

Ecological site R054XY034ND

Choppy Sands

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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.



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

R054XY025ND	Sands
R054XY035ND	Very Shallow
R054XY042ND	Sandy Terrace
R054XY043ND	Shallow Sandy
R054XY045ND	Limy Sands

Similar sites

R054XY025ND	Sands [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, sandy, and clayey sites. Won't form a ribbon; indicator species are sand bluestem and prairie sandreed evenly mixed, some Canada wildrye, penstemon, and leadplant and western snowberry. This site has far more production, thicker "A" horizon and a mollic epipedon, less needleandthread, less choppy landscape.]
R054XY045ND	Limy Sands [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 similar production with a thin "A" horizon, no mollic epipedon, but has lime within 6 inches to the surface, more little bluestem, plains muhly, sideoats grama, less prairie sand reed and sand bluestem, different landscape positions.]
R054XY042ND	Sandy Terrace [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, thicker "A" horizon and a mollic epipedon, no little bluestem, plains muhly, more prairie sandreed, green needlegrass and shrubs or trees, can be in the same landscape positions, but has more potential to receive additional moisture through occasional flooding.]
R054XY026ND	Sandy [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 more production, thicker "A" horizon and a mollic epipedon, lime deeper than 6 inches from the surface, less little bluestem, plains muhly, sideoats grama, more prairie sandreed, different landscape positions.]
R054XY043ND	Shallow Sandy [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 similar production, more little bluestem, sand bluestem, sedges and blue grama, less needleand-thread, 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 gently rolling to strongly sloping sedimentary uplands and flood plains.

Table 2. Representative physiographic features

Landforms	(1) Dune (2) Natural levee (3) Flood plain
Flooding frequency	None
Ponding frequency	None

Elevation	488–1,097 m
Slope	3–50%
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)	457 mm

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 3 to 50 percent. The soils in this site are somewhat excessively to excessively drained and formed in eolian deposits or alluvium. The loamy fine sand or fine sand surface layer is 4 to 6 inches thick. This site should show slight evidence of wind scoured areas or pedestalled plants. Water flow paths are not evident. The soil surface is unstable and areas of blow-outs can occur.

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) Fine sand
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Family particle size	(1) Sandy
Drainage class	Somewhat excessively drained to excessively drained
Permeability class	Rapid
Soil depth	102–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	5.08–10.16 cm
Calcium carbonate equivalent (0-101.6cm)	0–10%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
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, 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 quite fragile. Under continued adverse impacts, a rapid decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can slowly 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.

Continuous grazing or continuous seasonal (spring) 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. Heavy continuous grazing results in an increased amount of threadleaf sedge and forbs, and elimination of sand bluestem, prairie sandreed and little bluestem.

