

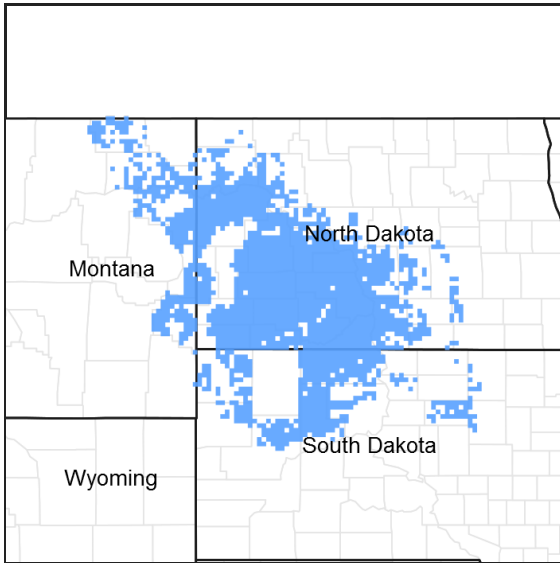
# Ecological site R054XY041ND

## Loamy Terrace

Accessed: 05/01/2024

### 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: 43a – Missouri Plateau.

### Associated sites

R054XY023ND	<b>Loamy Overflow</b>
R054XY031ND	<b>Loamy</b>
R054XY042ND	<b>Sandy Terrace</b>

### Similar sites

R054XY031ND	<p><b>Loamy</b>            [Does not receive additional moisture. Found on dry uplands upslope from loamy terraces or 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 more western wheatgrass and blue grama, less green needlegrass and big bluestem, less productions and different landscape position that does not receives extra moisture due to occasional flooding.]</p>
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R054XY042ND	<p><b>Sandy Terrace</b>  [Well drained soils on a river or stream terrace in a position that will flood occasionally (once in ten years) with no apparent water table. Indicator species are prairie sandreed evenly mixed with sand bluestem, some Canada wildrye, penstemon, and leadplant and/or western snowberry, and with possible trees. This site has more prairie sandreed, sand bluestem, sedges and shrubs, less green needlegrass, western wheatgrass, blue grama, similar production, and landscape position.]</p>
R054XY023ND	<p><b>Loamy Overflow</b>  [Moderately well drained soils in intermittent drainage ways, swales and areas that frequently receive additional moisture throughout the growing season, with no apparent water table. Indicator species: big bluestem with western wheatgrass and green needlegrass, American licorice, and western snowberry. This site has far more big bluestem, less western wheatgrass and green needlegrass, frequent flooding events, more production.]</p>

**Table 1. Dominant plant species**

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Pascopyrum smithii</i> (2) <i>Nassella viridula</i>

## Physiographic features

This soil occurs on level to nearly level occasionally flooded floodplains and terraces.

**Table 2. Representative physiographic features**

Landforms	(1) Flood plain (2) Terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to occasional
Ponding frequency	None
Elevation	488–1,097 m
Slope	0–2%
Ponding depth	0 cm
Water table depth	137–183 cm
Aspect	Aspect is not a significant factor

## Climatic features

MLRA 54 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 14 to 18 inches per year. The normal average annual temperature is about 42° F. January is the coldest month with average temperatures ranging from about 13° F (Beach, ND) to about 16° F (Bison, SD). July is the warmest month with temperatures averaging from about 69° F (Beach, ND) to about 72° F (Timber Lake, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 57° F. This large annual range attests to the continental nature of this MLRA's climate. Hourly winds are estimated to 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)	136 days
Freeze-free period (average)	157 days
Precipitation total (average)	457 mm

## Influencing water features

C6  
(Rosgen System)

## Soil features

The common features of soils in this site are the loam to silt loam-textured subsoils and slopes of 0 to 2 percent. The soils in this site are well drained and formed in alluvium. The silt loam to clay loam surface layer is 4 to 20 inches thick. The soils have a moderate to moderately slow infiltration rate. This site should show 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 non-restrictive to water movement and root penetration.

