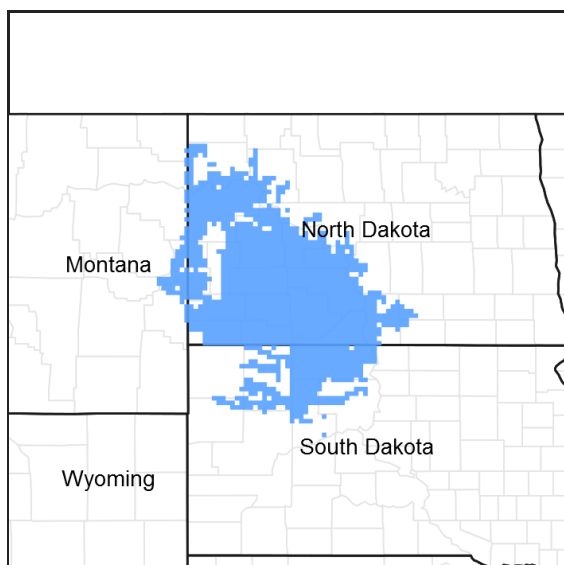


# **Ecological site R054XY025ND** **Sands**

Accessed: 05/10/2025

## **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: 43a – Missouri Plateau.

## **Associated sites**

R054XY026ND	<b>Sandy</b> Sandy
R054XY027ND	<b>Sandy Claypan</b> Sandy Claypan
R054XY034ND	<b>Choppy Sands</b> Thin Sands
R054XY042ND	<b>Sandy Terrace</b> Sandy Terrace
R054XY043ND	<b>Shallow Sandy</b> Shallow Sandy
R054XY045ND	<b>Limy Sands</b> Limy Sands

## Similar sites

R054XY027ND	<b>Sandy Claypan</b> Sandy Claypan (SCp) [Well drained soils on uplands and terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Subsoil will ribbon up to 1 inch. Indicator species are western wheatgrass intermixed with areas of prairie sandreed both dominating with an understory of needleandthread and blue grama, heath aster, cudweed sagewort and western yarrow along with fringed sagewort. This site has a dense sodic subsoil below 6 inches with salts below 16 inches, far more western wheatgrass, blue grama, less prairie sandreed, and sand bluestem, less production.]
R054XY034ND	<b>Choppy Sands</b> Thin Sands (TSa) [Deep entisol found on knobs and ridges of level to choppy sand blown plains; will not ribbon, found upslope from sands and sandy terrace sites; won't ribbon. Indicator species: Sand bluestem, prairie sandreed and needleandthread evenly mixed, some Canada wildrye, penstemon, lemon scurfpea western ragweed, yucca, silky prairie clover and leadplant. This site has far less production, thin "A" horizon, no mollic epipedon, more needleandthread, choppiest landscape.]
R054XY045ND	<b>Limy Sands</b> Limy Sands (LSa) [Moderately deep entisol, usually calcareous within 4 inches to the surface, found on knobs and/or sideslopes of hills and buttes; will not form a ribbon; up slope of sands or sandy and down slope from shallow sandy ecological sites. Indicator species: Little bluestem, sand bluestem, and prairie sandreed, along with penstemon, silverleaf scurfpea, purple coneflower, yucca, creeping juniper, and leadplant. This site has less production, thin "A" horizon, no mollic epipedon, lime within 6 inches to the surface, more little bluestem, plains muhly, sideoats grama, less prairie sand reed, different landscape positions]
R054XY042ND	<b>Sandy Terrace</b> Sandy Terrace (SyT) [Well drained soils on a river or stream terrace in a position that will flood occasionally (once in ten years) with no apparent water table. Indicator species are prairie sandreed evenly mixed with sand bluestem, some Canada wildrye, penstemon, and leadplant and/or western snowberry, and with possible trees. This site has more production, different landscape position and more potential to flood occasionally, more big bluestem, green needlegrass, blue grama, less needleandthread and sedges.] (054XY043ND) – Shallow Sandy (SwS) [Some what excessively well drained soils more than 10 less than 20 inches to sedimentary sandstone bedrock and/or gravels that restricts root penetration. Surface layer will ribbon less than 1 inch unless above gravels than more than 1 but less than 2 inches. Upslope from thin loamy, limy sands, sands or sandy sites and some times down slope form very shallow ecological sites. Indicator species: little bluestem, prairie sandreed, sand bluestem, and needle grasses, with dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, and shrubs like prairie rose and yucca. This site has less production, more little bluestem, blue grama and more sedges, restrictive layer within twenty inches.]
R054XY026ND	<b>Sandy</b> Sandy (Sy) [Does not receive additional moisture. Found on dry uplands upslope from sandy terraces or loamy overflow sites, down slope from limy sands or shallow sandy sites. Similar landscape position as loamy, sands, clayey sites; will ribbon up to 1 inches. Indicator species are prairie sandreed with western wheatgrass and green needlegrass intermixed. This site has less sand bluestem, needleandthread and sedges, more blue grama, green needlegrass and western wheatgrass, slightly less production, similar landscape position.]
R054XY043ND	<b>Shallow Sandy</b> Shallow Sandy (SwS) [Some what excessively well drained soils more than 10 less than 20 inches to sedimentary sandstone bedrock and/or gravels that restricts root penetration. Surface layer will ribbon less than 1 inch unless above gravels than more than 1 but less than 2 inches. Upslope from thin loamy, limy sands, sands or sandy sites and some times down slope form very shallow ecological sites. Indicator species: little bluestem, prairie sandreed, sand bluestem, and needle grasses, with dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, and shrubs like prairie rose and yucca. This site has less production, more little bluestem, blue grama and more sedges, restrictive layer within twenty inches.]

