

Ecological site R064XY002NE

Wet Subirrigated

Accessed: 05/19/2024

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.

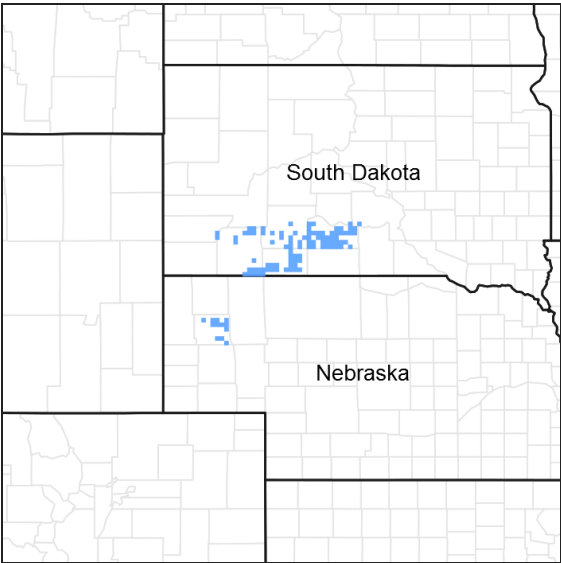


Figure 1. Mapped extent

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: 25a – Pine Ridge Escarpment, 43h – White River Badlands, and 43i – Keya Paha Tablelands.

Associated sites

R064XY022NE	Wet Land
R064XY024NE	Subirrigated

Similar sites

R064XY024NE	Subirrigated [little bluestem present; less prairie cordgrass]
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	(1) <i>Andropogon gerardii</i> (2) <i>Spartina pectinata</i>
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Physiographic features

This site occurs on nearly level to gently sloping floodplains.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	884–1,219 m
Slope	0–2%
Water table depth	0–46 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 64 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 air masses move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 14 to 20 inches per year. The normal average annual temperature is about 47° F. January is the coldest month with average temperatures ranging from about 21° F (Wood, SD) to about 25° F (Hemingford, NE). July is the warmest month with temperatures averaging from about 70° F (Keeline 3 W, WY) to about 76° F (Wood, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 55° F. This large annual range attests to the continental nature of this area's climate. Hourly winds average about 11 miles per hour annually, ranging from about 13 miles per hour during the spring to about 10 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 cool season plants begins in early to mid March, slowing or ceasing in late June. Warm season plants begin growth about mid May and continue to early or mid September. 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)	150 days
Freeze-free period (average)	129 days
Precipitation total (average)	432 mm

Influencing water features

Soil features

The features common to soils in this site are the fine sand and loam textured surface layers and slopes of 0 to 2 percent. The soils in this site are poorly drained and formed in eolian sands and sandy alluvium. The surface layer is 5 to 10 inches thick. The subsurface texture ranges from very fine sandy loam to silt loam. Rills and gullies should not typically be present. Water flow patterns should be barely distinguishable if at all present. Litter typically falls in place, and signs of movement are not common. Chemical and physical crusts are rare to non-existent.

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) Loam (2) Fine sand
Family particle size	(1) Loamy
Drainage class	Poorly drained
Permeability class	Moderate
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–20.32 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–6
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

