

Ecological site R053BY017ND Very Shallow

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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: 42a – Missouri Coteau; 42b – Collapsed Glacial Outwash; 42c – Missouri Coteau Slope; 42d – Northern Missouri Coteau; 42f – Southern Missouri Coteau Slope; 42g – Ponca Plains; and 42h – Southern River Breaks.

Associated sites

R053BY007ND	Sands
R053BY008ND	Sandy
R053BY009ND	Shallow Loamy
R053BY010ND	Shallow Gravel
R053BY011ND	Loamy
R053BY015ND	Thin Loamy

Similar sites

R053BY013ND	Thin Claypan [Well drained soils on uplands or terraces that don't receive extra moisture with a dense sodic subsoil above 6 inches and with salts above 16 inches that restricts root penetration. Usually found in microrelief within Claypan site, indicator species are western wheatgrass, Sandberg's bluegrass with an understory of blue grama and buffalograss, heath aster, cudweed sagewort and western yarrow along with shrubs such as fringed sagewort and brittle cactus. This site has no little bluestem, less steeper slopes, similar production, and a different restrictive layer.]
R053BY009ND	Shallow Loamy [Somewhat excessively well-drained soils more than 10 less than 20 inches to bedrock that restricts root penetration. Surface layer will ribbon less than 2 inches and greater than 1 inch. Upslope from Loamy site and some times down slope from Very Shallow site. Indicator species: needlegrasses, plains muhly and sideoats grama, with dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, and shrubs like broom snakeweed. This site has similar species but less needleandthread and blue grama, more plains muhly, green needlegrass, western wheatgrass, restrictive layer below 10 inches down to 20 inches to bedrock, more production.]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Hesperostipa comata</i> ssp. <i>comata</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

This site typically occurs on level to very steep uplands.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain (2) Beach ridge (3) Terrace
Flooding frequency	None
Ponding frequency	None
Elevation	488–610 m
Slope	0–35%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 53B 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 15 to 20 inches per year. The normal average annual temperature is about 41° F. January is the coldest month with average temperatures ranging from about 4° F (Powers Lake, ND) to about 10° F (Pollock, SD). July is the warmest month with temperatures averaging from about 67° F (Powers Lake, ND) to about 72° F (Pollock, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 62° F. This large annual range attests to the continental nature of this MLRA's climate. 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 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)	135 days
Freeze-free period (average)	156 days
Precipitation total (average)	508 mm

Influencing water features

No significant water features influence this site.

Soil features

These are very deep, excessively drained, moderately coarse and medium textured soils that are very shallow to porcelanite or sand and/or sand and gravel. Saturated hydraulic conductivity is very rapid and available water capacity is low and very low. Salinity and sodicity are none. This site is on flats, rises, and ridges on outwash plains, beach ridges and terraces. Slope ranges from 0 to 35 percent. While a definite restrictive layer is not present, the presence of a high amount of gravels in the subsurface layers at a depth of 10 or less inches creates a droughty condition which acts like a restrictive layer to the majority of plants. This site should show no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous. The soil surface is very unstable but intact. Sub-surface soil layers are restrictive to water movement and root penetration.

Low available water capacity caused by the shallow rooting depth strongly influences the soil-water-plant relationship. 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:

<http://www.nrcs.usda.gov/technical/efotg/>

Table 4. Representative soil features

Surface texture	(1) Loam (2) Very gravelly sandy loam (3) Stony
Family particle size	(1) Loamy
Drainage class	Excessively drained
Permeability class	Rapid to very rapid
Soil depth	203 cm
Surface fragment cover <=3"	10–50%
Surface fragment cover >3"	0–50%
Available water capacity (0-101.6cm)	2.54–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0

Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	20–90%
Subsurface fragment volume >3" (Depth not specified)	0–65%

Ecological dynamics

The 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 very fragile. Under continued adverse impacts, a very rapid decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can very slowly return to the Historic Climax Plant Community (HCPC).

