

Ecological site R066XY040NE Shallow Limy

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General information

Approved. An approved ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model, enough information to identify the ecological site, and full documentation for all ecosystem states contained in the state and transition model.



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: 43i – Keya Paha Tablelands.

Associated sites

R066XY032NE	Sandy 18-22" P.Z. Sandy 18-22" P.Z.
R066XY036NE	Loamy 18-22 P.Z. Loamy 18-22" P.Z.
R066XY054NE	Sandy 22-25 P.Z. Sandy 22-26" P.Z.
R066XY059NE	Thin Upland Thin Upland

Similar sites

R066XY059NE	Thin Upland
	Thin Upland (more little bluestem; more productive)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site occurs on side slopes and ridge tops of hills, plains, and uplands.

Landforms	(1) Hill(2) Ridge(3) Plain
Elevation	579–914 m
Slope	0–60%
Ponding depth	0 cm
Water table depth	0 cm
Aspect	Aspect is not a significant factor

Table 2. Representative physiographic features

Climatic features

MLRA 66 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the northern Great Plains and the winds move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 18 to 25 inches per year. The normal average annual temperature is about 48° F. January is the coldest month with average temperatures ranging from about 19° F (Bonesteel, SD) to about 23° F (Ainsworth, NE). July is the warmest month with temperatures averaging from about 73° F (Harrington, SD) to about 75° F (Gregory, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 54° F. This large annual range attests to the continental nature of this area's climate. Hourly winds average about 10 miles per hour annually, ranging from about 11 miles per hour during the spring to about 9 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 mid to late March and continues to late June. Native warm season plants begin growth in early May and continue to late August. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

Table 3. Representative climatic features

Frost-free period (average)	154 days
Freeze-free period (average)	173 days
Precipitation total (average)	635 mm

Influencing water features

No significant water features influence this site.

Soil features

The common features of soils in this site are the very fine sandy loam to silt loam textured subsoils and slopes of 0

to 60 percent. The soils in this site are well to somewhat excessivley drained and formed in soft siltstone or sandstone. The very fine sandy loam to silt loam surface layer is 2 to 10 inches thick. The soils have a moderate infiltration rate. This site should show slight to no evidence of rills, wind scoured areas, or pedestalled plants. Water flow paths are broken, irregular in appearance, or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. Sub-surface soil layers are restrictive to water movement and root penetration.

These soils are mainly susceptible to water erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Low available water capacity caused by the shallow rooting depth strongly influences the soil-water-plant relationship.

More information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

Surface texture	(1) Loam(2) Silt loam(3) Very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to moderately rapid
Soil depth	25–51 cm
Surface fragment cover <=3"	0–10%
Surface fragment cover >3"	0–20%
Available water capacity (0-101.6cm)	5.08–7.62 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0%

Table 4. Representative soil features

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. Under continued adverse impacts, a decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can return to the Bluestem/Sideoats Grama/Needlegrass Plant Community.

The plant community upon which interpretations are primarily based is the Bluestem/Sideoats Grama/Needlegrass Plant Community. This plant community has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

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



CSG – Continuous seasonal grazing; E – Encroachment; F – Fire; HCG – Heavy continuous grazing; HCPC – Historical Climax Plant Community; LTPG – Long-term prescribed grazing; NU/NF – Non-use, no fire for extended periods; PG – Prescribed grazing; TH – Thinning.

State 1 Bluestem/Sideoats Grama/Needlegrass

Community 1.1 Bluestem/Sideoats Grama/Needlegrass Interpretations are primarily based on the Bluestem/Sideoats Grama/Needlegrass Plant Community (this is also considered climax). This plant community evolved with grazing by large herbivores and is well suited for grazing by domestic livestock. This plant community can be found on areas that are properly managed with grazing and/or prescribed burning, and sometimes on areas receiving occasional short periods of rest. The potential vegetation is about 80% grasses or grass-like plants, 10% forbs, and 10% shrubs. A mixture of cool and warm season grasses dominates the site. The major grasses include the little bluestem, sideoats grama, big bluestem and/or sand bluestem, and needleandthread and/or porcupine grass. Other grasses and grass-likes occurring include prairie sandreed, blue grama, western wheatgrass, plains muhly, and sedge. Significant forbs include purple coneflower and purple prairie clover. Shrubs occurring in this plant community include leadplant, rose, fringed sagewort, and yucca. Refer to the plant community composition and group annual production table for species composition and production. This plant community is extremely resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. Community dynamics, nutrient cycle, water cycle, and energy flow are functioning properly. Plant litter is properly distributed with very little movement offsite and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6637 Growth curve name: Eroded Tableland, warmseason dominant, cool-season sub-dominant. Growth curve description: Warm-season dominant, cool-season subdominant. Transitional pathways and/or community pathways leading to other plant communities are as follows: Continuous seasonal grazing or low stock densities under continuous season-long grazing will convert this plant community to the Little Bluestem/Needleandthread/Grama Plant Community. Encroachment (or escaped), nonuse, and no fire will lead to a Eastern Redcedar/Ponderosa Pine Plant Community. This occurs when this plant community is protected from natural fires, or controlled burning.