These soils are susceptible to water and wind erosion. The hazard of erosion increases where vegetative cover is not adequate. Loss of the soil surface layer can result in a shift in species composition and/or production. Major soil series correlated to this ecological site can be found in Section II of the Natural Resources Conservation Service Field Office Technical Guide or the following web sites:  
North Dakota <http://www.nd.nrcs.usda.gov/>  
South Dakota <http://www.sd.nrcs.usda.gov/>  
Montana <http://www.mt.nrcs.usda.gov/>

**Table 4. Representative soil features**

Surface texture	(1) Silt loam (2) Loam (3) Clay loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	3–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–2
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4

Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–5%

## Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to climatic conditions and/or management actions. Due to the nature of the soils, the site is considered very stable. Under continued adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can quickly 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 considered. Subclimax plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

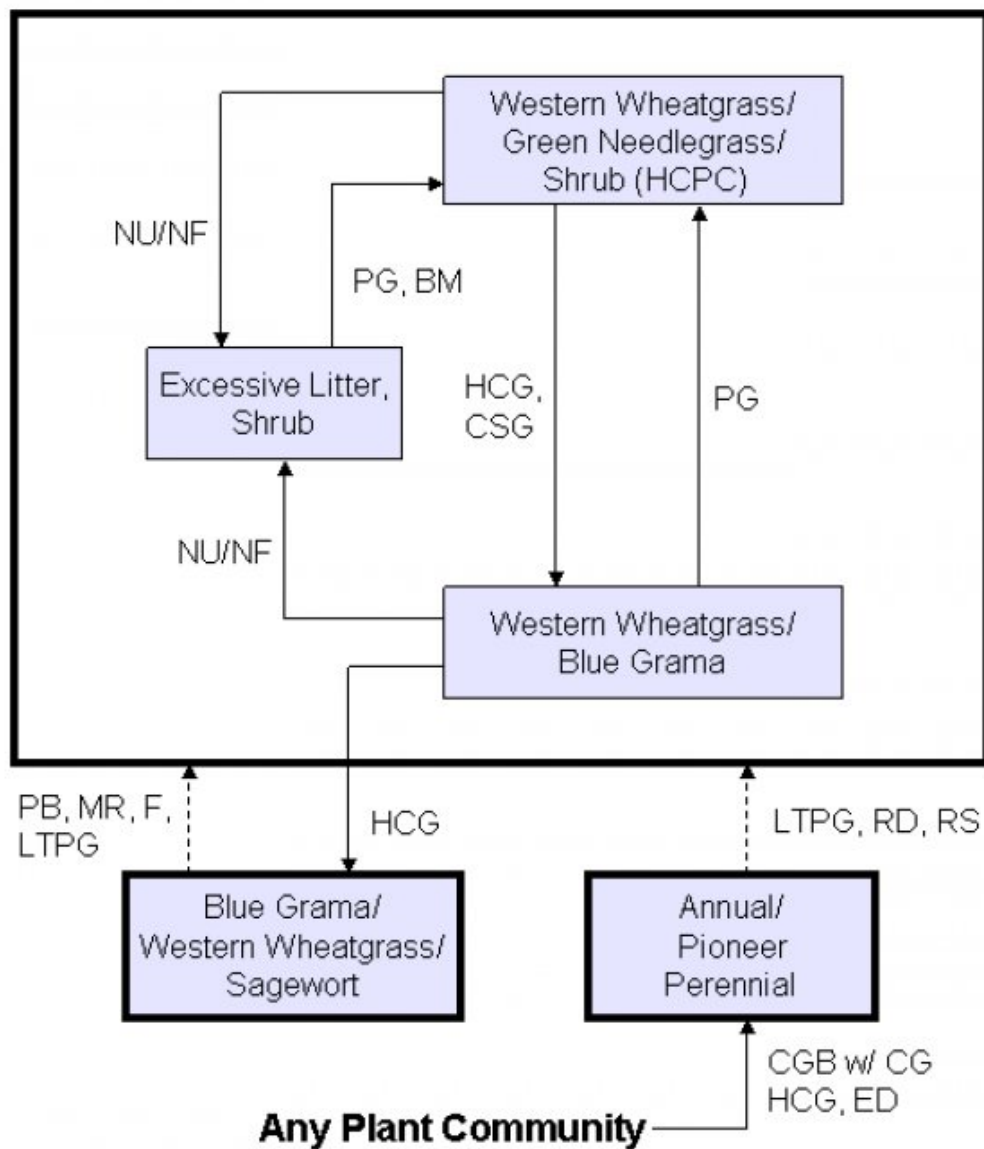
Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the HCPC. Species such as western wheatgrass and blue grama will initially increase. Big bluestem, green needlegrass, sideoats grama and porcupine grass will decrease in frequency and production. Heavy continuous grazing causes blue grama to increase.