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Andropogon hallii</i> (2) <i>Calamovilfa longifolia</i>

## Physiographic features

This site typically occurs on nearly level to moderately steep sedimentary uplands.

**Table 2. Representative physiographic features**

Landforms	(1) Knoll (2) Hill (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	1,600–3,600 ft
Slope	2–15%
Aspect	Aspect is not a significant factor

## Climatic features

MLRA 54 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature are characteristic. The climate is the result of this MLRA's location in the geographic center of North America. There are few natural barriers on the northern Great Plains. The air masses move unobstructed across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 14 to 18 inches per year. The normal average annual temperature is about 42° F. January is the coldest month with average temperatures ranging from about 13° F (Beach, ND) to about 16° F (Bison, SD). July is the warmest month with temperatures averaging from about 69° F (Beach, ND) to about 72° F (Timber Lake, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 57° F. This large annual range attests to the continental nature of this MLRA's climate. Hourly winds are estimated to 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 native cool-season plants begins in late March and continues to early to mid July. Native warm-season plants begin growth in mid May and continue to the end of August. Green up of cool-season plants can occur in September and October when adequate soil moisture is present.

**Table 3. Representative climatic features**

Frost-free period (average)	136 days
Freeze-free period (average)	157 days
Precipitation total (average)	18 in

## Influencing water features

No significant water features influence this site.

## Soil features

The common features of soils in this site are the loamy fine sand and fine sand textured subsoils and slopes of typically 2 to 15 percent. The soils in this site are well to somewhat excessively drained and formed in soft sandstone, eolian deposits or alluvium. The loamy fine sand to loamy sand surface layer is 4 to 20 inches thick. This site should show slight to 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 susceptible to water and wind erosion. Loss of the soil surface layer can result in a shift in species composition and/or production.

Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service Field Office Technical Guide or the following web sites:

North Dakota <http://www.nd.nrcs.usda.gov/>

South Dakota <http://www.sd.nrcs.usda.gov/>

Montana <http://www.mt.nrcs.usda.gov/>

**Table 4. Representative soil features**

Surface texture	(1) Loamy fine sand (2) Loamy sand
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Rapid to very rapid
Soil depth	40–60 in
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (0–40in)	2–4 in
Calcium carbonate equivalent (0–40in)	0–15%
Electrical conductivity (0–40in)	0–2 mmhos/cm
Sodium adsorption ratio (0–40in)	0–1
Soil reaction (1:1 water) (0–40in)	6.1–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

This site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered moderately resilient. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can readily return to the Reference Plant Community.

The plant community upon which interpretations are primarily based is the Reference Plant Community. The Reference Plant Community 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 considered. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

Heavy continuous grazing or continuous seasonal grazing, without adequate recovery opportunities following each grazing event during the growing season, will initially cause needleandthread, blue grama and threadleaf sedge to increase. Species such as sand bluestem and prairie sandreed decrease in frequency and production. In time, heavy continuous grazing will likely cause blue grama and threadleaf sedge to dominate and other pioneer perennials, annuals, and club moss (in its range) to increase. This plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the

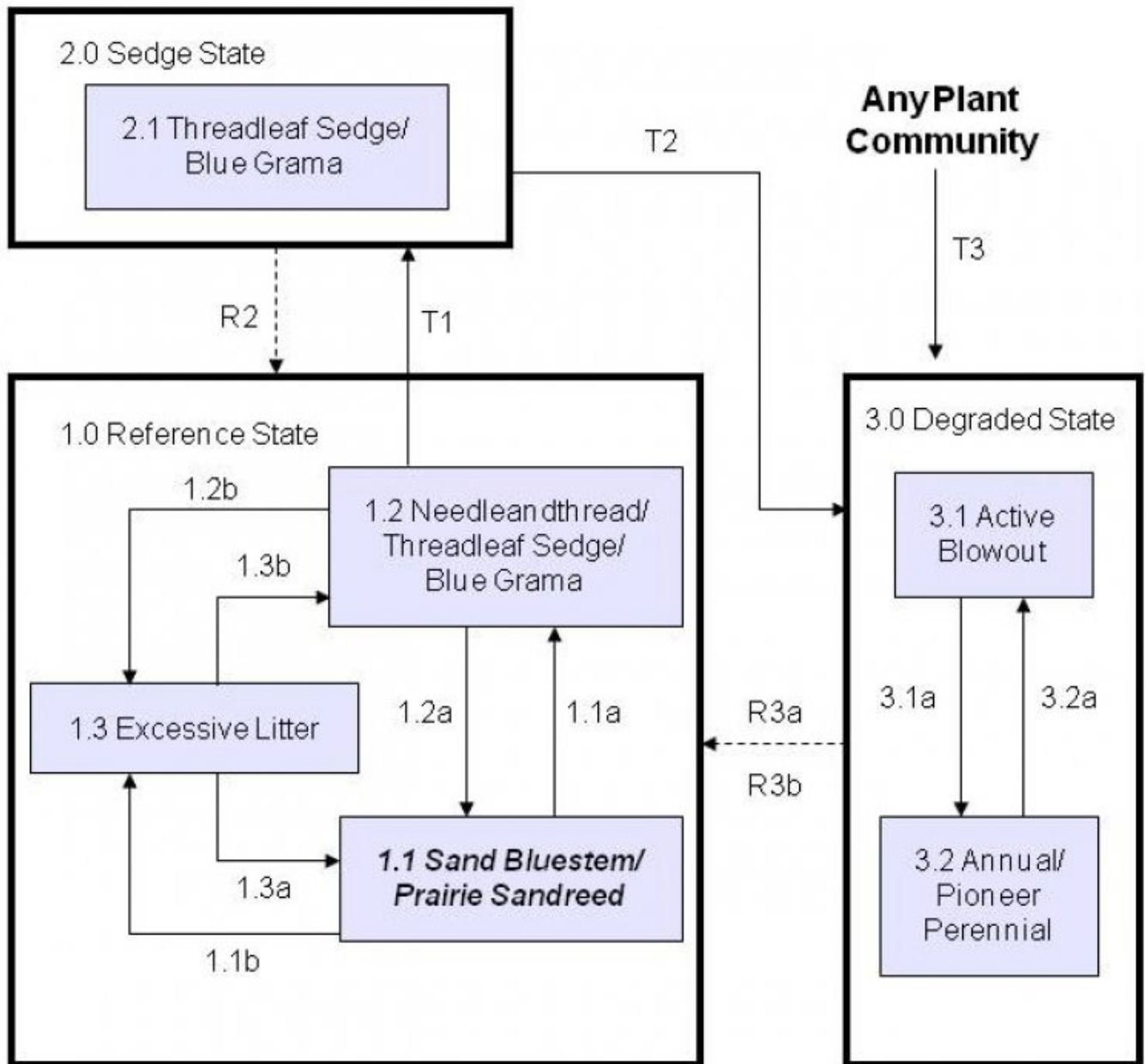
Reference Plant Community. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

