## Similar sites

R066XY058NE	<b>Loamy 22-25 P.Z.</b> Loamy 22-25" P.Z. [less big bluestem, lower production, steeper slopes]
-------------	----------------------------------------------------------------------------------------------------

R066XY026NE	<b>Loamy Overflow</b> Loamy Overflow [more big bluestem, higher production, adjacent to stream]
R066XY036NE	<b>Loamy 18-22 P.Z.</b> Loamy 18-22" P.Z. [less big bluestem, lower production, steeper slopes]

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

This site occurs on nearly level to gently sloping areas along drainageways of uplands and in valleys. This site receives run-in water from areas higher on the landscape, but is rarely subject to flooding.

**Table 2. Representative physiographic features**

Landforms	(1) Stream terrace
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare
Elevation	579–914 m
Slope	0–2%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

## Climatic features

MLRA 66 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the northern Great Plains and the winds move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 18 to 25 inches per year. The normal average annual temperature is about 48° F. January is the coldest month with average temperatures ranging from about 19° F (Bonesteel, SD) to about 23° F (Ainsworth, NE). July is the warmest month with temperatures averaging from about 73° F (Harrington, SD) to about 75° F (Gregory, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 54° F. This large annual range attests to the continental nature of this area's climate. Hourly winds average about 10 miles per hour annually, ranging from about 11 miles per hour during the spring to about 9 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

Growth of native cool season plants begins mid to late March and continues to late June. Native warm season plants begin growth in early May and continue to late August. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

**Table 3. Representative climatic features**

Frost-free period (average)	154 days
Freeze-free period (average)	173 days
Precipitation total (average)	635 mm

## Influencing water features

No significant water features influence this site.

## Soil features

The soils in this site are moderately well to well drained and formed in alluvium. The silt loam surface layer is 2 to 8 inches thick. The soils have a moderate infiltration rate. This site should show no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases where vegetative cover is not adequate. A drastic loss of the soil surface layer on this site can result in a shift in species composition and/or production. More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

**Table 4. Representative soil features**

Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–10
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

This site developed under Northern Great Plains climatic conditions, natural influences of large herbivores, occasional fire, and other biotic and abiotic factors that typically influence soil/site development. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions. While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well-below average precipitation, can cause significant shifts in plant communities and/or species composition.

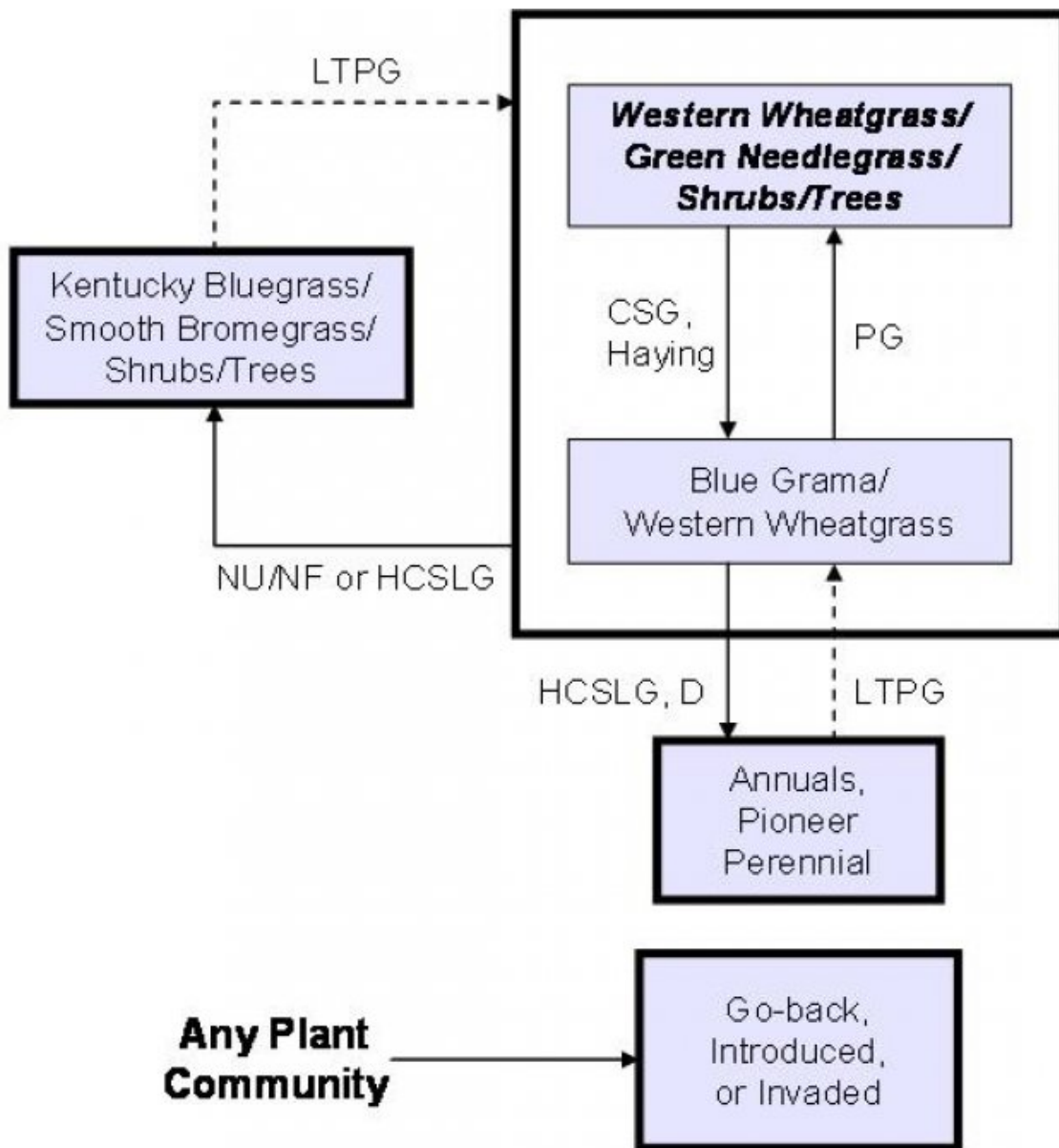
A high percentage of these areas have been tilled in the past, and have been planted to alfalfa for haying or are in a winter wheat/fallow rotation. Also, many of these areas are located in good winter livestock areas and are used as calving/feeding areas. Very few areas exist that have not had severe soil disturbance. Many areas that have not been tilled have been continuously hayed resulting in a mono-culture of western wheatgrass. Continuous seasonal

grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the climax species. Species such as blue grama will initially increase. Western wheatgrass, green needlegrass, and sideoats grama will decrease in frequency and production. Extended periods of non-use and/or lack of fire or heavy, continuous season-long grazing will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or smooth brome grass and in time, shrubs and trees such as western snowberry, chokecherry and green ash.

Interpretations are primarily based on the Western Wheatgrass/Green Needlegrass/Shrubs/Trees Plant Community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

### **State and transition model**



**CSG** – Continuous seasonal grazing (grazing a unit for an entire portion of a growing season, and the same season every year); **D** – Defoliation; **HCSLG** – Heavy, continuous season-long grazing; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PG** – Prescribed grazing (planned, controlled harvest of vegetation with grazing or browsing animals – see FOTG, Section IV, 528).

## State 1

### Western Wheatgrass/Green Needlegrass/Shrubs/Trees Plant Community

#### Community 1.1

### Western Wheatgrass/Green Needlegrass/Shrubs/Trees Plant Community

Interpretations are based primarily on the Western Wheatgrass/Green Needlegrass/Shrubs/Trees Plant Community, which is considered to be the climax community. The potential vegetation is between 65 to 90 percent grasses or grass-like plants, 5 to 10 percent forbs, 5 to 15 percent shrubs, and 1 to 8 percent trees. The community is dominated by cool-season grasses. The major grasses include western wheatgrass, and green needlegrass. Other prominent grasses and grass-likes include Canada wildrye, big bluestem, sideoats grama, blue grama, prairie sandreed, and sedges. Forbs consist of American licorice, goldenrod, Maximilian sunflower, and cudweed sagewort. Woody species found on this site are leadplant, American plum, and western snowberry. Common trees

include American elm, bur oak, green ash, and plains cottonwood. This plant community is productive and diverse. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity. Transitions or pathways leading to other plant communities are as follows: - Continuous seasonal grazing and/or haying will convert the plant community to the Blue Grama/Western Wheatgrass Plant Community. - Non-use and/or no fire or heavy, continuous season-long grazing will shift plant community towards the Kentucky Bluegrass/Smooth Bromegrass/Shrubs/Trees Plant Community.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1933	2448	2830
Shrub/Vine	140	314	560
Forb	140	235	359
Tree	28	141	286
<b>Total</b>	<b>2241</b>	<b>3138</b>	<b>4035</b>

Figure 5. Plant community growth curve (percent production by month).  
NE6634, Eroded Tableland, cool-season dominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	5	15	28	30	10	2	5	5	0	0

## State 2 Blue Grama/Western Wheatgrass Plant Community

## State 3 Kentucky Bluegrass/Smooth Bromegrass/Shrubs/Trees Plant Community

## State 4 Annuals, Pioneer Perennial Plant Community

### Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Wheatgrasses</b>			628–1098	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	471–1098	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	157–628	–
2	<b>Cool-Season Bunchgrasses</b>			471–785	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	314–628	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	63–314	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0–157	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–157	–
3	<b>Mid and Tall Warm-Season Grasses</b>			157–628	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	63–471	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–157	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–157	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–157	–