In time, heavy continuous grazing will likely cause blue grama to dominate and pioneer perennials, annuals, and club moss (in its range) 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.

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 bromegrass and in time, shrubs and trees such as western snowberry, chokecherry and green ash.

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



**BM** - Brush management; **CGB w/ CG** - cropped go-back with continuous grazing; **CSG** - continuous seasonal grazing; **ED** - excessive defoliation; **F** - fertilization followed with prescribed grazing; **HCG** - heavy continuous grazing; **HCPC** - Historical Climax Plant Community; **LTPG** - long-term prescribed grazing; **MR** - mechanical renovation with prescribed grazing; **NU/NF** - extended period of non-use & no fire; **PB** - prescribed burning; **PG** - prescribed grazing; **RD** - removal of disturbance; **RS** - range seeding with prescribed grazing.

**State 1**  
**Western Wheatgrass/Green Needlegrass/Shrub (HCPC)**

## Community 1.1

### Western Wheatgrass/Green Needlegrass/Shrub (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 adequate recovery periods following each grazing event. The potential vegetation is about 73% grasses and grass-like plants, 10% forbs, 15% shrubs, and 2% trees. Major grasses include green needlegrass and western wheatgrass. Other grasses occurring on this community includes bearded wheatgrass, needleandthread, sideoats grama, blue grama, big bluestem and porcupine grass. Major forbs and shrubs include American vetch, purple prairie clover, cudweed sagewort, western yarrow, sunflower, western snowberry and/or silver sagebrush and fringed sagewort. Scattered green ash, plains cottonwood and American elm may occur. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low. The diversity in plant species allows for high drought tolerance. 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	1838	2567	3323
Shrub/Vine	247	407	504
Forb	157	244	364
Tree	–	33	67
<b>Total</b>	<b>2242</b>	<b>3251</b>	<b>4258</b>

Figure 5. Plant community growth curve (percent production by month). ND5401, Missouri Slope, Native Grasslands, Cool-season Dominant. Cool-season, mid-grass dominant.

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

## State 2

### Western Wheatgrass/Blue Grama

#### Community 2.1

#### Western Wheatgrass/Blue Grama

This plant community can slowly develop from the adverse effects of continuous grazing without adequate recovery periods between each grazing event during the growing season. Recognition of this plant community will enable the land user to implement key management decisions before a significant ecological threshold is crossed. Blue grama and western wheatgrass are the dominant species. Green needlegrass has been greatly reduced. Big bluestem, porcupine grass and sideoats grama may have been removed. Forb species include western yarrow, asters, prairie coneflower, silverleaf scurfpea, wavyleaf thistle and western salsify. Western snowberry, chokecherry, juneberry and plum are greatly reduced while other shrub species would tend to be heavily browsed. If silver sagebrush is the principle shrub it would be sustaining. This plant community is relatively stable and less productive than the HCPC. Reduction of litter and reduced plant vigor result in higher soil temperatures, poor water infiltration rates, increased runoff and high evapo-transpiration rates. This plant community can occur throughout the site, on spot grazed areas, and around water sources where season-long grazing patterns occur. Soil erosion will be minimal due to the sod forming habit of blue grama.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	678	897	1222
Forb	50	112	174
Shrub/Vine	50	84	118
Tree	–	11	28
Moss	6	17	28
<b>Total</b>	<b>784</b>	<b>1121</b>	<b>1570</b>