This site if heavily disturbed through improper grazing, wildfire, excessive defoliation or any type of physical disturbance can lead to serious erosion problems (blowout) on these fragile soils. Extended periods of non-use and/or lack of fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or smooth brome grass. In time, shrubs such as yucca and cactus will likely become a major feature on this site.

Due to a general invasion of exotic species (such as Kentucky bluegrass and smooth brome grass) across the MLRA within this site, returning to the 1.1 Sand Bluestem/Prairie Sandreed Plant Community Phase may not be possible.

Following the state and transition diagram are narratives for each of the described states and community phases. These may not represent every possibility, but they are the most prevalent and repeatable states/community phases. The plant composition tables shown below have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these community phases and/or states may be revised or removed, and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

## **State and transition model**



State 1  
Reference

The State narrative is under development.

Community 1.1  
Sand Bluestem/Prairie Sandreed

This is the interpretive plant community and is considered to be the Reference Plant Community. This community evolved with grazing by large herbivores and occasional prairie fire. It is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs, and 5% shrubs. The plant community is dominated by sand bluestem and prairie sandreed. Other grasses and grass-like plants occurring include needleandthread, blue grama, western wheatgrass, threadleaf and sun sedge. Significant forbs include penstemon, green sagewort, silverleaf scurfpea and spiderwort. Leadplant, rose and yucca are the principal shrubs. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in terms of soil stability, watershed function and biologic integrity.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1435	2224	2995
Forb	120	188	275
Shrub/Vine	45	88	130
Total	1600	2500	3400

Figure 5. Plant community growth curve (percent production by month).  
ND5403, Missouri Slope, Native Grasslands, Warm-season dominant. Warm-season dominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	5	20	38	25	8	3	0	0	0

Community 1.2  
Needleandthread/Threadleaf Sedge/Blue Grama

This plant community is the result of long-term, heavy continuous grazing and/or continuous seasonal (spring) grazing. Sand bluestem has been removed and prairie sandreed has been greatly reduced. Threadleaf sedge, blue grama and needleandthread have increased and are the dominant species. Other grasses include western wheatgrass, red threeawn, sand dropseed, and prairie junegrass. Forbs such as western ragweed, green sagewort, hairy goldaster, cudweed sagewort, scarlet globemallow and sweet clover may also be present. Fringed sagewort and cactus have also increased. Annual production, and consequently litter amounts, have been reduced substantially. Nutrient cycle, water cycle and energy flow are becoming impaired. This plant community is at risk of losing all tall warm season grasses. Wind scoured areas may exist where cover has been reduced or eliminated.