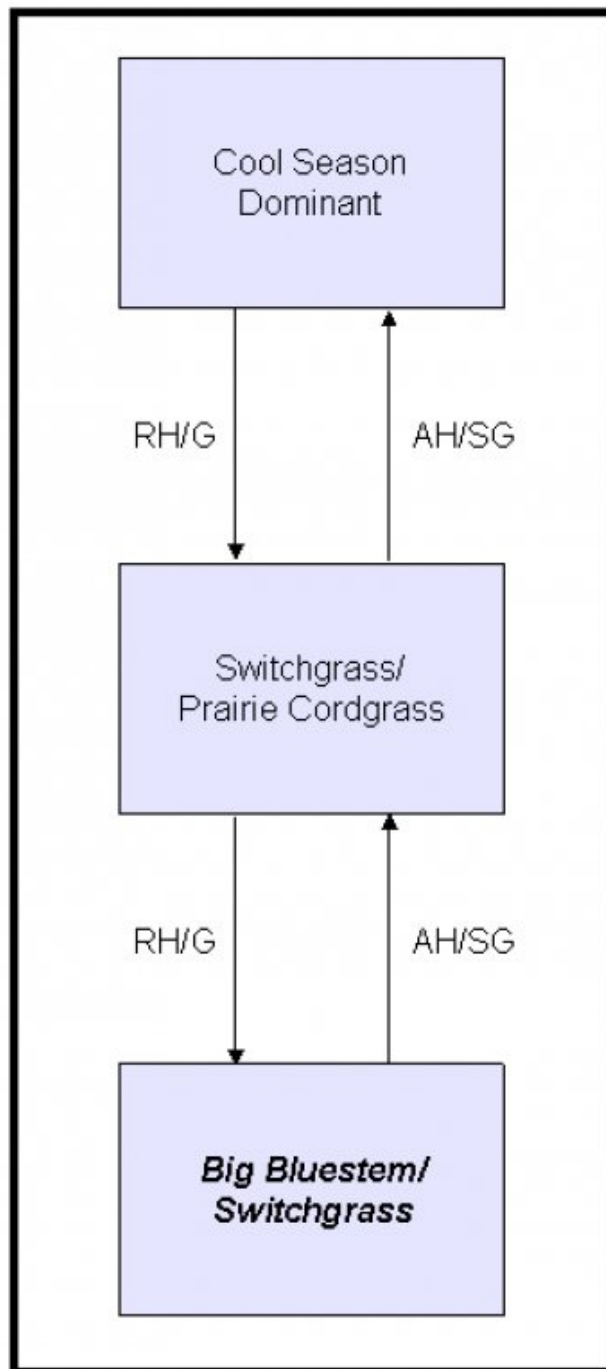
Ecological dynamics

This site developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire (often of light intensities), 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.

Continuous season-long grazing (during the typical growing season of May through October) and/or repeated seasonal grazing (e.g., every spring, every summer) without adequate recovery periods following each grazing occurrence causes this site to depart from the Big Bluestem/Switchgrass Plant Community. Species such as switchgrass, slender wheatgrass, Scribner panicum, western wheatgrass, foxtail barley, and prairie cordgrass will increase. Warm season grasses such as big bluestem and Indiangrass will decrease in frequency and production. Interpretations are primarily based on the Big Bluestem/Switchgrass 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



AH/SG - Annual haying/summer grazing
RH/G - Rotational haying/grazing

State 1
Big Bluestem/Switchgrass

Community 1.1
Big Bluestem/Switchgrass

Interpretations are primarily based on the Big Bluestem/Switchgrass Plant Community (this is also considered climax). This plant community can be found on areas that are properly managed with grazing and/or prescribed burning. Harvesting hay at a different time during the growing season each year allows this plant community to persist. The potential vegetation is about 85% grasses, 10% grass-like plants and 5% forbs. Tall, warm season grasses dominate the plant community. The major grasses include big bluestem, Indiangrass, switchgrass, bluejoint reedgrass, northern reedgrass, and prairie cordgrass. Other grasses occurring on this plant community include slender wheatgrass, plains bluegrass, and western wheatgrass. This plant community is extremely resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a healthy and sustainable plant community (site/soil stability, watershed function, and biologic integrity).

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	5044	5464	5856
Forb	—	140	308
Total	5044	5604	6164

Figure 7. Plant community growth curve (percent production by month).
NE6409, Pine Ridge/Badlands, warm-season dominant, cool-season sub-
dominant. Warm-season dominant, cool-season sub-dominant, lowlands.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		3	8	18	27	23	12	6	3		

State 2
Switchgrass/Prairie Cordgrass

Community 2.1
Switchgrass/Prairie Cordgrass

Historically, this plant community evolved under annual haying or moderate summer grazing followed by heavy grazing in the fall. The potential vegetation is about 80% grasses, 15% grass-like plants and 5% forbs. Dominant grasses include switchgrass, prairie cordgrass, big bluestem and forbs such as smartweed and ironweed. When compared to the Big Bluestem/Switchgrass Plant Community, switchgrass and prairie cordgrass have increased while big bluestem and Indiangrass have decreased. Plant diversity has decreased with the desirable, more palatable, grasses being suppressed due to heavier use. This plant community is somewhat resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4483	4918	5346
Forb	—	126	258
Total	4483	5044	5604