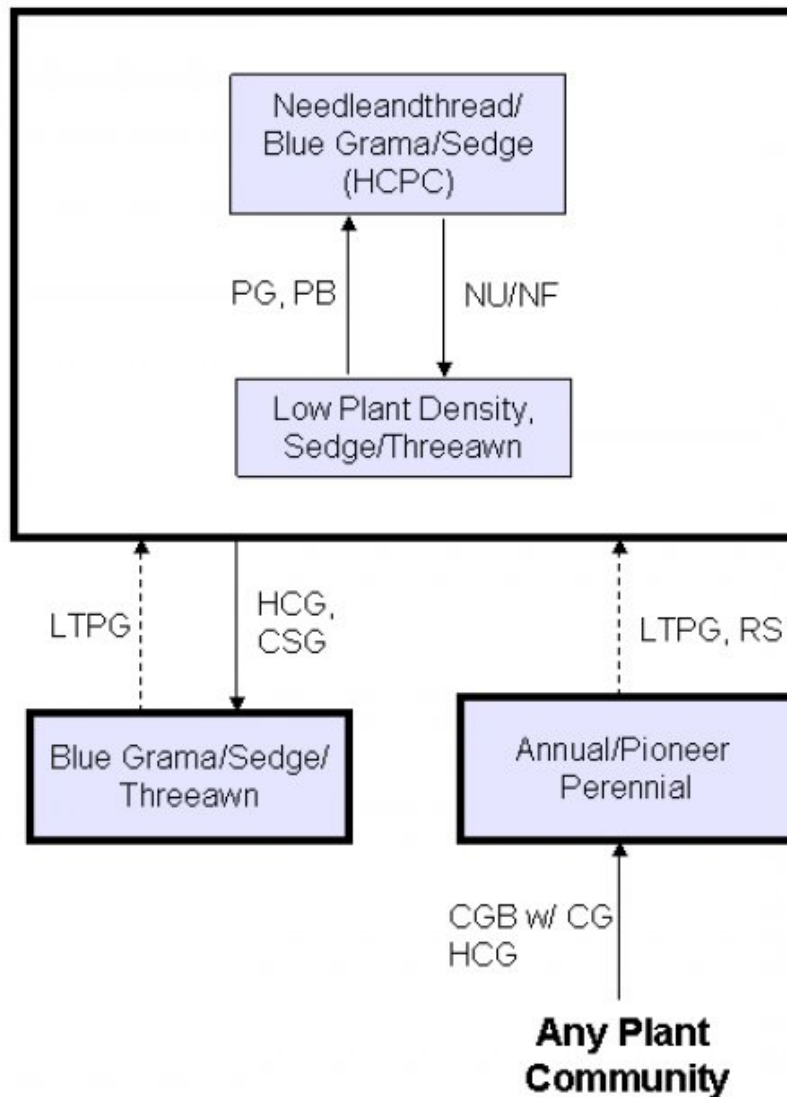
The plant community upon which interpretations are primarily based is the HCPC. The HCPC has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed 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 without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as threadleaf sedge and blue grama will initially increase. Plains muhly, western wheatgrass, little bluestem and sideoats grama will decrease in frequency and production and later disappear. Heavy continuous grazing causes blue grama and/or threadleaf sedge to increase. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and pioneer perennials and annuals to increase. The resulting plant community is relatively stable and the competitive advantage prevents other species from establishing.

Extended periods of non-use and lack of fire will result in a plant community having low density with higher litter amounts, which favors an increase in cheatgrass, Sandberg bluegrass and sweetclover. In time, shrubs such as cactus, creeping juniper and skunkbrush sumac will increase.

The following diagram illustrates the common plant communities and vegetation states commonly occurring on the site and the transition pathways between communities and states. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model



CGB w/ CG – Cropped go-back with continuous grazing; **CSG** – Continuous seasonal grazing; **HCG** – Heavy continuous grazing; **HCPC** – Historical Climax Plant Community; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning; **PG** – Prescribed grazing; **RS** – Range seeding followed by prescribed grazing.