	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–157	–
	composite dropseed	SPCOC2	<i>Sporobolus compositus</i> var. <i>compositus</i>	0–94	–
4	<b>Short Warm-Season Grasses</b>			31–157	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	31–157	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–94	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–63	–
5	<b>Other Native Grasses</b>			31–157	
	Graminoid (grass or grass-like)	2GRAM	<i>Graminoid (grass or grass-like)</i>	0–94	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	31–94	–
	saltgrass	DISP	<i>Distichlis spicata</i>	0–63	–
6	<b>Grass-Likes</b>			31–220	
	sedge	CAREX	<i>Carex</i>	31–220	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–94	–
<b>Forb</b>					
8	<b>Forbs</b>			157–314	
	Forb, native	2FN	<i>Forb, native</i>	31–157	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	31–94	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	31–94	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	31–94	–
	goldenrod	SOLID	<i>Solidago</i>	31–94	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	31–94	–
	hoary verbena	VEST	<i>Verbena stricta</i>	31–63	–
	American vetch	VIAM	<i>Vicia americana</i>	31–63	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	31–63	–
	prairie clover	DALEA	<i>Dalea</i>	31–63	–
	mint	MENTH	<i>Mentha</i>	0–63	–
	scurfpea	PSORA2	<i>Psoralegium</i>	31–63	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	31–63	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	31–63	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	0–63	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–31	–
	false boneset	BREU	<i>Brickellia eupatorioides</i>	0–31	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–31	–
	wood lily	LIPH	<i>Lilium philadelphicum</i>	0–31	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–31	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–31	–
	nettle	URTIC	<i>Urtica</i>	0–31	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			157–471	
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	31–314	–
	American plum	PRAM	<i>Prunus americana</i>	0–251	–

	Shrub (>.5m)	2SHRUB	<i>Shrub (&gt;.5m)</i>	0–251	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–251	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	31–157	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	0–157	–
	rose	ROSA5	<i>Rosa</i>	31–94	–
	false indigo bush	AMFR	<i>Amorpha fruticosa</i>	0–31	–
<b>Tree</b>					
10	<b>Trees</b>			31–251	
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–251	–
	bur oak	QUMA2	<i>Quercus macrocarpa</i>	0–251	–
	American elm	ULAM	<i>Ulmus americana</i>	0–157	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	0–157	–
	Tree	2TREE	<i>Tree</i>	0–157	–
	boxelder	ACNE2	<i>Acer negundo</i>	0–157	–
	common hackberry	CEOC	<i>Celtis occidentalis</i>	0–157	–

## Animal community

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

## Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B. Infiltration is moderate. Runoff potential for this site varies from negligible to low depending on slope and ground cover. In many cases, areas with greater than 75% 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% have the greatest potential to have reduced infiltration and higher runoff (refer to Part 630, NRCS National Engineering Handbook).

## 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

Seed harvest of native plant species can provide additional income on this site.

## Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.  
(<http://www.hprcc.unl.edu/>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224.  
(<http://wcc.nrcs.usda.gov>)



USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

USDA, NRCS, Various Published Soil Surveys.

## Contributors

Stan Boltz

## 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)	Stan Boltz
Contact for lead author	Stan Boltz, stanley.boltz@sd.usda.gov, 605-352-1236
Date	08/01/2006
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** None.

---

2. **Presence of water flow patterns:** None, or barely visible and discontinuous.

---

3. **Number and height of erosional pedestals or terracettes:** None.

---

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 0 to 5 percent is typical.

---

5. **Number of gullies and erosion associated with gullies:** None should 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):** Litter should fall in place. Slight amount of movement of smallest size class litter is possible, but not normal.
- 
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.
- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 8 to 15 inches thick with mollic (dark) colors when moist. Structure typically is medium to fine granular in the upper A-horizon.
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.
- 
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None – when dry, B horizons can be hard and appear to be compacted, but no platy structure will 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: Mid, cool-season rhizomatous grasses > mid and tall, cool-season bunchgrasses >
- Sub-dominant: Tall, warm-season rhizomatous grasses > shrubs >
- Other: Forbs > trees > grass-like species > short, warm-season grasses
- Additional: Other grasses in other functional groups occur in minor amounts.
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs are vigorous.
- 
14. **Average percent litter cover (%) and depth ( in):** Litter cover is roughly 60 to 80 percent, and the depth is 0.25 to 0.5 inches.
- 
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Total annual production ranges from 2,000 to 3,600 pounds/acre, with the reference value being 2,800 pounds/acre (air-dry basis).

- 
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: State and local noxious weeds; also Kentucky bluegrass and smooth brome grass.
- 

17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses should have vigorous rhizomes or tillers.
-