Table 6. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	330	684	840
Forb	130	158	185
Shrub/Vine	40	59	75
<b>Total</b>	<b>500</b>	<b>901</b>	<b>1100</b>

Figure 7. Plant community growth curve (percent production by month).  
ND5411, Missouri Slope, Needlegrass and Sedge. Cool-season mid grasses and short grass-like.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	9	27	35	15	4	5	2	0	0

### Community 1.3 Excessive Litter

This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire. Non-native grasses, such as Kentucky bluegrass, crested wheatgrass, and smooth brome grass tend to invade and may dominate this plant community. Other grasses present may include sand bluestem, prairie sandreed, little bluestem, western wheatgrass, and prairie junegrass. The common forbs include green sagewort, goldenrod, western wallflower, western ragweed and sweetclover. Fringed sagewort and prairie rose are the principal shrubs. Litter buildup reduces plant vigor and density, and native seedling recruitment declines. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. This plant community is dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. This plant community is resistant to change without prescribed grazing or fire. The combination of both grazing and fire is most effective in moving this plant community towards the Reference Plant Community. Soil erosion is low. Runoff is similar to the Reference Plant Community. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in diversity.

Table 7. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	1230	1936	2840
Forb	105	165	225
Shrub/Vine	85	99	135
<b>Total</b>	<b>1420</b>	<b>2200</b>	<b>3200</b>

Figure 9. Plant community growth curve (percent production by month).  
ND5406, Missouri Slope, Introduced Cool-season Grasses. Introduced cool-season grasses.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	35	35	5	2	8	2	0	0

### Pathway 1.1a Community 1.1 to 1.2

Heavy, continuous grazing and/or continuous seasonal (spring) grazing will convert the plant community to the Needleandthread/Threadleaf Sedge/Blue Grama Plant Community.

### Pathway 1.1b Community 1.1 to 1.3



Non-use and no fire for extended periods of time will convert this plant community to the Excessive Litter Plant Community.

### **Pathway 1.2a**

#### **Community 1.2 to 1.1**

Prescribed grazing that includes changing season of use and allowing adequate recovery periods between grazing events, will move this plant community back to the Sand Bluestem/Prairie Sandreed Plant Community.

#### **Conservation practices**

Prescribed Grazing
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### **Pathway 1.2b**

#### **Community 1.2 to 1.3**

Non-use and no fire over an extended period of time will shift this plant community to the Excessive Litter Plant Community.

### **Pathway 1.3a**

#### **Community 1.3 to 1.1**

Prescribed grazing and/or prescribed burning will move this plant community toward the Sand Bluestem/Prairie Sandreed Plant Community or the Needleandthread/Threadleaf Sedge/Blue Grama Plant Community. This would require long-term management with prescribed grazing and/or prescribed burning under favorable climatic conditions.

#### **Conservation practices**

Prescribed Burning
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Prescribed Grazing
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### **Pathway 1.3b**

#### **Community 1.3 to 1.2**

Prescribed grazing and/or prescribed burning will move this plant community toward the Sand Bluestem/Prairie Sandreed Plant Community or the Needleandthread/Threadleaf Sedge/Blue Grama Plant Community. This would require long-term management with prescribed grazing and/or prescribed burning under favorable climatic conditions.

#### **Conservation practices**

Prescribed Burning
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Prescribed Grazing
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## **State 2**

### **Sedge**

The State narrative is under development.

### **Community 2.1**

#### **Threadleaf Sedge/Blue Grama**

This plant community developed from heavy continuous grazing without adequate recovery periods between grazing events or continuous seasonal (spring) grazing. Threadleaf sedge and blue grama dominate this plant community. Blue grama has developed into a sod condition. Sand bluestem and prairie sandreed have been

removed. Other grasses and grass-likes present include sand dropseed, red threeawn, needleandthread, prairie junegrass and sun sedge. Forbs commonly found in this plant community include green sagewort, silverleaf scurfpea and hairy goldaster. Lack of litter and reduced plant vigor result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives blue grama a competitive advantage over cool-season mid grasses. The competitive nature of the dominant species prevents other species from establishing. This plant community is less productive than the Reference Plant Community. Soil loss due to water erosion will be minimal, but wind erosion remains a concern.