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	998	1677	2242
Forb	90	143	196
Shrub/Vine	34	67	101
Tree	-	19	39
Total	1122	1906	2578

Table 5. Annual production by plant type

Figure 5. Plant community growth curve (percent production by month). NE6637, Eroded Tableland, warm-season dominant, cool-season subdominant.

Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		5	8	15	24	23	15	5	5		

State 2 Grama/Sedge, Bare Ground

Community 2.1 Grama/Sedge, Bare Ground

This plant community evolves from heavy grazing over several years time. Diversity is lost, as the short grasses become dominant in the plant community. The grazing tolerant blue or hairy grama and sedges replace big bluestem, little bluestem, western wheatgrass, and the needlegrasses. Sideoats grama remains in the plant community, but is less productive because of the mid-summer grazing pressure. Because of the grazing pressure, fringed sagewort, cudweed sagewort, yucca, green sagewort, western ragweed, and cactus become more prevalent in the plant community. Non-native species such as bluegrass and cheatgrass will tend to invade this plant community. This plant community is typically resistant to change. Runoff will increase and infiltration will decrease. Continued overuse results in considerable bare ground and high erosion potential. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6636 Growth curve name: Eroded Tableland, cool-season/warm-season co-dominant. Growth curve description: Cool-season, warm-season co-dominant. Transitional pathways and/or

community pathways leading to other plant communities are as follows: Long-term prescribed grazing may convert this plant community to the Little Bluestem/Needleandthread/Grama Plant Community.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	493	958	1418
Shrub/Vine	17	67	118
Forb	50	84	118
Tree	_	11	28
Total	560	1120	1682

Figure 7. Plant community growth curve (percent production by month). NE6636, Eroded Tableland, cool-season/warm-season codominant.

Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
		5	10	20	25	20	10	5	5		

State 3 Eastern Redcedar/Ponderosa Pine

Community 3.1 Eastern Redcedar/Ponderosa Pine

Historically, ponderosa pine and juniper was confined to ridges and steep shallow slopes located adjacent to this ecological site. Currently, ponderosa pine and eastern redcedar are expanding on to this ecological site due to the suppression of fire. Tree canopy is greater than 15% of mature trees. Refer to the plant community composition and group annual production table for species composition and production. Dominant grasses and grass-likes include needleandthread, green needlegrass, Canada wildrye, and bluegrass. Grasses and grass-likes of secondary importance include sedge, blue grama, western wheatgrass, and cheatgrass. Forbs commonly found in this community include cudweed sagewort, goldenrod, green sagewort, salsify, and western ragweed. Non-native species such as cheatgrass and bluegrass will tend to invade this plant community. When compared to the Bluestem/Sideoats Grama/Needlegrass Plant Community, ponderosa pine or eastern redcedar increases significantly. The grass component decreases dramatically as the buildup of needles increases. Annual production of the understory also decreases significantly. While the tree canopy provides excellent protection from the weather for both livestock and wildlife, it is not capable of supporting large numbers of wildlife and livestock due to decreased production. This plant community is resistant to change. A significant reduction of eastern redcedar and ponderosa pine can only be accomplished through timber harvesting or crown fire. The vegetation in the understory is capable of enduring fire; however, very hot crown fires will have a detrimental effect to the plant community. Reclamation of tree dominated areas can be costly and prove to be temporary without proper management (i.e., prescribed burning, and prescribed grazing). The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6644 Growth curve name: Eroded Tableland, heavy tree canopy. Growth curve description: Mature conifer/deciduous overstory. Transitional pathways and/or community pathways leading to other plant communities are as follows: Wildfire (hot, crown fires) will move this plant community to the Little Bluestem/Needleandthread/Grama Plant Community. Removal of cedar/pine by timber harvest will allow the understory to develop and convert to the Little Bluestem/Needleandthread/Grama Plant Community.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	454	746	1110
Tree	247	437	673
Shrub/Vine	62	101	140
Forb	22	61	95
Total	785	1345	2018

Figure 9. Plant community growth curve (percent production by month). NE6644, Eroded Tableland, heavy conifer canopy.