Figure 9. Plant community growth curve (percent production by month). NE6410, Pine Ridge/Badlands, lowland warm-season dominant. Warm-season dominant, lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		3	7	15	25	25	17	6	2		

State 3
Cool Season Dominant

Community 3.1
Cool Season Dominant

Historically, this plant community evolved under long term annual haying in the mid summer. Cool season grasses make up a majority of the plant community with the balance made up of warm season grasses and miscellaneous forbs. The potential vegetation is about 70% grasses, 20% grass-like plants and 10% forbs. Dominant grasses include bluejoint and northern reedgrass, which are acceptable grasses on this plant community. The reedgrasses become aggressive and increase, crowding out the warm season plants of big bluestem, Indiangrass and switchgrass. Grasses of secondary importance include prairie cordgrass, slender wheatgrass, and western wheatgrass. Forbs commonly found in this plant community include red and white clover. When compared to the Big Bluestem/Switchgrass Plant Community, bluejoint and northern reedgrass, slender wheatgrass and prairie cordgrass have increased. Big bluestem and Indiangrass have decreased. This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3699	4044	4383
Forb	—	103	213
Total	3699	4147	4596

Figure 11. Plant community growth curve (percent production by month). NE6406, Pine Ridge/Badlands, lowland cool-season dominant. Cool-season dominant, lowland.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		5	13	28	28	12	5	6	3		

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-Season Grasses			2242–4203	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	841–1681	–
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	841–1681	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	841–1401	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	280–841	–
	marsh muhly	MURA	<i>Muhlenbergia racemosa</i>	0–280	–
2	Cool-Season Grasses			560–1681	
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	280–560	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	280–560	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	112–560	–
	plains bluegrass	POAR3	<i>Poa arida</i>	280–560	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–280	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	0–112	–
3	Other Native Grasses			0–280	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–280	–
4	Grass-Likes			280–560	
	sedge	CAREX	<i>Carex</i>	56–560	–
	rush	JUNCU	<i>Juncus</i>	0–280	–
	bulrush	SCHOE6	<i>Schoenoplectus</i>	0–280	–
	spikerush	ELEOC	<i>Eleocharis</i>	0–168	–
Forb					
6	Forbs			0–280	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–112	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–56	–
	scouringrush horsetail	EQHY	<i>Equisetum hyemale</i>	0–56	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–56	–
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0–56	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–56	–
	blackeyed Susan	RUHI2	<i>Rudbeckia hirta</i>	0–56	–
	goldenrod	SOLID	<i>Solidago</i>	0–56	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	0–56	–
	ironweed	VERNO	<i>Vernonia</i>	0–56	–

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-Season Grasses			2018–3026	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	1009–2018	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	1009–2018	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	504–1009	–
	marsh muhly	MURA	<i>Muhlenbergia racemosa</i>	0–252	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–252	–
2	Cool-Season Grasses			504–1513	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–504	–
	plains bluegrass	POAR3	<i>Poa arida</i>	252–504	–
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	252–504	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	252–504	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	101–504	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	0–151	–
3	Other Native Grasses			0–252	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–252	–
4	Grass-Likes			252–757	
	sedge	CAREX	<i>Carex</i>	50–504	–
	rush	JUNCU	<i>Juncus</i>	0–252	–
	bulrush	SCHOE6	<i>Schoenoplectus</i>	0–252	–
	spikerush	ELEOC	<i>Eleocharis</i>	0–151	–
5	Non-Native Grasses			0–252	
	reed canarygrass	PHAR3	<i>Phalaris arundinacea</i>	0–252	–
Forb					
6	Forbs			0–252	
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0–101	–
	ironweed	VERNO	<i>Vernonia</i>	0–101	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–101	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–101	–
	Pennsylvania smartweed	POPE2	<i>Polygonum pensylvanicum</i>	0–101	–
	blackeyed Susan	RUHI2	<i>Rudbeckia hirta</i>	0–101	–
	goldenrod	SOLID	<i>Solidago</i>	0–50	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–50	–
	scouringrush horsetail	EQHY	<i>Equisetum hyemale</i>	0–50	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–50	–