Table 8. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	270	508	645
Forb	100	122	145
Shrub/Vine	30	70	110
<b>Total</b>	<b>400</b>	<b>700</b>	<b>900</b>

Figure 11. Plant community growth curve (percent production by month).  
ND5408, Missouri Slope, Sedge Dominant. Cool-season, short grasses and grass-likes.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	30	25	20	5	5	2	0	0

### State 3 Degraded

The State narrative is under development.

#### Community 3.1 Active Blowout

Heavy continuous grazing, excessive defoliation, disturbance (tillage, etc.) and/or wildfire brings about this condition. Continuous grazing will only increase the size of the blowouts. This condition is not stable. It consists of bare areas that are continually eroded by wind.

#### Community 3.2 Annual/Pioneer Perennial

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include red threeawn, smooth brome, crested wheatgrass, annual brome, needleandthread, sand dropseed, sandbur, and Scribner’s Panicum. The dominant forbs include curlycup gumweed, mare’s tail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort and broom snakeweed. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of non-native species due to severe soil disturbances and relatively high percent of bare ground. Many annual and perennial forbs, including non-native species, have invaded the site. This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high. Significant economic inputs, management and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community.

### **Pathway 3.1a**

#### **Community 3.1 to 3.2**

Prescribed grazing will move this community to the Annual/Pioneer Perennial Community.

#### **Conservation practices**

Prescribed Grazing
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### **Pathway 3.2a**

#### **Community 3.2 to 3.1**

Heavy, continuous grazing and/or excessive defoliation will cause this plant community to move toward an Active Blowout.

### **Transition T1**

#### **State 1 to 2**

Heavy, continuous grazing and/or continuous seasonal (spring) grazing will cause further deterioration resulting in a shift to the Threadleaf Sedge/Blue Grama Sod Plant Community.

### **Restoration pathway R2**

#### **State 2 to 1**

Long-term prescribed grazing with adequate recovery periods following each grazing event may move this plant community toward the Needleandthread/Threadleaf Sedge/Blue Grama Plant Community, and may eventually return to the Reference Plant Community or associated successional plant community stages assuming an adequate seed/vegetative source is available. This process may take greater than 20 years.

#### **Conservation practices**

Prescribed Grazing
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### **Transition T2**

#### **State 2 to 3**

Heavy, continuous grazing and/or continuous seasonal (spring) grazing will cause further deterioration resulting in a shift to the Active Blowout or Annual/Pioneer Perennial Plant Community.

### **Transition T3**

#### **State 2 to 3**

This pathway is most commonly associated with the cessation of cropping without the benefit of range or pasture seeding resulting in a “go-back” situation. This may be compounded with excessive grazing which further inhibits the establishment of perennial grasses and forbs.

### **Restoration pathway R3b**

#### **State 3 to 1**

Removal of disturbance followed by long-term prescribed grazing, including adequate rest periods, will move this community through the successional stages, and may eventually lead to the Sand Bluestem/Prairie Sandreed Plant Community or associated successional plant communities assuming an adequate seed/vegetative source exists. This process will likely take a long period of time (25+ years). Range seeding followed by long-term prescribed grazing can be used to convert this plant community to one that may resemble the Reference Plant Community.

#### **Conservation practices**

## Restoration pathway R3a State 3 to 1

Removal of disturbance followed by range seeding, which can include mulching, followed by prescribed grazing can be used to convert this plant community to one that may resemble the Reference Plant Community.