Jan	Feb	Mar	Apr	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	3	7	10	20	28	15	5	4	4	2	1

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	Mid Warm-Season Gras	sses		286–572	
	little bluestem	SCSC	Schizachyrium scoparium	191–476	_
	sideoats grama	BOCU	Bouteloua curtipendula	191–476	_
	plains muhly	MUCU3	Muhlenbergia cuspidata	38–191	_
	purple lovegrass	ERSP	Eragrostis spectabilis	0–95	_
2	Tall Warm-Season Gras	sses		286–476	
	big bluestem	ANGE	Andropogon gerardii	95–381	-
	sand bluestem	ANHA	Andropogon hallii	95–381	-
	prairie sandreed	CALO	Calamovilfa longifolia	38–191	-
	switchgrass	PAVI2	Panicum virgatum	0–95	-
	Indiangrass	SONU2	Sorghastrum nutans	0–95	-
3	Cool-Season Bunchgra	isses		191–381	
	needle and thread	HECOC8	Hesperostipa comata ssp. comata	95–286	-
	porcupinegrass	HESP11	Hesperostipa spartea	95–286	_
	green needlegrass	NAVI4	Nassella viridula	38–191	_
4	Short Warm-Season Gr	asses		95–286	
	blue grama	BOGR2	Bouteloua gracilis	95–191	-
	hairy grama	BOHI2	Bouteloua hirsuta	19–95	-
	buffalograss	BODA2	Bouteloua dactyloides	0–95	-
	threeawn	ARIST	Aristida	0–38	-
5	Mid Rhizomatous Cool	-Season G	rasses	38–191	
	western wheatgrass	PASM	Pascopyrum smithii	38–191	-
6	Other Native Grasses			19–133	
	Grass, perennial	2GP	Grass, perennial	0–95	_
	Canada wildrye	ELCA4	Elymus canadensis	0–57	_
	prairie Junegrass	KOMA	Koeleria macrantha	19–57	_
	sand dropseed	SPCR	Sporobolus cryptandrus	19–57	_

	Scribner's rosette grass	DIOLS	Dichanthelium oligosanthes var. scribnerianum	0–38	_
	fall rosette grass	DIWI5	Dichanthelium wilcoxianum	0–38	_
7	Grass-Likes			38–152	
	threadleaf sedge	CAFI	Carex filifolia	38–152	_
	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	0–95	-
Forb	-				
9	Forbs			95–191	
	scurfpea	PSORA2	Psoralidium	19–57	_
	Forb, native	2FN	Forb, native	19–57	_
	tarragon	ARDR4	Artemisia dracunculus	19–57	-
	white sagebrush	ARLU	Artemisia ludoviciana	19–57	-
	blacksamson echinacea	ECAN2	Echinacea angustifolia	19–57	_
	hairy false goldenaster	HEVI4	Heterotheca villosa	19–57	_
	dotted blazing star	LIPU	Liatris punctata	19–38	_
	wavyleaf thistle	CIUN	Cirsium undulatum	0–38	_
	milkvetch	ASTRA	Astragalus	19–38	_
	Cuman ragweed	AMPS	Ambrosia psilostachya	0–38	_
	upright prairie coneflower	RACO3	Ratibida columnifera	19–38	_
	goldenrod	SOLID	Solidago	19–38	-
	purple prairie clover	DAPU5	Dalea purpurea	19–38	_
	stiff sunflower	HEPA19	Helianthus pauciflorus	19–38	_
	Nuttall's sensitive-briar	MINU6	Mimosa nuttallii	0–38	_
	American vetch	VIAM	Vicia americana	19–38	-
	beardtongue	PENST	Penstemon	19–38	_
	spiny phlox	PHHO	Phlox hoodii	0–19	-
	purple locoweed	OXLA3	Oxytropis lambertii	0–19	-
	Indian breadroot	PEDIO2	Pediomelum	0–19	-
	scarlet globemallow	SPCO	Sphaeralcea coccinea	0–19	-
	white heath aster	SYER	Symphyotrichum ericoides	0–19	-
	stemless four-nerve daisy	TEACA2	Tetraneuris acaulis var. acaulis	0–19	_
	pussytoes	ANTEN	Antennaria	0–19	_
	common yarrow	ACMI2	Achillea millefolium	0–19	_
	onion	ALLIU	Allium	0–19	_
	yellow sundrops	CASE12	Calylophus serrulatus	0–19	_
	white prairie clover	DACA7	Dalea candida	0–19	_
	scarlet beeblossom	GACO5	Gaura coccinea	0–19	-
	American bird's-foot trefoil	LOUNU	Lotus unifoliolatus var. unifoliolatus	0–19	_
	rush skeletonplant	LYJU	Lygodesmia juncea	0–19	
	lacy tansyaster	MAPI	Machaeranthera pinnatifida	0–19	_
Shrub	Nine				

