

Ecological site R053BY008ND

Sandy

Last updated: 1/11/2024

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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.

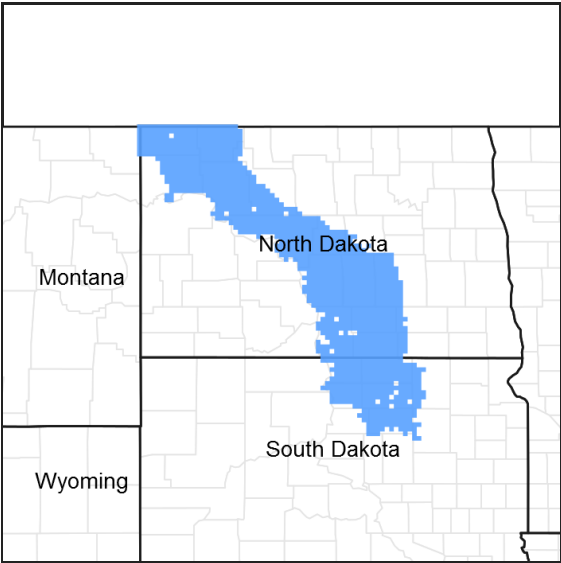


Figure 1. Mapped extent

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

R053BY005ND	Loamy Overflow
R053BY007ND	Sands
R053BY009ND	Shallow Loamy
R053BY011ND	Loamy

Similar sites

R053BY014ND	Choppy Sands [Deep entisol found on knobs and ridges of level to choppy sand blown plains; will not ribbon, found upslope from Sands sites; won't ribbon. Indicator species: sand bluestem, prairie sandreed and needleandthread evenly mixed, some Canada wildrye, penstemon, lemon scurfpea western ragweed, yucca, silky prairie clover and leadplant. This site has less production, thin "A" horizon, no mollic epipedon, different soil texture, lime within 6 inches to the surface.]
R053BY007ND	Sands [Does not receive additional moisture. Found on dry uplands, upslope from Loamy Overflow sites, down slope from Thin Loamy or Shallow Loamy sites. Similar landscape position as Loamy, Sandy, and Clayey sites. Won't form a ribbon; indicator species are prairie sandreed and sand bluestem evenly mixed, some Canada wildrye, penstemon, and leadplant and western snowberry. This site has more sand bluestem, needleandthread and sedges, less blue grama, green needlegrass and western wheatgrass, slightly more production.]
R053BY011ND	Loamy [Does not receive additional moisture. Found on dry uplands upslope from Loamy Overflow sites, down slope from Thin Loamy or Shallow Loam sites; similar landscape position as Sandy, Sands, Clayey sites. Will ribbon greater than 1 inch and up to 2 inches. Indicator species are western wheatgrass some green needlegrass and blue grama, with fringed sagewort and western snowberry being the dominant shrubs. This site has no prairie sandreed or sand bluestem, less needleandthread and sedges, more blue grama, green needlegrass and western wheatgrass, similar production, similar landscape position, different soil texture.]

Table 1. Dominant plant species

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

Physiographic features

This site occurs on nearly level to steep uplands.

Table 2. Representative physiographic features

Landforms	(1) Outwash plain (2) Till plain (3) Stream terrace
Flooding frequency	None
Ponding frequency	None
Elevation	488–610 m
Slope	0–45%
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 moderately deep to very deep and well to somewhat excessively drained soils. Soil textures include moderately coarse and moderately coarse over moderately fine and moderately coarse over sandy or sandy skeletal (24 to 40 inches to sand or sand and gravel). Saturated hydraulic conductivity is moderately rapid to moderate and available water capacity is low to moderate. These soils are friable and susceptible to wind erosion. Low available water capacity influences the soil-water-plant relationship. This site is on nearly level to very steep outwash plains, stream terraces and till plains. Slope ranges from 0 to 45 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. Sub-surface soil layers are non-restrictive to water movement and root penetration.