### Conservation practices

Prescribed Grazing

## Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Bluestem</b>			375–625	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	250–500	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–250	–
2	<b>Other Native Tall Grasses</b>			250–500	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	250–500	–
3	<b>Needlegrass</b>			125–375	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	125–375	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	25–75	–
4	<b>Grama</b>			50–125	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	50–125	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–75	–
5	<b>Other Native Grasses</b>			125–225	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	50–125	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	50–75	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	25–50	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–25	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos var. scribnerianum</i>	0–25	–
6	<b>Grass-Likes</b>			125–250	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	75–175	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	25–75	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	25–50	–
<b>Forb</b>					
8	<b>Forbs</b>			125–250	
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	50–75	–
	silky prairie clover	DAVI	<i>Dalea villosa</i>	0–50	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	25–50	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	25–50	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	25–50	–

	blazing star	LIATR	<i>Liatris</i>	25–50	–
	beardtongue	PENST	<i>Penstemon</i>	25–50	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	25–50	–
	goldenrod	SOLID	<i>Solidago</i>	25–50	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	25–50	–
	American vetch	VIAM	<i>Vicia americana</i>	0–25	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	25	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	25	–
	large Indian breadroot	PEES	<i>Pedimelum esculentum</i>	0–25	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	25	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–25	–
	plains milkvetch	ASGI5	<i>Astragalus gilviflorus</i>	0–25	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–25	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–25	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	25	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			50–125	
	leadplant	AMCA6	<i>Amorpha canescens</i>	25–50	–
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0–25	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	25	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–25	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–25	–
	rose	ROSA5	<i>Rosa</i>	25	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–25	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–25	–

Table 10. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Bluestem</b>			0–18	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–18	–
2	<b>Other Native Tall Grasses</b>			0–45	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–45	–
3	<b>Needlegrasses</b>			90–180	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	90–180	–
4	<b>Grama</b>			63–108	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	63–108	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–45	–
5	<b>Other Native Grasses</b>			36–72	
	Grass, perennial	2GP	<i>Grass, perennial</i>	9–27	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	18–27	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	18–27	–
	Scribner's rosette grass	DICLS	<i>Dichanthelium oligosanthos</i> var.	0–18	–

	Scribner's rosette grass	DIOLO	<i>Dicrananthium oligosanthes</i> var. <i>scribnerianum</i>	9–18	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	9–18	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	9–18	–
6	<b>Grass-Likes</b>			135–180	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	90–180	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	18–27	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	9–18	–
7	<b>Non-Native Grasses</b>			9–27	
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–18	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–18	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–9	–
<b>Forb</b>					
8	<b>Forbs</b>			135–180	
	sweetclover	MELIL	<i>Melilotus</i>	0–90	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	45–90	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	27–45	–
	scurfpea	PSORA2	<i>Psoralegium</i>	27–45	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	18–27	–
	goldenrod	SOLID	<i>Solidago</i>	9–27	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	18–27	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	9–18	–
	blazing star	LIATR	<i>Liatris</i>	9–18	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	9–18	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	9–18	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–18	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	9–18	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	9	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	9	–
	Forb, annual	2FA	<i>Forb, annual</i>	9	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–9	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			45–72	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	27–54	–
	pricklypear	OPUNT	<i>Opuntia</i>	18–27	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	9–27	–
	rose	ROSA5	<i>Rosa</i>	9–18	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	9–18	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–9	–

Table 11. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					

1	<b>Bluestem</b>			66–154	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	66–110	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–110	–
2	<b>Other Native Tall Grasses</b>			44–110	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	44–110	–
3	<b>Needlegrass</b>			110–176	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	110–176	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–22	–
4	<b>Grama</b>			22–66	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	22–44	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–22	–
5	<b>Other Native Grasses</b>			88–154	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	44–110	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	22–88	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	44–66	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	22–44	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	22–44	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos var. scribnerianum</i>	0–22	–
6	<b>Grass-Likes</b>			88–176	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	66–154	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	44–66	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	22–44	–
7	<b>Non-Native Grasses</b>			550–990	
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–880	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	220–880	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–330	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–220	–
<b>Forb</b>					
8	<b>Forbs</b>			110–220	
	sweetclover	MELIL	<i>Melilotus</i>	0–220	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	44–66	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	22–44	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	22–44	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	22–44	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	22–44	–
	scurfpea	PSORA2	<i>Psoralegium</i>	22–44	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	22–44	–
	goldenrod	SOLID	<i>Solidago</i>	22–44	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	0–22	–
	American vetch	VIAM	<i>Vicia americana</i>	0–22	–
	blazing star	LIATR	<i>Liatris</i>	0–22	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	22	–

