

Ecological site R066XY040NE

Shallow Limy

Accessed: 04/26/2024

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)
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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.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge (3) Plain
Elevation	1,900–3,000 ft
Slope	0–60%
Ponding depth	0 in
Water table depth	0 in
Aspect	Aspect is not a significant factor

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)	25 in

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 excessively 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.

Table 4. Representative soil features

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	10–20 in
Surface fragment cover ≤3"	0–10%
Surface fragment cover >3"	0–20%
Available water capacity (0-40in)	2–3 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	6.6–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0%

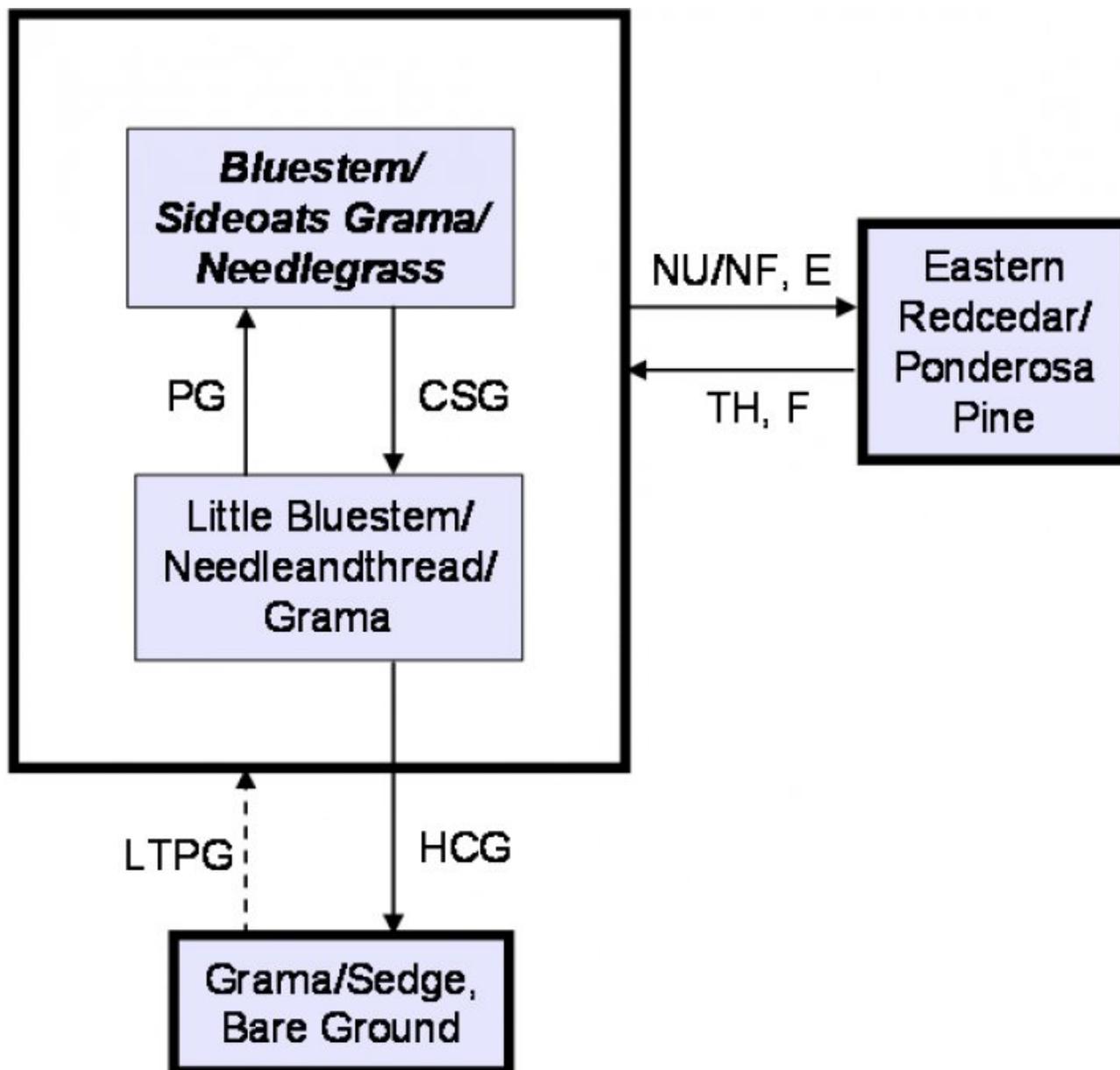
Ecological dynamics

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 off-site 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, warm-season dominant, cool-season sub-dominant. Growth curve description: Warm-season dominant, cool-season sub-dominant. 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.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	890	1496	2000
Forb	80	128	175
Shrub/Vine	30	60	90
Tree	0	17	35
Total	1000	1701	2300