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) Fine sandy loam (2) Sandy loam (3) Coarse sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	51–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–20%
Subsurface fragment volume >3" (Depth not specified)	0–10%

Ecological dynamics

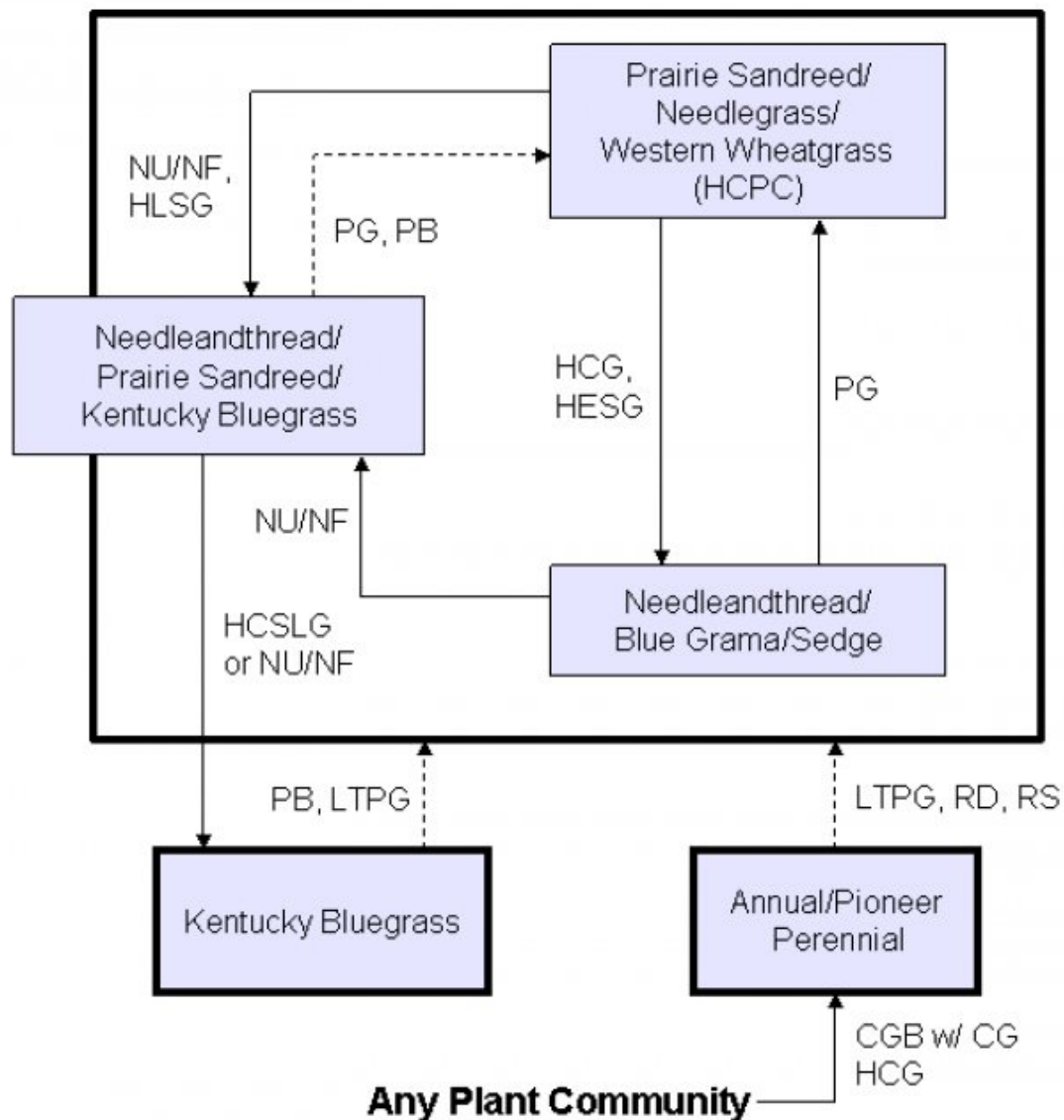
This site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to management actions and/or climatic conditions. Due to the nature of the soils, the site is considered moderately resilient. Under continued adverse impacts, a moderate decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can more readily return to the Historic Climax Plant Community (HCPC). The plant community upon which interpretations are primarily based is the Historic Climax Plant Community. 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 used. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

Heavy continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as prairie sandreed, big bluestem, and sand bluestem decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate, and pioneer perennials and annuals to increase. This plant community is relatively stable and the competitive advantage prevents other species from establishing. This plant community is less productive than the HCPC. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

Excessive defoliation or any type of physical disturbance can lead to serious erosion problems resulting in an increase in annual and pioneer perennial vegetation. 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 is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model