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-Season Grasses			829–1866	
	prairie cordgrass	SPPE	<i>Spartina pectinata</i>	622–1451	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–622	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	207–622	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–207	–
	marsh muhly	MURA	<i>Muhlenbergia racemosa</i>	0–83	–
2	Cool-Season Grasses			1244–3110	
	bluejoint	CACA4	<i>Calamagrostis canadensis</i>	415–1037	–
	northern reedgrass	CASTI3	<i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>	415–1037	–
	plains bluegrass	POAR3	<i>Poa arida</i>	415–1037	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	83–622	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–415	–
	foxtail barley	HOJU	<i>Hordeum jubatum</i>	0–207	–
3	Other Native Grasses			0–207	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–207	–
4	Grass-Likes			207–829	
	sedge	CAREX	<i>Carex</i>	83–622	–
	spikerush	ELEOC	<i>Eleocharis</i>	0–207	–
	rush	JUNCU	<i>Juncus</i>	41–207	–
	bulrush	SCHOE6	<i>Schoenoplectus</i>	0–207	–
5	Non-Native Grasses			0–622	
	reed canarygrass	PHAR3	<i>Phalaris arundinacea</i>	0–622	–
7	Non-Native Grasses			0–207	
	red clover	TRPR2	<i>Trifolium pratense</i>	0–207	–
	white clover	TRRE3	<i>Trifolium repens</i>	0–83	–
Forb					
6	Forbs			0–207	
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	0–124	–
	ironweed	VERNO	<i>Vernonia</i>	0–124	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–83	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0–83	–
	Pennsylvania smartweed	POPE2	<i>Polygonum pennsylvanicum</i>	0–83	–
	blackeyed Susan	RUHI2	<i>Rudbeckia hirta</i>	0–83	–
	goldenrod	SOLID	<i>Solidago</i>	0–41	–
	cinquefoil	POTEN	<i>Potentilla</i>	0–41	–
	scouringrush horsetail	EQHY	<i>Equisetum hyemale</i>	0–41	–
	American licorice	GLLE3	<i>Glycyrrhiza lepidota</i>	0–41	–

Hydrological functions

Moisture conditions tend to be ideal for forage production on this site. Soils on this site are in Hydrologic Soil Group C due to high water tables. Although soils are permeable, high water tables limit infiltration in wet seasons. Surrounding upland areas tend to have permeable soils and surface inflow peaks on these sites are often muted. Many areas are seasonally flooded for short periods in wet weather. Refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves.

Recreational uses

This site provides hunting, hiking, photography, bird watching and other opportunities. The wide variety of plants that 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.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used. Those involved in developing this site include: Stan Boltz, Range Management Specialist, NRCS; Jill Epley, Range Management Specialist, NRCS; Rick Peterson, Range Management Specialist, NRCS; David Steffen, Range Management Specialist, NRCS; Jeff Vander Wilt, Range Management Specialist, NRCS; Phil Young, Soil Scientist, NRCS.

Other references

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

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

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USDA, NRCS, Various Published Soil Surveys.

Contributors

SCB

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.

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Date	03/31/2004

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.

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):** Bare ground is typically less than 5 percent.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Litter falls in place, and is in contact with the soil surface.

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 typically 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 10 to 20 inches thick or more with black to very dark gray 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:** Deep rooted species (mid and tall rhizomatous cool- and warm-season grasses and grass-like) 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.

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, warm-season rhizomatous grasses >>

Sub-dominant: Mid and tall, cool-season grasses >>

Other: Grass-likes species > forbs

Additional:

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.
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14. **Average percent litter cover (%) and depth (in):** Litter cover 80 to 90 percent and in contact with soil surface. Depth of litter is typically 0.5 to 1 inch.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Total annual production ranges from 4,500 to 5,500 pounds/acre, with the reference value being 5,000 pounds/acre (air-dry basis).
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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:** State and local noxious weeds; also reed canarygrass.
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17. **Perennial plant reproductive capability:** Perennial grasses and grass-likes should have vigorous rhizomes or tillers.
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