Community 1.1

Needleandthread/Blue Grama/Sedge (HCPC)

This is the interpretive plant community and is considered to be the Historic Climax Plant Community (HCPC). 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 87% grasses or grass-like plants, 8% forbs and 5% shrubs. An even mix of both cool and warm-season grasses dominates this plant community. The major grasses and grass-like plants include needleandthread, blue grama, western wheatgrass, threadleaf sedge and plains muhly. Other grasses occurring on the site include sideoats grama, little bluestem, slender wheatgrass, hairy grama and thickspike wheatgrass. The significant forbs include gayfeather, purple coneflower, prairie clover and cutleaf ironplant. Significant shrubs are fringed sagewort, creeping juniper and rose. 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 at the site's potential. Plant litter is properly distributed with some movement off-site and natural plant mortality is low. The diversity in plant species allows for high drought tolerance.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	701	1211	1721
Forb	62	87	112
Shrub/Vine	22	47	73
Total	785	1345	1906

Figure 5. Plant community growth curve (percent production by month).
ND5303, Missouri Coteau, cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	6	21	40	20	6	4	1	0	0

State 2

Blue Grama/Sedge/Threeawn

Community 2.1

Blue Grama/Sedge/Threeawn

This plant community can very quickly develop from the adverse effects of long-term, heavy, continuous grazing and/or continuous seasonal grazing (annual, early spring seasonal grazing). Annual, grazing too early in the spring depletes stored carbohydrates, resulting in weakening and eventual death of the cool season mid-grasses. Short grasses and forbs increase to dominate the site and annual production decreases dramatically. Lack of litter and reduced vigor result in higher soil temperatures, poor water infiltration rates, and high evapotranspiration, which gives blue grama and sedges a highly competitive advantage over cool and warm-season mid-grasses. This plant community can occur throughout the pasture, on spot grazed areas, and around water sources where season-long grazing patterns occur. Blue grama, threadleaf sedge and red threeawn are the dominant grass/grass-like species. Other grasses include western wheatgrass, needleandthread, little bluestem, plains muhly, and prairie junegrass. Significant forbs include American pasqueflower, green sagewort, cutleaf ironplant, rush skeletonweed, prairie coneflower and scarlet globemallow. There is usually less than 20% bare ground. The significant shrubs include broom snakeweed, cactus and fringed sagewort. This plant community is relatively stable. The competitive advantage of blue grama and threadleaf sedge prevents other species from establishing. This plant community is less productive than the HCPC. Runoff has increased and infiltration has decreased. Soil erosion will be minimal due to the "sod-like" habit of blue grama.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	202	392	695
Forb	17	34	50
Shrub/Vine	6	22	39
Total	225	448	784

Figure 7. Plant community growth curve (percent production by month).
ND5303, Missouri Coteau, cool-season/warm-season co-dominant.. Cool-season, warm-season co-dominant..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	6	21	40	20	6	4	1	0	0

State 3 Low Plant Denstiy, Sedge/Threeawn

Community 3.1 Low Plant Denstiy, Sedge/Threeawn

This plant community develops after an extended period of 15 or more years of non-use by herbivores and no fire. Plant litter may accumulate as this plant community first develops. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to colonies. Standing decadent plants and moderate litter covers shorter understory species (i.e. short grasses and sedges), restricting their ability to capture adequate sunlight for photosynthesis. Vigor and diversity of native plants are reduced. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill interspaces once occupied by desirable species. Crested wheatgrass, cheatgrass and/or sweetclover may invade this plant community. All native plants present in the HCPC may be present in this state, but in less vigor and health. The common forbs include American pasqueflower, green sagewort, gayfeather and purple coneflower. Fringed sagewort, cactus, creeping juniper and skunkbrush sumac are the principal shrubs and tend to increase in density and cover. This plant community is resistant to change without prescribed grazing. Grazing is the most effective treatment in moving this plant community towards the HCPC. Soil erosion is low. Compared to the HCPC, infiltration and runoff is similar. Once this plant community is reached, any of the preferred treatments can readily return the diversity and production of the site.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	471	856	1356
Shrub/Vine	45	76	106
Forb	45	76	106
Total	561	1008	1568