CGB w/ CG – Cropped go-back with continuous grazing; **HCG** – Heavy continuous grazing; **HCPC** – Historical Climax Plant Community; **HCSLG** – Heavy continuous season-long grazing; **HESG** – Heavy early seasonal grazing; **HLSG** – Heavy late seasonal grazing; **LTPG** – Long-term prescribed grazing; **NU/NF** – Extended period of non-use & no fire; **PB** – Prescribed burning, followed by prescribed grazing; **PG** – Prescribed grazing; **RD** – Removal of disturbance; **RS** – Range seeding with prescribed grazing.

State 1

Prairie Sandreed/Needlegrass/Western Wheatgrass (HCPC)

Community 1.1

Prairie Sandreed/Needlegrass/Western Wheatgrass (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. Dominant grasses include prairie sandreed, and needleandthread. Other grasses and grass-likes include big bluestem, sand bluestem, blue grama, green needlegrass, porcupine grass, western wheatgrass, and threadleaf and sun sedge. Significant forbs include penstemon, American vetch, green sagewort, silverleaf scurfspea and spiderwort. In many areas western snowberry is the principal shrub and occurs in patchy mosaics. Other shrubs include prairie rose, leadplant, fringed sagewort and yucca. 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 little movement off-site and natural plant mortality is very low. The diversity in species allows for high drought tolerance. Run-off from adjacent sites and moderate or high available water capacity provides 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	1608	2493	3357
Forb	135	211	308
Shrub/Vine	50	99	146
Total	1793	2803	3811

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

Needleandthread/Prairie Sandreed/Kentucky Bluegrass

Community 2.1

Needleandthread/Prairie Sandreed/Kentucky Bluegrass

This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire. Non-native grasses, such as Kentucky bluegrass, crested wheatgrass, and smooth brome grass tend to invade and may begin to dominate this plant community. Needleandthread and prairie sandreed are still the dominant grasses in the early stages of this transition. Other grasses present include Kentucky bluegrass, prairie junegrass, western wheatgrass, green needlegrass and possibly smooth brome grass and crested wheatgrass. The common forbs include sweetclover, green sagewort, cudweed sagewort, western salsify and western ragweed. Western snowberry and prairie rose are the principal shrubs and may increase in density and cover. 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 and/or fire. The combination of both grazing and fire is most effective in moving this plant community towards the HCPC. Soil erosion is low. Runoff is similar to the HCPC. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in diversity.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1631	2195	2757
Forb	118	185	252
Shrub/Vine	45	86	129
Total	1794	2466	3138

Figure 7. 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

State 3

Needleandthread/Blue Grama/Sedge

Community 3.1

Needleandthread/Blue Grama/Sedge

This plant community is the result of long-term, heavy, continuous grazing and/or annual, early spring seasonal grazing. Needleandthread, threadleaf sedge and blue grama are the dominant species. Other grasses include western wheatgrass, red threeawn, sand dropseed and prairie junegrass. Forbs such as western ragweed, green sagewort, hairy goldaster, cudweed sagewort, scarlet globemallow and sweet clover may also be present. Annual production, and consequently litter amounts, has 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 erosion is a concern where cover has been reduced or eliminated.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	493	998	1502
Forb	50	84	118
Shrub/Vine	17	39	62
Total	560	1121	1682

Figure 9. 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 4

Kentucky Bluegrass

Community 4.1

Kentucky Bluegrass

This plant community developed from continued heavy continuous season-long grazing without adequate recovery periods between grazing events or from continued non-use and no fire for extended periods of time. Kentucky bluegrass will tend to dominate this plant community; however, other non-native species such as smooth brome grass and crested wheatgrass may also become prevalent. Needlegrass, sand bluestem, big bluestem and

prairie sandreed are absent or nearly so, and other grasses and grass-like species present include sand dropseed, red threeawn, prairie junegrass and sun sedge. Forbs commonly found in this plant community include green sagewort, scurfpea, and sweetclover. When this plant community is reached through extended periods of non-use and no fire, litter buildup reduces native plant vigor and density severely, and native seedling recruitment is rare. 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 can be dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is sometimes found in properly stocked pastures grazed season-long.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1003	1506	2001
Forb	84	179	280
Shrub/Vine	34	108	185
Total	1121	1793	2466

