

Ecological site R053BY002ND **Claypan**

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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.

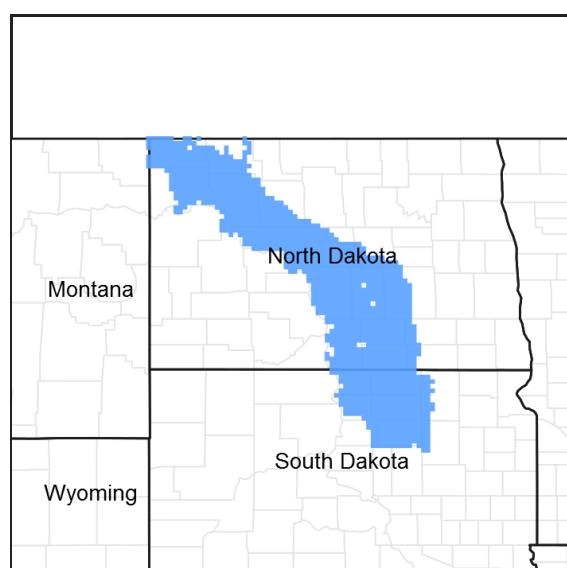


Figure 1. Mapped extent

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

R053BY001ND	Clayey
R053BY003ND	Closed Depression
R053BY006ND	Saline Lowland
R053BY011ND	Loamy
R053BY013ND	Thin Claypan

Similar sites

R053BY001ND	Clayey [Does not receive additional moisture. Found on dry uplands, upslope from Loamy Terrace or Loamy Overflow sites, down slope from Thin Loamy or Shallow Loamy sites. Similar landscape position as Sandy, Sands, and Loamy sites. Will ribbon greater than 2 inches. Indicator species: dominated by western wheatgrass and green needlegrass. This site has more production, more green needlegrass, less blue grama, deeper soils, no sodic subsoil layer.]
R053BY011ND	Loamy [Does not receive additional moisture. Found on dry uplands upslope from Loamy terrace or Loamy Overflow sites, down slope from Thin Loamy or Shallow Loamy sites; similar landscape position as Sandy, Sands, Clayey sites. Will ribbon greater than 1 inch and up to 2 inches. Indicator species: western wheatgrass, green needlegrass and blue grama, with fringed sagewort and western snowberry being the dominant shrubs. This site has more production, more green needlegrass and shrubs, less blue grama, deeper soils, no sodic subsoil layer.]
R053BY003ND	Closed Depression [Poorly drained clayey soils with sodic subsoils and with redoximorphic features within depressions. Ponds periodically with no apparent water table. Indicator species: dominated by western wheatgrass with alkaligrass and foxtail barley intermixed, forb indicator is western dock, no shrubs. This site has more production, more western wheatgrass but no blue grama.]
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 restricting root penetration. Usually found in micro relief within Claypan sites, 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 a few shrubs of fringed sagewort and brittle cactus. This site has a shallower sodic subsoils layer, less production, similar species, more blue grama, less needleandthread & green needlegrass.]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Bouteloua gracilis</i>

Physiographic features

This site occurs on gently undulating to rolling residual uplands.

Table 2. Representative physiographic features

Landforms	(1) Lake plain (2) Till plain (3) Swale
Flooding frequency	None
Ponding frequency	None
Elevation	488–610 m
Slope	0–9%
Water table depth	107–203 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

Climate stations used

- (1) GARRISON [USW00094041], Garrison, ND
- (2) POWERS LAKE 1N [USC00327281], Powers Lake, ND
- (3) LEOLA [USC00394891], Leola, SD
- (4) ROSCOE [USC00397277], Roscoe, SD
- (5) POLLOCK [USC00396712], Pollock, SD
- (6) PETTIBONE [USC00327047], Pettibone, ND
- (7) IPSWICH [USC00394206], Ipswich, SD
- (8) STREETER 5 NW [USC00328415], Tappen, ND

Influencing water features

No significant water features influence this site.