Figure 9. Plant community growth curve (percent production by month).
ND5302, Missouri Coteau, cool-season dominant, warm-season sub-dominant.. Cool-season dominant, warm-season sub-dominant..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	7	23	42	15	5	4	1	0	0

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
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Grass/Grasslike					
1	Needlegrass			202–336	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	202–336	–
2	Grama			135–336	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	67–269	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	27–67	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	27–67	–
3	Mid Warm-Season			40–108	
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	27–108	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	13–67	–
4	Wheatgrass			27–108	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	27–108	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–67	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–67	–
5	Other Native Grasses			40–108	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–40	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	13–40	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	13–27	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	13–27	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–13	–
6	Grass-Likes			67–175	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	67–175	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–67	–
Forb					
8	Forbs			67–108	
	prairie clover	DALEA	<i>Dalea</i>	13–40	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	13–40	–
	blazing star	LIATR	<i>Liatris</i>	13–40	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	13–27	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	13–27	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	13–27	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	13–27	–
	alpine golden buckwheat	ERFLF	<i>Eriogonum flavum</i> var. <i>flavum</i>	13–27	–
	Forb, annual	2FA	<i>Forb, annual</i>	13–27	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	13–27	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	13–27	–
	onion	ALLIU	<i>Allium</i>	0–13	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–13	–
	blanketflower	GAAR	<i>Gaillardia aristata</i>	0–13	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–13	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–13	–
	eastern pasqueflower	PUPA5	<i>Pulsatilla patens</i>	0–13	–

	plains milkvetch	ASGI5	<i>Astragalus gilviflorus</i>	0–13	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–13	–
Shrub/Vine					
9	Shrubs			27–67	
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–40	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	13–27	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	13–27	–
	pricklypear	OPUNT	<i>Opuntia</i>	13–27	–
	rose	ROSA5	<i>Rosa</i>	13–27	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	13–27	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–13	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–13	–

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Needlegrass			4–22	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	4–22	–
2	Grama			67–135	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	45–135	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–45	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–22	–
4	Wheatgrass			4–22	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	4–22	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus ssp. lanceolatus</i>	0–9	–
5	Other Native Grasses			18–45	
	Fendler threeawn	ARPUL	<i>Aristida purpurea var. longiseta</i>	9–45	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	4–22	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–13	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	4–9	–
6	Grass-Likes			67–135	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	67–135	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–22	–
7	Non-Native Grasses			0–9	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–9	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	0–9	–
Forb					
8	Forbs			22–45	
	sweetclover	MELIL	<i>Melilotus</i>	0–22	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–22	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–22	–

	tarragon	ARDR4	<i>Artemisia dracunculus</i>	4–13	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	4–13	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	0–13	–
	blazing star	LIATR	<i>Liatris</i>	4–9	–
	pussytoes	ANTEN	<i>Antennaria</i>	4–9	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	4–9	–
	prairie clover	DALEA	<i>Dalea</i>	4–9	–
	alpine golden buckwheat	ERFLF	<i>Eriogonum flavum</i> var. <i>flavum</i>	0–9	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	4–9	–
	eastern pasqueflower	PUPA5	<i>Pulsatilla patens</i>	4–9	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	4–9	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	4–9	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	4–9	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–4	–
	onion	ALLIU	<i>Allium</i>	0–4	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–4	–
Shrub/Vine					
9	Shrubs			9–36	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	4–22	–
	pricklypear	OPUNT	<i>Opuntia</i>	4–18	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	0–13	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–13	–
	rose	ROSA5	<i>Rosa</i>	4–13	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	4–13	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–4	–