Figure 7. Plant community growth curve (percent production by month).  
 ND5404, Missouri Slope, Warm-season Dominant, Cool-season  
 Subdominant. Short warm-season dominant, mid cool-season subdominant  
 & club moss..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	5	20	38	25	8	3	0	0	0

### State 3 Excessive Litter, Shrub

#### Community 3.1 Excessive Litter, Shrub

This plant community develops after an extended period (10 to 20 years or more) of non-use and exclusion of fire. Eventually litter levels become high enough to reduce native grass vigor, diversity and density. Kentucky bluegrass and/or smooth brome grass tend to invade and may dominate this plant community. Common forbs include sweetclover, cudweed sagewort, and goldenrod species. Shrubs such as western snowberry and/or silver sagebrush, buffaloberry, and chokecherry will increase in density and cover and eventually tree species such as green ash. 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 toward the HCPC. Soil erosion is low. Runoff is similar to the HCPC. Once the advanced stage of this plant community is reached, time and external resources will be needed to see any immediate recovery in the diversity of the site.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1603	2098	2651
Shrub/Vine	247	539	729
Tree	28	189	392
Forb	28	87	151
<b>Total</b>	<b>1906</b>	<b>2913</b>	<b>3923</b>

Figure 9. Plant community growth curve (percent production by month).  
 ND5406, Missouri Slope, Introduced Cool-season Grasses. Introduced cool-  
 season grasses.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	35	35	5	2	8	2	0	0

### State 4 Blue Grama/Western Wheatgrass/Sagewort

#### Community 4.1

## Blue Grama/Western Wheatgrass/Sagewort

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing events. Blue grama with an evenly scattered overstory of western wheatgrass, cudweed sagewort and fringe sagewort dominates the community. The western wheatgrass is low in vigor. Green needlegrass has been mostly removed. Rose pussytoes, western yarrow, curlycup gumweed, heath aster, wavyleaf thistle and sweetclover have increased. Key shrubs have been severely reduced in vigor or removed completely. Where silver sagebrush is the dominant shrub, remnants will remain scattered throughout the site which protect some of the remaining decreaseers such as green needlegrass. Remnant trees remain, but regeneration is not occurring. This plant community is resistant to change due to grazing tolerance of blue grama. A significant amount of production and diversity has been lost when compared to the HCPC. Loss of cool season grasses, tall warm season grasses, shrub component and nitrogen fixing forbs have negatively impacted energy flow and nutrient cycling. Water infiltration is reduced significantly due to the massive shallow root system characteristic of overgrazed plant communities. Soil loss may be accelerated where concentrated flows occur.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	432	677	919
Shrub/Vine	39	90	140
Forb	84	112	140
Moss	6	13	22
Tree	–	4	11
<b>Total</b>	<b>561</b>	<b>896</b>	<b>1232</b>

Figure 11. Plant community growth curve (percent production by month).  
ND5404, Missouri Slope, Warm-season Dominant, Cool-season  
Subdominant. Short warm-season dominant, mid cool-season subdominant  
& club moss..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	1	5	20	38	25	8	3	0	0	0

## Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Western Wheatgrass</b>			325–650	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	325–650	–
2	<b>Needlegrass</b>			325–650	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	325–650	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–325	–
3	<b>Grama</b>			130–260	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	130–260	–
4	<b>Other Warm-Season</b>			130–325	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	130–228	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	98–228	–
5	<b>Other Native Perennials</b>			163–325	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	98–163	–
	prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	98–163	–