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

Jan	Feb	Mar	Apr	May	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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	440	855	1265
Shrub/Vine	15	60	105
Forb	45	75	105
Tree	0	10	25
Total	500	1000	1500

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

Jan	Feb	Mar	Apr	May	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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	405	666	990
Tree	220	390	600
Shrub/Vine	55	90	125
Forb	20	54	85
Total	700	1200	1800

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

Jan	Feb	Mar	Apr	May	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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Mid Warm-Season Grasses			255–510	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	170–425	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	170–425	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	34–170	–
	purple lovegrass	ERSP	<i>Eragrostis spectabilis</i>	0–85	–
2	Tall Warm-Season Grasses			255–425	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	85–340	–
	sand bluestem	ANHA	<i>Andropogon hallii</i>	85–340	–
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	34–170	–
	switchgrass	PAVI2	<i>Panicum virgatum</i>	0–85	–
	Indiangrass	SONU2	<i>Sorghastrum nutans</i>	0–85	–
3	Cool-Season Bunchgrasses			170–340	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	85–255	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	85–255	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	34–170	–
4	Short Warm-Season Grasses			85–255	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	85–170	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	17–85	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–85	–
	threeawn	ARIST	<i>Aristida</i>	0–34	–
5	Mid Rhizomatous Cool-Season Grasses			34–170	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	34–170	–
6	Other Native Grasses			17–119	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–85	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–51	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	17–51	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	17–51	–

	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	0-34	-
	fall rosette grass	DIWI5	<i>Dichanthelium wilcoxianum</i>	0-34	-
7	Grass-Likes			34-136	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	34-136	-
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0-85	-
Forb					
9	Forbs			85-170	
	scurfpea	PSORA2	<i>Psoraleidium</i>	17-51	-
	Forb, native	2FN	<i>Forb, native</i>	17-51	-
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	17-51	-
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	17-51	-
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	17-51	-
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	17-51	-
	dotted blazing star	LIPU	<i>Liatris punctata</i>	17-34	-
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0-34	-
	milkvetch	ASTRA	<i>Astragalus</i>	17-34	-
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	0-34	-
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	17-34	-
	goldenrod	SOLID	<i>Solidago</i>	17-34	-
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	17-34	-
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	17-34	-
	Nuttall's sensitive-briar	MINU6	<i>Mimosa nuttallii</i>	0-34	-
	American vetch	VIAM	<i>Vicia americana</i>	17-34	-
	beardtongue	PENST	<i>Penstemon</i>	17-34	-
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0-17	-
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0-17	-
	Indian breadroot	PEDIO2	<i>Pedimelum</i>	0-17	-
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0-17	-
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0-17	-
	stemless four-nerve daisy	TEACA2	<i>Tetraneuris acaulis</i> var. <i>acaulis</i>	0-17	-
	pussytoes	ANTEN	<i>Antennaria</i>	0-17	-
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0-17	-
	onion	ALLIU	<i>Allium</i>	0-17	-
	yellow sundrops	CASE12	<i>Calylophus serrulatus</i>	0-17	-
	white prairie clover	DACA7	<i>Dalea candida</i>	0-17	-
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0-17	-
	American bird's-foot trefoil	LOUNU	<i>Lotus unifoliolatus</i> var. <i>unifoliolatus</i>	0-17	-
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0-17	-
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	0-17	-
Shrub/Vine					

10	Shrubs			34–85	
	leadplant	AMCA6	<i>Amorpha canescens</i>	17–85	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	17–51	–
	smooth sumac	RHGL	<i>Rhus glabra</i>	0–51	–
	rose	ROSA5	<i>Rosa</i>	17–51	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–51	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	17–34	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–34	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	17–34	–
Tree					
11	Trees			0–34	
	Tree	2TREE	<i>Tree</i>	0–34	–
	eastern redcedar	JUVI	<i>Juniperus virginiana</i>	0–34	–
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	0–34	–

Table 9. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Mid Warm-Season Grasses			10–120	
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–100	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–100	–
	purple lovegrass	ERSP	<i>Eragrostis spectabilis</i>	0–50	–
2	Tall Warm-Season Grasses			0–50	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	0–50	–
3	Cool-Season Bunchgrasses			20–100	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	20–100	–
4	Short Warm-Season Grasses			200–350	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	150–350	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	50–150	–
	threeawn	ARIST	<i>Aristida</i>	20–100	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–100	–
5	Mid Rhizomatous Cool-Season Grasses			10–50	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	10–50	–
6	Other Native Grasses			20–80	
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	20–80	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–50	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	0–20	–
	fall rosette grass	DIWI5	<i>Dichanthelium wilcoxianum</i>	0–20	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–20	–
7	Grass-Likes			50–180	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	50–180	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–100	–