Figure 11. 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

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	Warm-Season Grasses			280–560	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	280–560	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–140	–
2	Needlegrass			280–560	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	140–420	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–280	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–140	–
3	Wheatgrasses			140–280	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	56–280	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	56–280	–
4	Bluestem			140–280	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	84–280	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	0–140	–
5	Grama			140–280	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	140–280	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–140	–
6	Other Native Grasses			84–224	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–140	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–140	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	28–56	–

	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	28–56	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	28–56	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–28	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–28	–
7	Grass-Likes			84–196	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	56–168	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	28–84	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–84	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	0–28	–
Forb					
9	Forbs			140–280	
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–140	–
	prairie clover	DALEA	<i>Dalea</i>	28–56	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	28–56	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	28–56	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	28–56	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	28–56	–
	blazing star	LIATR	<i>Liatris</i>	28–56	–
	beardtongue	PENST	<i>Penstemon</i>	28–56	–
	scurfpea	PSORA2	<i>Psoralegium</i>	28–56	–
	goldenrod	SOLID	<i>Solidago</i>	28–56	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–28	–
	American vetch	VIAM	<i>Vicia americana</i>	0–28	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–28	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–28	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–28	–
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	0–28	–
	groundplum milkvetch	ASCR2	<i>Astragalus crassicaupus</i>	0–28	–
	yellow sundrops	CASE12	<i>Calylophus serrulatus</i>	0–28	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–28	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–28	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	0–28	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0–28	–
Shrub/Vine					
10	Shrubs			56–140	
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–84	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	28–84	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–84	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	28–56	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–28	–
	rose	ROSA5	<i>Rosa</i>	0–28	–
	soanweed yucca	YUIGI	<i>Yucca glauca</i>	0–28	–

	cupressus jeffreyi	POCJ	Pinus jeffreyi	0-25	
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Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-Season Grasses			49–247	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	49–247	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–74	–
2	Needlegrasses			247–493	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	247–493	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–123	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–74	–
3	Wheatgrasses			123–247	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	49–247	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	49–247	–
4	Bluestem			0–49	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–49	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	0–25	–
5	Grama			123–247	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	123–247	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–123	–
6	Other Native Grasses			74–197	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–123	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	25–123	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	25–99	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	25–49	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–25	–
7	Grass-Likes			74–247	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	49–247	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	25–74	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–74	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	0–25	–
8	Non-Native Grasses			123–370	
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	49–370	–
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–197	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–123	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–123	–
Forb					
9	Forbs			123–247	
	Forb, annual	2FA	<i>Forb, annual</i>	0–123	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–123	–
	sweetclover	MELIL	<i>Melilotus</i>	0–123	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	25–99	–

	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	25–74	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	25–74	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–74	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	25–74	–
	goldenrod	SOLID	<i>Solidago</i>	25–74	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	0–49	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	0–49	–
	blazing star	LIATR	<i>Liatris</i>	25–49	–
	prairie clover	DALEA	<i>Dalea</i>	25–49	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0–49	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–25	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	0–25	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–25	–
	beardtongue	PENST	<i>Penstemon</i>	0–25	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0–25	–
	groundplum milkvetch	ASCR2	<i>Astragalus crassicaupus</i>	0–25	–
	yellow sundrops	CASE12	<i>Calylophus serrulatus</i>	0–25	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–25	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	0–25	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–25	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–25	–
	American vetch	VIAM	<i>Vicia americana</i>	0–25	–
Shrub/Vine					
10	Shrubs			49–123	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	25–99	–
	rose	ROSA5	<i>Rosa</i>	25–74	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–74	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–74	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–25	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–25	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–25	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-Season Grasses			0–56	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–56	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–11	–
2	Needlegrasses			22–168	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	22–168	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–22	–