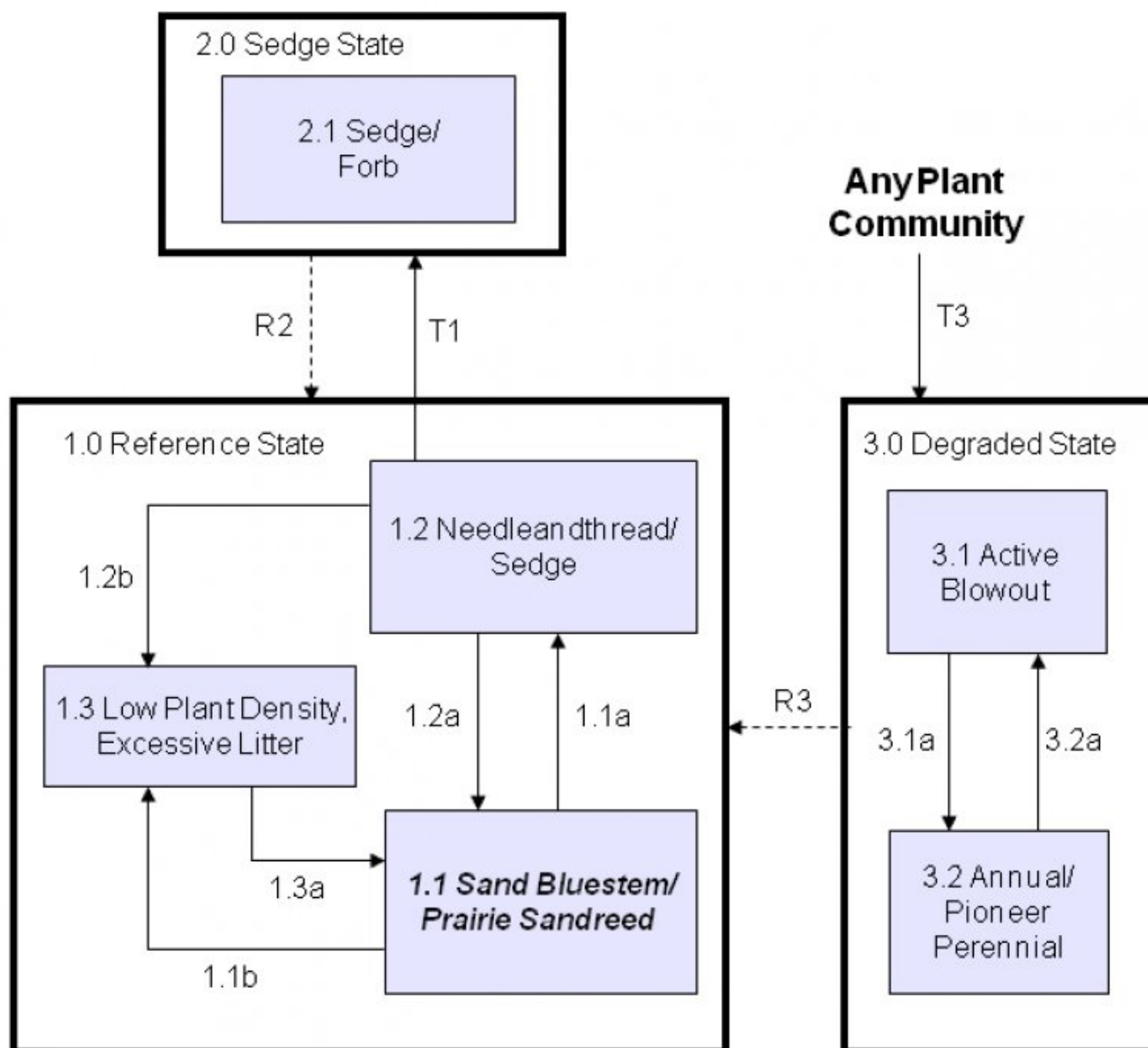
Non-use (rest) and/or lack of fire will likely cause litter to increase causing decadence, mortality and increased introduced cool-season grasses. Heavy continuous grazing, wildfire, excessive defoliation or any type of physical disturbance can lead to serious erosion problems on these fragile soils (i.e., blowouts).

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. Warm season grasses such as sand bluestem and prairie sandreed dominate the plant community. Other grasses and grass-like plants occurring on the site include needleandthread, blue grama, hairy grama, western wheatgrass and sedges. Significant forbs

include penstemon, green sagewort, stiff sunflower, 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. Waterflow patterns may not be present, but there is a very high risk of wind erosion and eventually blowouts if vegetative cover is not adequate. Cryptogamic crusts can be present, but typically only cover 1-2% of the soil surface. Some pedestalling of plants occurs, but it is not very evident on casual observation and occurs on less than 5% of the plants. Overall this site (the interpretive plant community) has the appearance of being stable and productive.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1003	1596	2186
Forb	84	135	185
Shrub/Vine	34	63	95
Total	1121	1794	2466

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/Sedge

This plant community can quickly develop from the adverse effects of long-term, heavy continuous grazing. Sand bluestem and prairie sandreed have been greatly reduced. Needleandthread and threadleaf sedge have increased and are the dominant species. Other grasses include western wheatgrass, blue grama, red threeawn, sand dropseed, Indian Ricegrass, blowout grass and prairie junegrass. Forbs such as western ragweed, green sagewort, hairy goldaster, lemon scurfpea and sweetclover may also be present. Yucca, rose, 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	252	502	757
Forb	56	77	95
Shrub/Vine	28	37	45
Total	336	616	897

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

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 Low Plant Density, Excessive Litter

This plant community develops after an extended period of 10 or more years of non-use by herbivores or exclusion of fire. Non-native grasses, such as Kentucky bluegrass and cheatgrass tend to invade and may dominate this plant community. Other grasses and grass-like plants present include sand bluestem, prairie sandreed, little bluestem, Canada wildrye, western wheatgrass, and threadleaf sedge. The common forbs include green sagewort, goldenrod, western wallflower, prairie coneflower, western ragweed and sweetclover. Cactus and yucca 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	673	1279	1889
Forb	151	196	241
Shrub/Vine	73	94	112
Total	897	1569	2242

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 or continuous seasonal (spring) grazing will convert the plant community to the Needleandthread/Sedge 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 Low Plant Density, 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 to enhance cool season grasses will lead this plant community back to the Sand Bluestem/Prairie Sandreed Plant Community.