Shruh/Vine

10	Shrubs			38–95	
	leadplant	AMCA6	Amorpha canescens	19–95	_
	prairie sagewort	ARFR4	Artemisia frigida	19–57	_
	smooth sumac	RHGL	Rhus glabra	0–57	-
	rose	ROSA5	Rosa	19–57	-
	Shrub (>.5m)	2SHRUB	Shrub (>.5m)	0–57	_
	soapweed yucca	YUGL	Yucca glauca	19–38	_
	skunkbush sumac	RHTR	Rhus trilobata	0–38	_
	plains pricklypear	OPPO	Opuntia polyacantha	19–38	-
Tree		-			
11	Trees			0–38	
	Tree	2TREE	Tree	0–38	_
	eastern redcedar	JUVI	Juniperus virginiana	0–38	_
	ponderosa pine	PIPO	Pinus ponderosa	0–38	_

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass	/Grasslike			•	
1	Mid Warm-Season Gras	sses		11–135	
	little bluestem	SCSC	Schizachyrium scoparium	0–112	_
	sideoats grama	BOCU	Bouteloua curtipendula	0–112	_
	purple lovegrass	ERSP	Eragrostis spectabilis	0–56	_
2	Tall Warm-Season Gras	sses		0–56	
	prairie sandreed	CALO	Calamovilfa longifolia	0–56	_
3	Cool-Season Bunchgra	ISSES		22–112	
	needle and thread	HECOC8	Hesperostipa comata ssp. comata	22–112	-
4	Short Warm-Season G	asses		224–392	
	blue grama	BOGR2	Bouteloua gracilis	168–392	_
	hairy grama	BOHI2	Bouteloua hirsuta	56–168	_
	threeawn	ARIST	Aristida	22–112	_
	buffalograss	BODA2	Bouteloua dactyloides	0–112	_
5	Mid Rhizomatous Cool-Season Grasses		rasses	11–56	
	western wheatgrass	PASM	Pascopyrum smithii	11–56	_
6	Other Native Grasses			22–90	
	sand dropseed	SPCR	Sporobolus cryptandrus	22–90	_
	Grass, perennial	2GP	Grass, perennial	0–56	-
	Scribner's rosette grass	DIOLS	Dichanthelium oligosanthes var. scribnerianum	0–22	_
	fall rosette grass	DIWI5	Dichanthelium wilcoxianum	0–22	_
	prairie Junegrass	KOMA	Koeleria macrantha	0–22	_
7	Grass-Likes			56–202	
	threadleaf sedge	CAFI	Carex filifolia	56–202	_
	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	0–112	_