3	Wheatgrasses			22–90	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	22–90	–
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–56	–
5	Grama			112–224	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	112–224	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–112	–
6	Other Native Grasses			34–78	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	22–78	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–56	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos</i> var. <i>scribnerianum</i>	11–45	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–22	–
7	Grass-Likes			168–280	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	56–280	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–112	–
	sun sedge	CAINH2	<i>Carex inops</i> ssp. <i>heliophila</i>	11–56	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	0–22	–
8	Non-Native Grasses			22–56	
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–56	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–56	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	11–56	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–22	–
Forb					
9	Forbs			56–112	
	sweetclover	MELIL	<i>Melilotus</i>	0–90	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–56	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–56	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	11–56	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	11–45	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	0–45	–
	goldenrod	SOLID	<i>Solidago</i>	11–34	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	11–34	–
	scurfpea	PSORA2	<i>Psoralegium</i>	11–34	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	0–34	–
	prairie clover	DALEA	<i>Dalea</i>	0–22	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0–22	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–22	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	11–22	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	0–22	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–22	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–11	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–11	–

	blazing star	LIATR	<i>Liatris</i>	0–11	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–11	–
Shrub/Vine					
10	Shrubs			22–56	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	11–56	–
	rose	ROSA5	<i>Rosa</i>	11–34	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–34	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–22	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–11	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–11	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Warm-Season Grasses			0–54	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–54	–
2	Needlegrasses			36–179	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	36–179	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–54	–
3	Wheatgrasses			0–90	
	slender wheatgrass	ELTR7	<i>Elymus trachycaulus</i>	0–90	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	0–90	–
5	Grama			0–90	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–90	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–54	–
6	Other Native Grasses			18–126	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–90	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	18–90	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	0–36	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–36	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–18	–
7	Grass-Likes			18–90	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	18–90	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–54	–
	sun sedge	CAINH2	<i>Carex inops ssp. heliophila</i>	0–36	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	0–18	–
8	Non-Native Grasses			448–717	
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	179–628	–
	smooth brome	BRIN2	<i>Bromus inermis</i>	90–448	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–179	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–90	–
Forb					

9	Forbs			90–269	
	sweetclover	MELIL	<i>Melilotus</i>	0–179	–
	common sunflower	HEAN3	<i>Helianthus annuus</i>	0–90	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–90	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–90	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	18–90	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	18–72	–
	Rocky Mountain beeplant	CLSE	<i>Cleome serrulata</i>	0–54	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	18–54	–
	goldenrod	SOLID	<i>Solidago</i>	18–54	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	18–54	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	18–54	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	0–54	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–36	–
	blazing star	LIATR	<i>Liatris</i>	0–36	–
	prairie clover	DALEA	<i>Dalea</i>	0–36	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–18	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	0–18	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–18	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	0–18	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–18	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–18	–
	spiderwort	TRADE	<i>Tradescantia</i>	0–18	–
Shrub/Vine					
10	Shrubs			36–179	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	18–126	–
	rose	ROSA5	<i>Rosa</i>	18–72	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–72	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (<.5m)</i>	0–54	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–18	–
	pricklypear	OPUNT	<i>Opuntia</i>	0–18	–

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 production on this site. The soils are dominated by hydrologic groups A and B, with localized areas in hydrologic group D. Infiltration varies from moderate to moderately rapid and runoff potential varies from very low to low for this site 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. Greatest potential for reduced infiltration and high runoff are areas with ground cover of less than 50% (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 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 4 1969 – 1976 SD Campbell

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>)

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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.

Author(s)/participant(s)	Jeff Printz, Stan Boltz, Lee Voigt, Jody Forman
Contact for lead author	Jeff.printz@nd.usda.gov 701-530-2080
Date	03/01/2012
Approved by	Suzanne Mayne-Kinney
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills:** None on slopes < 25%. Rills of < 12 inches in length may be observable but rare on slopes > 25%

- 2. Presence of water flow patterns:** None on slopes < 25%. May be present but rare on slopes > 25% but would be short, broken, irregular and discontinuous.

- 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 < 5%. Patch size 2 inches or less and not connected.

- 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 rating. 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.
-
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 grasses >
- Sub-dominant: Mid, cool-season bunchgrasses >
- Other: Mid, cool-season rhizomatous grasses = short, warm-season grasses = forbs > grass-likes = mid, warm-season grasses > 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.
-
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Little to no plant mortality or decadence.
-
14. **Average percent litter cover (%) and depth (in):** Plant litter is in contact with soil surface.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 2500 lbs/ac air dry with a range of 1600 to 3400 lbs./ac air dry depending upon growing conditions.
-
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** State and local noxious weeds, Kentucky bluegrass, smooth brome grass
-
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.