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Needlegrass			20–101	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	20–101	–
2	Grama			50–151	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	50–101	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–50	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–50	–
3	Mid Warm-Season			0–30	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–30	–
4	Wheatgrass			20–101	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	20–101	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–30	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–10	–
5	Other Native Grasses			40–171	

	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	20–151	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	10–50	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–30	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–20	–
6	Grass-Likes			50–151	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	50–151	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–50	–
7	Non-Native Grasses			20–101	
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	10–101	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	10–81	–
Forb					
8	Forbs			50–101	
	sweetclover	MELIL	<i>Melilotus</i>	0–71	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–50	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–50	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	10–40	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	10–40	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	0–30	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0–30	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	10–30	–
	blazing star	LIATR	<i>Liatris</i>	10–20	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	10–20	–
	prairie clover	DALEA	<i>Dalea</i>	10–20	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–10	–
	alpine golden buckwheat	ERFLF	<i>Eriogonum flavum</i> var. <i>flavum</i>	0–10	–
	blanketflower	GAAR	<i>Gaillardia aristata</i>	0–10	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–10	–
	plains milkvetch	ASGI5	<i>Astragalus gilviflorus</i>	0–10	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–10	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–10	–
	eastern pasqueflower	PUPA5	<i>Pulsatilla patens</i>	0–10	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–10	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0–10	–
Shrub/Vine					
9	Shrubs			50–101	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	10–50	–
	creeping juniper	JUHO2	<i>Juniperus horizontalis</i>	10–40	–
	rose	ROSA5	<i>Rosa</i>	10–40	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–30	–
	pricklypear	OPUNT	<i>Opuntia</i>	10–30	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–20	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–10	–

Animal community

Wildlife Interpretations:
Under development.

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 varies from negligible to low depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An 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 varieties 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

Selected seed harvest of certain unique native plant species can provide additional income.

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 specialists. Those involved in developing this site description include: Stan Boltz, NRCS Range Management Specialist; Michael D. Brand, State Land Dept., Director Surface Management; David Dewald, NRCS State Biologist; Paul Drayton, NRCS District Conservationist; Jody Forman, NRCS Range Management Specialist; Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Kevin Sedivec, Extension Rangeland Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; and Lee Voigt, NRCS Range Management Specialist.

Data Source Number of Records Sample Period State County
SCS-RANGE-417 1 1969 ND Emmons

Other references

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

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224.

(<http://www.wcc.nrcs.usda.gov>)

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

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

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

USDA, NRCS, Various Published Soil Surveys.

Contributors

Jeff Printz

Jeff Printz/Stam Boltz

Approval

Suzanne Mayne-Kinney, 1/11/2024

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	01/17/2012
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- Number and extent of rills:** Due to the wide slope range associated with this site, the number and extent of rills will vary from none on sites with slopes of < 15% to occasionally present but short (12 to 20 inches) on slopes > 15%.

- Presence of water flow patterns:** Due to the wide slope range associated with this site, water flow patterns will vary from barely observable on sites with slopes of < 15% from broken and irregular in appearance on slopes > 15%.

- Number and height of erosional pedestals or terracettes:** Not evident on slopes < 15%. Erosional pedestals will be present with terracettes present at debris dams on slopes >15%.

- Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 20 to 35%.

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

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.
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7. **Amount of litter movement (describe size and distance expected to travel):** None on slopes < 15%. Movement of small size litter (i.e. forb leaves) for short distances (12 to 24 inches) does occur on slopes > 15%.
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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 or greater. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.
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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/surface layer.
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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.
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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Mid cool-season bunchgrasses = short warm-season grasses
- Sub-dominant: Grass-likes > mid warm-season grasses
- Other: Mid cool-season rhizomatous = forbs > shrubs > short cool-season grasses
- 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):** None.
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14. **Average percent litter cover (%) and depth (in):** Plant litter is in contact with
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 1200 lbs./ac air dry with a range of 700 to 1700 lbs./ac air dry depending upon

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