Soil features

These are moderately deep to very deep, moderately well and well drained soils. Saturated hydraulic conductivity is moderately slow to very slow and available water capacity is moderate. They have moderately coarse to moderately fine textured surface layers underlain by a sodic subsoil. The subsoils are moderately fine to fine textured and are high in sodium. These dense sodic subsoils restrict root growth. Salinity is moderate to strong at depths greater than 16 inches. This site is on nearly level to undulating lake plains, till plains and swales. Slope ranges from 0 to 9 percent. 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. The soil surface is stable and intact.

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) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained to well drained

Permeability class	Very slow to moderately slow
Soil depth	20–61 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–1%
Available water capacity (0-101.6cm)	5.08–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	0–30%
Electrical conductivity (0-101.6cm)	0–16 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–25
Soil reaction (1:1 water) (0-101.6cm)	5.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–5%

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 management actions and/or climatic conditions. 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 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.

Heavy continuous grazing and/or continuous seasonal (spring) grazing, without adequate recovery periods following each grazing occurrence causes this site to depart from the HCPC. Blue grama and buffalograss will begin to increase. Western wheatgrass will increase initially and then begin to decrease. Green needlegrass will decrease in frequency and production. In time, heavy continuous grazing will likely cause blue grama and buffalograss to dominate and pioneer perennials and annuals to increase.

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.

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

Ecosystem states

1. Western
Wheatgrass/Blue
Grama (HCPC)

2. Western
Wheatgrass/Excessive
Litter

3. Blue Grama/Inland
Saltgrass/Sedge

State 1 submodel, plant communities

1.1. Western
Wheatgrass/Blue
Grama (HCPC)

State 2 submodel, plant communities

2.2. Western
Wheatgrass/Excessive
Litter

State 3 submodel, plant communities

3.3. Blue Grama/Inland
Saltgrass/Sedge

State 1
Western Wheatgrass/Blue Grama (HCPC)

Community 1.1
Western Wheatgrass/Blue Grama (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 85% grasses or grass-like plants, 10% forbs and 5% shrubs. Cool-season grasses dominate the site, but warm-season short grasses are also prevalent. Western wheatgrass is the dominant grass. Other grasses and grass-like plants occurring on the site include blue grama, needleandthread, buffalograss, green needlegrass, Sandberg bluegrass, inland saltgrass and sedges. Significant forbs include silverleaf scurfpea, cudweed sagewort and heath aster. Shrubs present include brittle cactus, plains pricklypear, fringed sagewort 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 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. Good vegetative cover coupled with moderate available water capacity provides for a favorable soil-water-plant relationship.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1239	1706	2169
Forb	90	143	196
Shrub/Vine	17	56	101
Total	1346	1905	2466

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

Western Wheatgrass/Excessive Litter

Community 2.1

Western Wheatgrass/Excessive Litter

This plant community develops after an extended period of 15 years or more of non-use by herbivores and exclusion of fire. 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. Plant litter accumulates in large amounts as this community develops. Litter buildup reduces plant vigor and density, and seedling recruitment declines. Eventually litter levels become abundant enough to crowd out living plants and reduce plant density. Annual and/or biennial forbs, annual grasses, and cryptogams commonly fill these interspaces. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. Heavy 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. 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 include western wheatgrass, thickspike wheatgrass, needleandthread and Sandberg bluegrass. The common forbs include sweetclover, cudweed sagewort and western yarrow. Brittle cactus is the principal shrub. 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 HCPC. Soil erosion is low. Compared to the HCPC, infiltration is reduced to the lower root zone. Runoff is similar to the HCPC. This plant community tends to be moisture loving and usually tends to utilize the spring moisture quickly causing forage base to become dry and not very palatable early in the summer. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in the diversity of the site.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1020	1318	1614
Forb	73	157	241
Shrub/Vine	28	94	163
Total	1121	1569	2018

Figure 7. Plant community growth curve (percent production by month).