8	Non-Native Grasses			50–150	
	cheatgrass	BRTE	<i>Bromus tectorum</i>	20–150	–
	bluegrass	POA	<i>Poa</i>	20–150	–
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–50	–
Forb					
9	Forbs			50–100	
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	20–70	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	20–70	–
	sweetclover	MELIL	<i>Melilotus</i>	0–70	–
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–60	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	10–60	–
	goldenrod	SOLID	<i>Solidago</i>	10–50	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	10–40	–
	goatsbeard	TRAGO	<i>Tragopogon</i>	10–40	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	10–40	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–30	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	0–30	–
	Forb, native	2FN	<i>Forb, native</i>	0–20	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–10	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–10	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–10	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–10	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–10	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–10	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–10	–
Shrub/Vine					
10	Shrubs			20–100	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	20–80	–
	smooth sumac	RHGL	<i>Rhus glabra</i>	0–80	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–50	–
	rose	ROSA5	<i>Rosa</i>	10–40	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	10–40	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–30	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–10	–
Tree					
11	Trees			0–20	
	eastern redcedar	JUVI	<i>Juniperus virginiana</i>	0–20	–
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	0–20	–

Table 10. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	Mid Warm-Season Grasses			0–60	

	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–60	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–36	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	0–24	–
3	Cool-Season Bunchgrasses			0–120	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	0–120	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–120	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–60	–
4	Short Warm-Season Grasses			24–96	
	threeawn	ARIST	<i>Aristida</i>	12–60	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	12–60	–
	hairy grama	BOHI2	<i>Bouteloua hirsuta</i>	0–60	–
	buffalograss	BODA2	<i>Bouteloua dactyloides</i>	0–36	–
5	Mid Rhizomatous Cool-Season Grasses			12–84	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	12–84	–
6	Other Native Grasses			24–120	
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	12–96	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–60	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes var. scribnerianum</i>	0–24	–
	fall rosette grass	DIWI5	<i>Dichanthelium wilcoxianum</i>	0–24	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	0–24	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–24	–
7	Grass-Likes			24–120	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	24–120	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–60	–
8	Non-Native Grasses			120–216	
	bluegrass	POA	<i>Poa</i>	60–216	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	24–120	–
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–60	–
Forb					
9	Forbs			24–84	
	Forb, introduced	2FI	<i>Forb, introduced</i>	0–60	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	12–60	–
	sweetclover	MELIL	<i>Melilotus</i>	0–60	–
	goldenrod	SOLID	<i>Solidago</i>	12–60	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	12–36	–
	Forb, native	2FN	<i>Forb, native</i>	12–36	–
	goatsbeard	TRAGO	<i>Tragopogon</i>	12–36	–
	tarragon	ARDR4	<i>Artemisia dracunculus</i>	12–36	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	0–24	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	0–24	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	0–24	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–24	–

	American bird's-foot trefoil	LOUNU	<i>Lotus unifoliolatus</i> var. <i>unifoliolatus</i>	0–12	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–12	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–12	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–12	–
	onion	ALLIU	<i>Allium</i>	0–12	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–12	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–12	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	0–12	–
	American vetch	VIAM	<i>Vicia americana</i>	0–12	–
Shrub/Vine					
10	Shrubs			60–120	
	smooth sumac	RHGL	<i>Rhus glabra</i>	0–120	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–84	–
	rose	ROSA5	<i>Rosa</i>	12–60	–
	skunkbush sumac	RHTR	<i>Rhus trilobata</i>	0–48	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	0–36	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	12–36	–
	plains pricklypear	OPPO	<i>Opuntia polyacantha</i>	12–24	–
	soapweed yucca	YUGL	<i>Yucca glauca</i>	0–12	–
Tree					
11	Trees			240–540	
	eastern redcedar	JUVI	<i>Juniperus virginiana</i>	60–480	–
	ponderosa pine	PIPO	<i>Pinus ponderosa</i>	60–480	–
	Tree	2TREE	<i>Tree</i>	0–300	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–300	–
	boxelder	ACNE2	<i>Acer negundo</i>	0–240	–

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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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.
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14. **Average percent litter cover (%) and depth (in):** Litter cover typically 50 to 70 percent. Litter cover 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):** Total annual production ranges from 1,000 to 2,300 pounds/acre, with the reference value being 1,700 pounds/acre (air-dry basis).
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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** State and local noxious, Kentucky bluegrass, smooth bromegrass.
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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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