	5)	1			
8	Non-Native Grasses			56–168	
	cheatgrass	BRTE	Bromus tectorum	22–168	_
	bluegrass	POA	Poa	22–168	_
	smooth brome	BRIN2	Bromus inermis	0–56	-
Forb	-	-	-		
9	Forbs			56–112	
	tarragon	ARDR4	Artemisia dracunculus	22–78	_
	white sagebrush	ARLU	Artemisia ludoviciana	22–78	-
	sweetclover	MELIL	Melilotus	0–78	_
	Forb, introduced	2FI	Forb, introduced	0–67	_
	Cuman ragweed	AMPS	Ambrosia psilostachya	11–67	_
	goldenrod	SOLID	Solidago	11–56	_
	white heath aster	SYER	Symphyotrichum ericoides	11–45	_
	goatsbeard	TRAGO	Tragopogon	11–45	_
	scurfpea	PSORA2	Psoralidium	11–45	_
	wavyleaf thistle	CIUN	Cirsium undulatum	0–34	_
	western yarrow	ACMIO	Achillea millefolium var. occidentalis	0–34	_
	Forb, native	2FN	Forb, native	0–22	_
	pussytoes	ANTEN	Antennaria	0–11	_
	blacksamson echinacea	ECAN2	Echinacea angustifolia	0–11	-
	rush skeletonplant	LYJU	Lygodesmia juncea	0–11	_
	upright prairie coneflower	RACO3	Ratibida columnifera	0–11	-
	purple locoweed	OXLA3	Oxytropis lambertii	0–11	_
	spiny phlox	РННО	Phlox hoodii	0–11	_
	scarlet globemallow	SPCO	Sphaeralcea coccinea	0–11	_
Shrub	/Vine				
10	Shrubs			22–112	
	prairie sagewort	ARFR4	Artemisia frigida	22–90	-
	smooth sumac	RHGL	Rhus glabra	0–90	-
	soapweed yucca	YUGL	Yucca glauca	0–56	-
	rose	ROSA5	Rosa	11–45	-
	plains pricklypear	OPPO	Opuntia polyacantha	11–45	-
	skunkbush sumac	RHTR	Rhus trilobata	0–34	_
	Shrub (>.5m)	2SHRUB	Shrub (>.5m)	0–11	-
Tree					
11	Trees	T		0–22	
	eastern redcedar	JUVI	Juniperus virginiana	0–22	-
	ponderosa pine	PIPO	Pinus ponderosa	0–22	-

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					

1	Mid Warm Saaaan Cra			0.67	
1	little bluester	sses	Sabizaaburium aaanarium	0-67	
		BOOL		0-07	_
			Bouleioua curtiperidula	0-40	_
2	plains muniy	NUCUS	Munienbergia cuspidata	0-27	_
3	Cool-Season Bunchgra	UECOCO	Llooporacting compta con compta	0-135	
		HECOC8	Hesperostipa comata ssp. comata	0-135	_
	green neediegrass			0-135	_
4	porcupinegrass	HESPIT	Hesperostipa spartea	0-67	_
4	Short warm-Season Gr	ADIOT		27-108	
		ARIST	Aristida	13-07	_
	biue grama	BOGRZ	Bouteloua gracilis	13-67	_
	nairy grama	BOHIZ	Bouteroua nirsuta	0-67	_
-	buffalograss	BODA2	Bouteloua dactyloides	0-40	
5	Mid Rhizomatous Cool	-Season G	rasses	13–94	
	western wheatgrass	PASM	Pascopyrum smithii	13–94	_
6	Other Native Grasses			27–135	
	Canada wildrye	ELCA4	Elymus canadensis	13–108	_
	Grass, perennial	2GP	Grass, perennial	0–67	_
	Scribner's rosette grass	DIOLS	Dichanthelium oligosanthes var. scribnerianum	0–27	_
	fall rosette grass	DIWI5	Dichanthelium wilcoxianum	0–27	_
	prairie Junegrass	KOMA	Koeleria macrantha	0–27	_
	sand dropseed	SPCR	Sporobolus cryptandrus	0–27	-
7	Grass-Likes		27–135		
	threadleaf sedge	CAFI	Carex filifolia	27–135	-
	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	0–67	-
8	Non-Native Grasses	<u>.</u>		135–242	
	bluegrass	POA	Poa	67–242	_
	cheatgrass	BRTE	Bromus tectorum	27–135	_
	smooth brome	BRIN2	Bromus inermis	0–67	_
Forb		<u>.</u>			
9	Forbs			27–94	
	Forb, introduced	2FI	Forb, introduced	0–67	_
	white sagebrush	ARLU	Artemisia ludoviciana	13–67	_
	sweetclover	MELIL	Melilotus	0–67	_
	goldenrod	SOLID	Solidago	13–67	_
	Cuman ragweed	AMPS	Ambrosia psilostachya	13–40	_
	Forb, native	2FN	Forb, native	13–40	_
	goatsbeard	TRAGO	Tragopogon	13–40	_
	tarragon	ARDR4	Artemisia dracunculus	13–40	_
	western yarrow	ACMIO	Achillea millefolium var. occidentalis	0–27	_
	white heath aster	SYER	Symphyotrichum ericoides	0–27	-
	scurfpea	PSORA2	Psoralidium	0–27	