ND5301, Missouri Coteau, cool-season dominant.. Cool-season dominant..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	8	24	45	10	3	5	2	0	0

State 3

Blue Grama/Inland Saltgrass/Sedge

Community 3.1

Blue Grama/Inland Saltgrass/Sedge

This plant community can quickly result from heavy continuous grazing and/or 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 plant community and annual production decreases dramatically. Lack of litter and reduced plant vigor result in higher soil temperatures, high evapotranspiration and poor water infiltration rates, which gives blue grama a competitive advantage over cool 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 and Sandberg bluegrass are the prominent species with the balance being a few species of cool-season grasses and warm-season grasses including buffalograss, inland saltgrass, prairie junegrass and needleandthread. Forbs and shrubs such as fringed sagewort, cudweed sagewort, heath aster and western yarrow may also be present. There is usually less than 10% bare ground. This plant community is relatively stable. The competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	510	903	1182
Forb	45	76	106
Shrub/Vine	6	29	56
Total	561	1008	1344

Figure 9. Plant community growth curve (percent production by month).

ND5304, Missouri Coteau, warm-season dominant, cool-season sub-dominant.. Warm-season dominant, cool-season sub-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

Additional community tables

Table 8. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrasses			381–572	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	381–572	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	38–191	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–95	–
2	Short Warm-Season Grasses			191–286	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	191–286	–
3	Needlegrasses			95–343	

	green needlegrass	NAVI4	<i>Nassella viridula</i>	95–286	–
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	19–95	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–95	–
4	Other Native Perennials			95–229	
	Grass, perennial	2GP	<i>Grass, perennial</i>	19–95	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	38–95	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	38–95	–
	saltgrass	DISP	<i>Distichlis spicata</i>	19–57	–
5	Grass-Likes			38–191	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	38–191	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	19–95	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–95	–
Forb					
7	Forbs			95–191	
	scurfpea	PSORA2	<i>Psoralegium</i>	19–38	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	19–38	–
	goldenrod	SOLID	<i>Solidago</i>	19–38	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	19–38	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	19–38	–
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	0–38	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–38	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	19–38	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	19–38	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	19–38	–
	leafy wildparsley	MUDI	<i>Musineon divaricatum</i>	0–19	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–19	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–19	–
	onion	ALLIU	<i>Allium</i>	0–19	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–19	–
	Nuttall's violet	VINU2	<i>Viola nuttallii</i>	0–19	–
Shrub/Vine					
8	Shrubs			19–95	
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	19–38	–
	rose	ROSA5	<i>Rosa</i>	19–38	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–38	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	19–38	–
	spiny star	ESVIV	<i>Escobaria vivipara</i> var. <i>vivipara</i>	0–19	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–19	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–19	–

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production #kg/ha/yr	Foliar Cover (%)
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Group	Common name	Symbol	Scientific name	(kg/hectare)	Cover (%)
Grass/Grasslike					
1	Wheatgrasses			78–235	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	78–235	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–78	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–78	–
2	Short Warm-Season Grasses			16–78	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	16–78	–
3	Needlegrasses			47–157	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	31–126	–
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	16–78	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	16–78	–
4	Other Native Perennials			31–78	
	Grass, perennial	2GP	<i>Grass, perennial</i>	16–78	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	16–63	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	16–63	–
	saltgrass	DISP	<i>Distichlis spicata</i>	0–47	–
5	Grass-Likes			31–78	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	16–78	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–63	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	16–47	–
6	Non-Native Grasses			235–549	
	smooth brome	BRIN2	<i>Bromus inermis</i>	78–471	–
	bluegrass	POA	<i>Poa</i>	78–471	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	78–314	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–235	–
Forb					
7	Forbs			78–235	
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	16–78	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–78	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	16–63	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	16–63	–
	goldenrod	SOLID	<i>Solidago</i>	16–63	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	16–47	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	16–47	–
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	0–47	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	16–31	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	16–31	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–31	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	16–31	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	16–31	–
	onion	AI1111	<i>Allium</i>	0–16	–