	slender wheatgrass	ELTRS	<i>Elymus trachycaulus ssp. subsecundus</i>	65–130	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	33–98	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	33–98	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	33–98	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	33–98	–
	saltgrass	DISP	<i>Distichlis spicata</i>	0–33	–
6	<b>Grass-Likes</b>			33–163	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	33–98	–
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	65–98	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	33–65	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–33	–
<b>Forb</b>					
8	<b>Forbs</b>			163–325	
	common yarrow	ACMI2	<i>Achillea millefolium</i>	33–65	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	33–65	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	33–65	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	33–65	–
	goldenrod	SOLID	<i>Solidago</i>	33–65	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	33–65	–
	American vetch	VIAM	<i>Vicia americana</i>	33–65	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	33	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	33	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–33	–
	mint	MENTH	<i>Mentha</i>	33	–
	bluebells	MERTE	<i>Mertensia</i>	33	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	33	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	33	–
	larkspur	DELPH	<i>Delphinium</i>	0–33	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–33	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum var. capitatum</i>	33	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	33	–
	groundplum milkvetch	ASCR2	<i>Astragalus crassicaarpus</i>	33	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	0–33	–
	onion	ALLIU	<i>Allium</i>	0–33	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–33	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			325–488	
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–325	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	33–325	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	33–98	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–98	–
	American plum	PRAM	<i>Prunus americana</i>	33–65	–

	chokecherry	PRVI	<i>Prunus virginiana</i>	33–65	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	33–65	–
	prickly rose	ROAC	<i>Rosa acicularis</i>	33–65	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	33–65	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–65	–
	currant	RIBES	<i>Ribes</i>	33	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–33	–

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Western Wheatgrass</b>			112–168	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	112–168	–
2	<b>Needlegrass</b>			0–11	
	green needlegrass	NAVI4	<i>Nassella viridula</i>	0–11	–
3	<b>Grama</b>			336–392	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	336–392	–
5	<b>Other Native Perennials</b>			112–146	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	56–112	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	22–45	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	22–45	–
	saltgrass	DISP	<i>Distichlis spicata</i>	22–45	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–11	–
6	<b>Grass-Likes</b>			45–78	
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	34–56	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	34–56	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–11	–
<b>Forb</b>					
8	<b>Forbs</b>			56–168	
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	34–56	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	34–56	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	34–56	–
	sweetclover	MELIL	<i>Melilotus</i>	0–56	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	34–56	–
	silverleaf Indian breadroot	PEAR6	<i>Pedimelum argophyllum</i>	22–34	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–34	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	11–22	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	11–22	–
	curlycup gumweed	GRSQ	<i>Grindelia squarrosa</i>	11–22	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	11–22	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	11–22	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	11–22	–

	goldenrod	SOLID	<i>Solidago</i>	11–22	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	11–22	–
	American vetch	VIAM	<i>Vicia americana</i>	0–11	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–11	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	0–11	–
	onion	ALLIU	<i>Allium</i>	0–11	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			56–112	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	56–112	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–56	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–22	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	11–22	–
	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	0–11	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–11	–
<b>Tree</b>					
10	<b>Trees</b>			0–22	
	boxelder	ACNE2	<i>Acer negundo</i>	0–11	–
	Russian olive	ELAN	<i>Elaeagnus angustifolia</i>	0–11	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–11	–
	plains cottonwood	PODEM	<i>Populus deltoides</i> ssp. <i>monilifera</i>	0–11	–
	American elm	ULAM	<i>Ulmus americana</i>	0–11	–
<b>Moss</b>					
11	<b>Cryptogams</b>			11–22	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	11–22	–

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Western Wheatgrass</b>			29–146	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	29–146	–
2	<b>Needlegrass</b>			29–146	
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	29–146	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	29–146	–
3	<b>Grama</b>			0–29	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	0–29	–
4	<b>Other Warm-Season</b>			0–29	
	big bluestem	ANGE	<i>Andropogon gerardii</i>	0–29	–
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	0–29	–
5	<b>Other Native Perennials</b>			58–175	
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	117–175	–
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	87–146	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	29–58	–