	dotted blazing star	LIPU	Liatris punctata	0–27	_
	American bird's-foot trefoil	LOUNU	Lotus unifoliolatus var. unifoliolatus	0–13	-
	rush skeletonplant	LYJU	Lygodesmia juncea	0–13	_
	spiny phlox	PHHO	Phlox hoodii	0–13	_
	upright prairie coneflower	RACO3	Ratibida columnifera	0–13	_
	onion	ALLIU	Allium	0–13	-
	pussytoes	ANTEN	Antennaria	0–13	-
	wavyleaf thistle	CIUN	Cirsium undulatum	0–13	-
	purple prairie clover	DAPU5	Dalea purpurea	0–13	-
	American vetch	VIAM	Vicia americana	0–13	-
Shrub	/Vine	-	-		
10	Shrubs			67–135	
	smooth sumac	RHGL	Rhus glabra	0–135	-
	Shrub (>.5m)	2SHRUB	Shrub (>.5m)	0–94	-
	rose	ROSA5	Rosa	13–67	-
	skunkbush sumac	RHTR	Rhus trilobata	0–54	-
	leadplant	AMCA6	Amorpha canescens	0–40	-
	prairie sagewort	ARFR4	Artemisia frigida	13–40	-
	plains pricklypear	OPPO	Opuntia polyacantha	13–27	-
	soapweed yucca	YUGL	Yucca glauca	0–13	-
Tree			•	•	
11	Trees			269–605	
	eastern redcedar	JUVI	Juniperus virginiana	67–538	_
	ponderosa pine	PIPO	Pinus ponderosa	67–538	_
	Tree	2TREE	Tree	0–336	_
	green ash	FRPE	Fraxinus pennsylvanica	0–336	_
	boxelder	ACNE2	Acer negundo	0–269	_

Animal community

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide year-long forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

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 moderately slow to moderate and runoff varies from low to high depending on 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 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 data and other inventory data. Field observations from range trained personnel were also used. Those involved in developing this site include: Wayne Bachman, Soil Scientist, NRCS; Stan Boltz, Range Management Specialist, NRCS; Anna Ferguson, Soil Conservationist, NRCS; Roger Hammer, Soil Scientist, NRCS; Dana Larsen, Range Management Specialist, NRCS; Dave Schmidt, Rangeland Management Specialist, NRCS; Kim Stine, Rangeland Management Specialist, NRCS.

There are 8 SCS-RANGE-417 records from Brown, Keya Paha, Knox, and Cherry counties in Nebraska. The sample period was from 1968 to 1983

There are also 3 Ocular Estimates collected in 2002 in Keya Paha county, Nebraska and Todd county, South Dakota.

Other references

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

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

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Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

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Contact for lead author	Stan Boltz, stanley.boltz@sd.usda.gov, 605-352-1236
Date	08/01/2006
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

- 1. Number and extent of rills: Typically non-existent.
- 2. Presence of water flow patterns: Non-existent or barely visible.
- 3. Number and height of erosional pedestals or terracettes: Typically none, few pedestalled plants may be present, but no roots exposed.
- 4. Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground): Bare ground is typically less than 10 percent.
- 5. Number of gullies and erosion associated with gullies: None should be present.
- 6. Extent of wind scoured, blowouts and/or depositional areas: None.
- 7. Amount of litter movement (describe size and distance expected to travel): Little to no plant litter movement.
- 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 to 6, normally 6. Surface organic matter adheres to the soil surface.
- 9. Soil surface structure and SOM content (include type of structure and A-horizon color and thickness): Soil surface structure is typically granular, with mollic (dark, organic matter) colors roughly 4 to 9 inches in depth.
- 10. Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff: Combination of deep-rooted perennial grasses and forbs enhance infiltration.
- 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 rooting restriction occurring at 10 to 20 inches.

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, warm-season grasses > tall, warm-season rhizomatous grasses >

Sub-dominant: Mid and tall, cool-season bunchgrasses > short, warm-season grasses >

Other: Mid, cool-season rhizomatous grasses = forbs > grass-like species > shrubs > trees

Additional: Other grasses in other functional groups occur in minor amounts.

- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): Little to no plant decadence or mortality, bunchgrasses have healthy centers.
- 14. Average percent litter cover (%) and depth (in): Litter cover typically 50 to 70 percent. Litter cover is in contact with soil surface.
- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annualproduction): Total annual production ranges from 1,000 to 2,300 pounds/acre, with the reference value being 1,700 pounds/acre (air-dry basis).
- 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 bromegrass.
- 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.