Conservation practices

Prescribed Grazing

Pathway 1.2b

Community 1.2 to 1.3

Non-use and no fire over an extended period of time may lead this plant community to the Low Plant Density, Excessive Litter Plant Community.

Pathway 1.3a

Community 1.3 to 1.1

Prescribed grazing or prescribed burning followed by prescribed grazing, will move this plant community toward the Sand Bluestem/Prairie Sandreed Plant Community. This would require long-term management with prescribed grazing and/or prescribed burning under controlled conditions.

Conservation practices

Prescribed Burning
Prescribed Grazing

State 2

Sedge

The State narrative is under development.

Community 2.1

Sedge/Forb

This plant community developed from heavy continuous grazing without adequate recovery periods between grazing events or continuous seasonal (spring) grazing. An increased amount of threadleaf sedge and forbs characterize this plant community. Sand bluestem and prairie sandreed have been reduced to negligible amounts. Other grasses and grass-like species present include sand dropseed, red threeawn, needleandthread, prairie junegrass and sandbur. Forbs commonly found in this plant community include green sagewort, lemon scurfpea, western ragweed, buffalo bur and hairy goldaster. Shrubs present include fringed sagewort and prairie rose. Species diversity has shifted from a grass-dominated community to a forb dominated community. Production has been significantly decreased due to reduction of tall and mid-grass species. Energy flow, water cycle and mineral cycle have been negatively affected. Litter levels are very low and unevenly distributed. Soil erosion may be a concern on steeper slopes and exposed areas.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	224	353	482
Forb	73	93	112
Shrub/Vine	39	58	78
Total	336	504	672

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

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, crested wheatgrass, annual brome, needleandthread, sand dropseed, blowout grass, sandbur, Scribner's Panicum and little bluestem. The dominant forbs include curlycup gumweed, maretail, salsify, kochia, 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 and concentrated animal impact (such as feeding hay on the blowout), will begin to heal the blowout and provide an opportunity for the Annual/Pioneer Perennial Plant Community to establish.

Conservation practices

Prescribed Grazing

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 condition.

Transition T1

State 1 to 2

Heavy, continuous grazing and/or continuous seasonal (spring) grazing may cause further deterioration resulting in a shift to the Sedge/Forb Plant Community.

Restoration pathway R2

State 2 to 1

Long term prescribed grazing with adequate recovery periods following each grazing event and proper stocking over long periods of time move this plant community toward the Needleandthread/Sedge Plant Community. Eventually the plant community may 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

Transition T3 State 2 to 3

Excessive defoliation (i.e., areas of heavy animal concentration) or cropped go-back land with continuous grazing will convert the plant community to the Annual/Pioneer Perennial Plant Community.

Restoration pathway R3 State 3 to 1

Long-term prescribed grazing and removal of disturbance, including adequate rest periods, will move this community through the successional stages, and may eventually lead to a plant community resembling 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 (50+ years). Range seeding followed with 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 (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Bluestem			269–448	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	269–448	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–90	–
2	Other Native Tall Grasses			179–359	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	179–359	–
3	Needlegrass			179–269	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	179–269	–
4	Grama			36–90	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	18–90	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–54	–
5	Other Native Grasses			90–179	
	Grass, perennial	2GP	<i>Grass, perennial</i>	18–36	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	18–36	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	18–36	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	18–36	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	18–36	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	18	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–18	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos var. scribnerianum</i>	18	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	18	–
6	Grass-Likes			90–179	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	90–126	–