	Grass, perennial	2GP	<i>Grass, perennial</i>	29–58	–
	plains reedgrass	CAMO	<i>Calamagrostis montanensis</i>	0–29	–
	saltgrass	DISP	<i>Distichlis spicata</i>	0–29	–
	slender wheatgrass	ELTRS	<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	0–29	–
6	<b>Grass-Likes</b>			0–87	
	Pennsylvania sedge	CAPE6	<i>Carex pensylvanica</i>	0–87	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–29	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	0–29	–
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	0–29	–
7	<b>Non-Native Grasses</b>			583–1166	
	smooth brome	BRIN2	<i>Bromus inermis</i>	0–1020	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	291–1020	–
	crested wheatgrass	AGCR	<i>Agropyron cristatum</i>	0–583	–
	cheatgrass	BRTE	<i>Bromus tectorum</i>	0–146	–
<b>Forb</b>					
8	<b>Forbs</b>			29–146	
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	0–146	–
	sweetclover	MELIL	<i>Melilotus</i>	0–146	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	29–58	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	29–58	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	29–58	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	29–58	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–58	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	29–58	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	29–58	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	29–58	–
	goldenrod	SOLID	<i>Solidago</i>	29–58	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	0–29	–
	larkspur	DELPH	<i>Delphinium</i>	0–29	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	0–29	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	0–29	–
	Maximilian sunflower	HEMA2	<i>Helianthus maximiliani</i>	0–29	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	0–29	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–29	–
	groundplum milkvetch	ASCR2	<i>Astragalus crassicaarpus</i>	0–29	–
	American vetch	VIAM	<i>Vicia americana</i>	0–29	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	0–29	–
	mint	MENTH	<i>Mentha</i>	0–29	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			437–641	
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	146–583	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–437	–

	silver buffaloberry	SHAR	<i>Shepherdia argentea</i>	58–146	–
	chokecherry	PRVI	<i>Prunus virginiana</i>	29–87	–
	prickly rose	ROAC	<i>Rosa acicularis</i>	29–58	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	0–29	–
	currant	RIBES	<i>Ribes</i>	0–29	–
	Subshrub (<.5m)	2SUBS	<i>Subshrub (&lt;.5m)</i>	0–29	–
	Saskatoon serviceberry	AMAL2	<i>Amelanchier alnifolia</i>	0–29	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	0–29	–
	winterfat	KRLA2	<i>Krascheninnikovia lanata</i>	0–29	–
	American plum	PRAM	<i>Prunus americana</i>	0–29	–

**Tree**

10	<b>Trees</b>			29–350	
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	29–291	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	0–262	–
	American elm	ULAM	<i>Ulmus americana</i>	0–146	–
	boxelder	ACNE2	<i>Acer negundo</i>	0–146	–
	Russian olive	ELAN	<i>Elaeagnus angustifolia</i>	0–146	–

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
<b>Grass/Grasslike</b>					
1	<b>Needlegrass</b>			45–135	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	45–135	–
3	<b>Grama</b>			269–359	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	269–359	–
5	<b>Other Native Perennials</b>			27–54	
	saltgrass	DISP	<i>Distichlis spicata</i>	18–45	–
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	18–45	–
	Sandberg bluegrass	POSE	<i>Poa secunda</i>	18–45	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	9–18	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–9	–
6	<b>Grass-Likes</b>			27–54	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	27–45	–
	needleleaf sedge	CADU6	<i>Carex duriuscula</i>	18–36	–
<b>Forb</b>					
8	<b>Forbs</b>			90–135	
	sweetclover	MELIL	<i>Melilotus</i>	0–90	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	45–90	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	36–45	–
	silverleaf Indian breadroot	PEAR6	<i>Pediomelum argophyllum</i>	27–36	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	27–36	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	27–36	–
	curlcup gumweed	GRSQ	<i>Grindelia squarrosa</i>	9–27	–