	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–16	–
Shrub/Vine					
8	Shrubs			31–157	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	16–78	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	16–78	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–47	–
	rose	ROSA5	<i>Rosa</i>	16–47	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–31	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–31	–
	spinystar	ESVIV	<i>Escobaria vivipara</i> var. <i>vivipara</i>	0–16	–

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Wheatgrasses			20–101	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	20–101	–
	thickspike wheatgrass	ELLAL	<i>Elymus lanceolatus</i> ssp. <i>lanceolatus</i>	0–50	–
2	Short Warm-Season Grasses			151–303	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	101–303	–
3	Needlegrasses			0–50	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–30	–
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	0–20	–
4	Other Native Perennials			50–151	
	saltgrass	DISP	<i>Distichlis spicata</i>	30–101	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	20–81	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	10–50	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	10–30	–
5	Grass-Likes			50–151	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	50–151	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	20–81	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–50	–
6	Non-Native Grasses			20–101	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	20–101	–
	bluegrass	POA	<i>Poa</i>	20–101	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–40	–
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–40	–
Forb					
7	Forbs			50–101	
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	20–81	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	10–30	–
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	0–30	–

	goldenrod	SOLID	<i>Solidago</i>	10–30	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	10–30	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	10–30	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–20	–
	woolly plantain	PLPA2	<i>Plantago patagonica</i>	0–20	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	0–20	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–20	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	10–20	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–20	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–10	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	0–10	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–10	–
Shrub/Vine					
8	Shrubs			10–50	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	10–50	–
	broom snakeweed	GUSA2	<i>Gutierrezia sarothrae</i>	0–40	–
	brittle pricklypear	OPFR	<i>Opuntia fragilis</i>	0–40	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	0–30	–
	rose	ROSA5	<i>Rosa</i>	10–30	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–20	–
	spiny star	ESVIV	<i>Escobaria vivipara</i> var. <i>vivipara</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.

Utilization Level % Use Description

Slight (Light) 0-20 Appears practically undisturbed when viewed obliquely. Only choice areas and forage utilized.

Moderate 20-40 Almost all of accessible range shows grazing.

Little or no use of poor forage. Little evidence of trailing to grazing.

Full 40-60 All fully accessible areas are grazed. The major sites have key forage species properly utilized (about half taken, half left). Points of concentration with overuse limited to 5 to 10 percent of accessible area.

Close (Heavy) 60-80 All accessible range plainly shows use and major sections closely cropped. Livestock forced to use

less desirable forage, considering seasonal preference.
Severe > 80 Key forage species completely used. Low-value forages are dominant.

Hydrological functions

Water is the principal factor limiting herbage production on this site. The site is dominated by soils in hydrologic group D. Infiltration varies from moderate to slow and runoff potential varies from medium to very high depending on soil hydrologic group, slope and ground cover. Usually 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 many 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 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.

Other references

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

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

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Contributors

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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	03/02/2012
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

2. **Presence of water flow patterns:** None.

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

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is < 10%.

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

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

7. **Amount of litter movement (describe size and distance expected to travel):** None.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Average 5 to 6. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** Use soil

series description for depth, color and structure of A horizon/surface layer.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.
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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):** No compaction layer would be expected except for the naturally occurring pan within 8 to 15 inches of the soil surface which restricts root penetration.
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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 rhizomatous grasses >
- Sub-dominant: Mid, cool-season bunchgrasses > short, warm-season grasses >
- Other: grass-likes = forbs = short, cool-season bunchgrasses > 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):** No plant mortality or decadence.
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14. **Average percent litter cover (%) and depth (in):** Plant litter is in contact with soil surface.
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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** 1200 1700 2200 lbs./acre air dry 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 weeds, Kentucky bluegrass, smooth brome grass, Russian olive
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17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses should have vigorous rhizomes or tillers.
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