	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	36–54	–
	horsetail	EQUIS	<i>Equisetum</i>	18–36	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	18–36	–
Forb					
8	Forbs			90–179	
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	36–54	–
	beardtongue	PENST	<i>Penstemon</i>	36–54	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	36–54	–
	goldenrod	SOLID	<i>Solidago</i>	18–36	–
	lemon scurfspea	PSLA3	<i>Psoralegium lanceolatum</i>	18–36	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	18–36	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	18–36	–
	blazing star	LIATR	<i>Liatris</i>	18–36	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	18–36	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	18–36	–
	silky prairie clover	DAVI	<i>Dalea villosa</i>	18–36	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–18	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	0–18	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–18	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	18	–
	plains milkvetch	ASGI5	<i>Astragalus gilviflorus</i>	0–18	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–18	–
	bractless blazingstar	MENU	<i>Mentzelia nuda</i>	0–18	–
	large Indian breadroot	PEES	<i>Pedimelum esculentum</i>	0–18	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–18	–
Shrub/Vine					
9	Shrubs			36–90	
	leadplant	AMCA6	<i>Amorpha canescens</i>	36–54	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	18–36	–
	rose	ROSA5	<i>Rosa</i>	18–36	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	18–36	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	18	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–18	–
	western sandcherry	PRPUB	<i>Prunus pumila</i> var. <i>besseyi</i>	0–18	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–18	–

Table 10. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Bluestem			0–12	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–12	–
	reed bluestem	ANBLA	<i>Andropogon hallii</i>	0–7	–

	sand bluestem	ANNA	<i>Andropogon nani</i>	0–7	–
2	Other Native Tall Grasses			0–31	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–31	–
3	Needlegrass			62–155	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	62–155	–
4	Grama			31–49	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	19–49	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	19–49	–
5	Other Native Grasses			31–62	
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	12–31	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	19–25	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	12–25	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	7–12	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	7–12	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	7–12	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–7	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–7	–
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	7	–
6	Grass-Likes			90–179	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	93–155	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	7–12	–
	horsetail	EQUIS	<i>Equisetum</i>	0–7	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–7	–
7	Non-Native Grasses			12–19	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–19	–
Forb					
8	Forbs			62–93	
	sweetclover	MELIL	<i>Melilotus</i>	0–62	–
	lemon scurfpea	PSLA3	<i>Psoraleidium lanceolatum</i>	25–49	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	19–44	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	25–31	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	12–19	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	12–19	–
	goldenrod	SOLID	<i>Solidago</i>	7–12	–
	buffalobur nightshade	SORO	<i>Solanum rostratum</i>	7–12	–
	bractless blazingstar	MENU	<i>Mentzelia nuda</i>	0–12	–
	blazing star	LIATR	<i>Liatris</i>	7–12	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	12	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	7–12	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	7–12	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	7–12	–
	buckwheat	FRIOG	<i>Eriogonum</i>	0–12	–

	Forb, annual	ERAC	<i>Erysimum capitatum</i>	0–7	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	0–7	–
	Forb, annual	2FA	<i>Forb, annual</i>	7	–
	large Indian breadroot	PEES	<i>Pediomelum esculentum</i>	0–7	–
	beardtongue	PENST	<i>Penstemon</i>	7	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	7	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	7	–
Shrub/Vine					
9	Shrubs			31–44	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	19–25	–
	pricklypear	OPUNT	<i>Opuntia</i>	12–19	–
	rose	ROSA5	<i>Rosa</i>	12–19	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	12–19	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	7–12	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–7	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–7	–

Table 11. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Bluestem			78–173	
	sand bluestem	ANHA	<i>Andropogon hallii</i>	78–157	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–110	–
2	Other Native Tall Grasses			78–157	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	78–157	–
3	Needlegrass			157–235	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	157–235	–
4	Grama			16–31	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	16–31	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	16–31	–
5	Other Native Grasses			157–235	
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	47–78	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	47–63	–
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	31–47	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	31–47	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	16–31	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	16–31	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	16–31	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	16–31	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	16	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–16	–
6	Grass-Likes			157–235	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	78–235	–

	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	47–78	–
	horsetail	EQUIS	<i>Equisetum</i>	31–47	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–16	–
7	Non-Native Grasses			47–157	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–78	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	47–78	–
Forb					
8	Forbs			157–235	
	sweetclover	MELIL	<i>Melilotus</i>	0–157	–
	Forb, annual	2FA	<i>Forb, annual</i>	31–47	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	31–47	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	31–47	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	16–31	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	16–31	–
	buckwheat	ERIOG	<i>Eriogonum</i>	16–31	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	16–31	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	16–31	–
	blazing star	LIATR	<i>Liatris</i>	16–31	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	16–31	–
	bractless blazingstar	MENU	<i>Mentzelia nuda</i>	0–31	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	16–31	–
	beardtongue	PENST	<i>Penstemon</i>	16–31	–
	lemon scurfp pea	PSLA3	<i>Psoralegium lanceolatum</i>	16–31	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	16–31	–
	goldenrod	SOLID	<i>Solidago</i>	16–31	–
	buffalobur nightshade	SORO	<i>Solanum rostratum</i>	16–31	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	0–16	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–16	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	16	–
	silky prairie clover	DAVI	<i>Dalea villosa</i>	16	–
	large Indian breadroot	PEES	<i>Pedimelum esculentum</i>	0–16	–
	plains milkvetch	ASGI5	<i>Astragalus gilviflorus</i>	0–16	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	16	–
Shrub/Vine					
9	Shrubs			78–110	
	pricklypear	OPUNT	<i>Opuntia</i>	31–47	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	31–47	–
	rose	ROSA5	<i>Rosa</i>	16–31	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	16–31	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	16–31	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	16	–
	western sandcherry	PRPUB	<i>Prunus pumila</i> var. <i>besseyi</i>	0–16	–