	silky prairie clover	DAVI	<i>Dalea villosa</i>	0–22	–
	large Indian breadroot	PEES	<i>Pedimelum esculentum</i>	22	–
	beardtongue	PENST	<i>Penstemon</i>	0–22	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	22	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–22	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	22	–
	plains milkvetch	ASGI5	<i>Astragalus gilviflorus</i>	0–22	–
	Forb, annual	2FA	<i>Forb, annual</i>	22	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	22	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			66–132	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	44–88	–
	rose	ROSA5	<i>Rosa</i>	22–44	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	22–44	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–44	–
	dwarf false indigo	AMNA	<i>Amorpha nana</i>	0–22	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	22	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–22	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–22	–

Table 12. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
3	<b>Needlegrass</b>			14–35	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	14–35	–
4	<b>Grama</b>			70–105	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	70–105	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–35	–
5	<b>Other Native Grasses</b>			35–63	
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	14–28	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	14–28	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos</i> var. <i>scribnerianum</i>	7–21	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	7–21	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–7	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–7	–
6	<b>Grass-Likes</b>			140–210	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	140–210	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	14–35	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	21–35	–
7	<b>Non-Native Grasses</b>			0–7	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–7	–
<b>Forb</b>					



8	<b>Forbs</b>			105–140	
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	35–105	–
	sweetclover	MELIL	<i>Melilotus</i>	0–70	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	28–49	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	28–49	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	14–28	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	14–28	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	7–21	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–21	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	14–21	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	7–14	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	7–14	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	7–14	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	7–14	–
	Forb, annual	2FA	<i>Forb, annual</i>	7	–
	blazing star	LIATR	<i>Liatris</i>	0–7	–
	goldenrod	SOLID	<i>Solidago</i>	0–7	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			35–105	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	35–70	–
	pricklypear	OPUNT	<i>Opuntia</i>	21–35	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	14–28	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	14–21	–
	rose	ROSA5	<i>Rosa</i>	7	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–7	–

## Hydrological functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic groups A and D. Infiltration varies from very rapid to rapid and runoff potential varies from negligible to low depending on soil hydrologic group and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where short grasses form a dense 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 Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

## 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.

## Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field tested by various private, state and federal agency specialist.

Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; L. Michael Stirling, NRCS Range Management Specialist; Stan Boltz, NRCS Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

Data Source Number of Records Sample Period State County

SCS-RANGE-417 4 1978 – 1979 ND Adams

Ocular Estimates 7 1984 – 2001 ND Dunn, Grant, Morton

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## Contributors

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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.

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Date	05/12/2011
Approved by	Jeff Printz
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 15 to 20%.
- 
5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present. Existing gullies should be "healed" with a good vegetative cover.
- 
6. **Extent of wind scoured, blowouts and/or depositional areas:** Active blowouts should not be present. Historic blowouts should be "healed" with a good vegetative cover.
- 
7. **Amount of litter movement (describe size and distance expected to travel):** Plant litter to no 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 70% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be 5 – 6.
- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil series description for depth, color and structure of A-horizon.
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. Deep rooted warm season grasses enhance infiltration and reduce runoff.
- 
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, rhizomatous warm-season grasses >
- Sub-dominant: mid, cool-season bunchgrasses >
- Other: grass-likes = mid and short, warm-season grasses = forbs > shrubs

Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome grass do not fit into reference plant community F/S groups.

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

14. **Average percent litter cover (%) and depth ( in):** Litter cover is in contact with soil surface.
- 

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 2500 lbs/ac with a range of 1600 lbs/ac to 3400 lbs/ac (air dry weight) depending upon growing conditions
- 

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, Kentucky bluegrass, smooth brome grass
- 

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