	Subshrub (<.5m)	2SUBS	Subshrub (<.5m)	0–16	–
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Table 12. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
3	Needlegrass			26–50	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	26–50	–
4	Grama			16–26	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	10–26	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	10–26	–
5	Other Native Grasses			26–50	
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	26–50	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	26–36	–
	mat sandbur	CELO3	<i>Cenchrus longispinus</i>	10–16	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos var. scribnerianum</i>	6–10	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	6–10	–
	Indian ricegrass	ACHY	<i>Achnatherum hymenoides</i>	0–6	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–6	–
6	Grass-Likes			127–177	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	127–177	–
7	Non-Native Grasses			10–16	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–16	–
Forb					
8	Forbs			76–111	
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	36–76	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	30–50	–
	sweetclover	MELIL	<i>Melilotus</i>	0–50	–
	lemon scurfp pea	PSLA3	<i>Psoraleidum lanceolatum</i>	40–50	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	16–20	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	16–20	–
	buffalobur nightshade	SORO	<i>Solanum rostratum</i>	16–20	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	16	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	10–16	–
	buckwheat	ERIOG	<i>Eriogonum</i>	0–16	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	6–10	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	6–10	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	6–10	–
	goldenrod	SOLID	<i>Solidago</i>	0–6	–
	Forb, annual	2FA	<i>Forb, annual</i>	6	–
	blazing star	LIATR	<i>Liatris</i>	0–6	–
Shrub/Vine					
9	Shrubs			10–76	

3	Shrubs			40-10	
	soapweed yucca	YUGL	<i>Yucca glauca</i>	20-36	-
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	20-26	-
	pricklypear	OPUNT	<i>Opuntia</i>	16-20	-
	rose	ROSA5	<i>Rosa</i>	10-16	-
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	10-16	-
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0-6	-

Animal community

Animal Community – Wildlife Interpretations:
Under development.

Animal Community – Grazing Interpretations:

This site is well adapted to managed grazing by domestic livestock. The predominance of herbaceous plants across all plant community phases best lends these sites to grazing by cattle but other domestic grazers with differing diet preferences may also be a consideration depending upon management objectives. Often, the current plant community does not entirely match any particular plant community (as described in the ecological site description). Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of this inventory data will permit the establishment of a safe, initial stocking rate for the type and class of animals and level of grazing management. More accurate stocking rate estimates should eventually be calculated using actual stocking rate information and monitoring data.

Hydrological functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group A. Infiltration varies from rapid to very rapid and runoff potential varies from negligible to very 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. 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; Stan Boltz, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; L. Michael Stirling, NRCS Range Management Specialist; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

Data Source Number of Records Sample Period State County

SCS-RANGE-417 1 1969 ND Mercer

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.
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USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224.
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USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (<http://plants.usda.gov>). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.

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Contributors

Jeff Printz

Jeff Printz/Stam 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.

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Date	05/24/2011
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:** Barely observable.

-
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground 20 to 25% consisting of randomly scattered small patches no greater than 2 inches in diameter.

-
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 although a few, small, scattered scour sites may be observed. Historic blowouts should be "healed" with a good vegetative cover.
-

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 70% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be greater than 3.
-

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. Healthy, deep rooted native grasses enhance infiltration and reduce runoff. Infiltration rate is rapid.
-

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 short, cool-season bunchgrasses >

Other: grass-likes = forbs > short, warm-season grasses = 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.

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 = 1600 lbs/ac with a range of 1000 lbs/ac to 2200 lbs/ac (air dry weight) depending upon growing conditions
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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, Kentucky bluegrass, smooth brome grass, creeping juniper.
-

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