	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	18–27	–
	rosy pussytoes	ANRO2	<i>Antennaria rosea</i>	18–27	–
	common dandelion	TAOF	<i>Taraxacum officinale</i>	9–18	–
	yellow salsify	TRDU	<i>Tragopogon dubius</i>	9–18	–
	Forb (herbaceous, not grass nor grass-like)	2FORB	<i>Forb (herbaceous, not grass nor grass-like)</i>	0–18	–
	Forb, perennial	2FP	<i>Forb, perennial</i>	0–9	–
	common yarrow	ACMI2	<i>Achillea millefolium</i>	0–9	–
	onion	ALLIU	<i>Allium</i>	0–9	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–9	–
<b>Shrub/Vine</b>					
9	<b>Shrubs</b>			45–135	
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	45–135	–
	silver sagebrush	ARCA13	<i>Artemisia cana</i>	0–63	–
	prairie rose	ROAR3	<i>Rosa arkansana</i>	0–9	–
<b>Tree</b>					
10	<b>Trees</b>			0–9	
	boxelder	ACNE2	<i>Acer negundo</i>	0–9	–
	Russian olive	ELAN	<i>Elaeagnus angustifolia</i>	0–9	–
	green ash	FRPE	<i>Fraxinus pennsylvanica</i>	0–9	–
	plains cottonwood	PODEM	<i>Populus deltoides ssp. monilifera</i>	0–9	–
	American elm	ULAM	<i>Ulmus americana</i>	0–9	–
<b>Moss</b>					
11	<b>Cryptogams</b>			9–18	
	lesser spikemoss	SEDE2	<i>Selaginella densa</i>	9–18	–

## Animal community

Animal Community – Wildlife Interpretations:  
Under development.

Animal Community – Grazing Interpretations:

This site is well adapted to managed grazing by domestic livestock. The predominance of herbaceous plants across all plant community phases best lends these sites to grazing by cattle but other domestic grazers with differing diet preferences may also be a consideration depending upon management objectives. Often, the current plant community does not entirely match any particular plant community (as described in the ecological site description). Because of this, a resource inventory is necessary to document plant composition and production. Proper interpretation of this inventory data will permit the establishment of a safe, initial stocking rate for the type and class of animals and level of grazing management. More accurate stocking rate estimates should eventually be calculated using actual stocking rate information and monitoring data.

## Hydrological functions

Water is the principal factor limiting herbage production. The site is dominated by soils in hydrologic groups B. Infiltration varies from moderately slow to moderate and runoff potential varies from low to moderate depending on soil hydrologic group 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 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 specialist.

Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Stan Boltz, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; L. Michael Stirling, NRCS Range Management Specialist; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.

Data Source Number of Records Sample Period State County

SCS-RANGE-417 0

Ocular estimates 4 1998 -2001 ND; SD Dunn, Hettinger, Morton

## Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728.

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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	05/12/2011
Approved by	Jeff Printz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:** Rills should not be present.  
\_\_\_\_\_
2. **Presence of water flow patterns:** Barely observable.  
\_\_\_\_\_
3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent.  
\_\_\_\_\_
4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is less than 10%.  
\_\_\_\_\_
5. **Number of gullies and erosion associated with gullies:** Active gullies should not be present. Existing gullies should be "healed" with a good vegetative cover.  
\_\_\_\_\_
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 litter movement. Plant litter remains in place and is not moved by erosional forces.  
\_\_\_\_\_
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Plant cover and litter is at 90% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be 5 or greater.  
\_\_\_\_\_
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.  
\_\_\_\_\_
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** High grass canopy and basal cover and small gaps between plants should reduce raindrop impact and slow overland flow, providing increased time for infiltration to occur. Healthy, deep rooted native grasses enhance infiltration and reduce runoff.  
\_\_\_\_\_
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 or soil surface crusting should be evident.

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

Dominant: Mid, cool-season rhizomatous grasses = mid, cool-season bunchgrasses >

Sub-dominant: shrubs >

Other: tall, rhizomatous warm-season grasses = forbs > short, warm-season grasses > grass-likes > trees

Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome grass do not fit into reference plant community F/S groups.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very low.
- 

14. **Average percent litter cover (%) and depth ( in):** Litter cover 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 = 2900 lbs/ac with a range of 2000 lbs/ac to 3800 lbs/ac (air dry weight) 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, smooth brome grass, Kentucky bluegrass, Russian Olive.
- 

17. **Perennial plant reproductive capability:** All species are capable of reproducing.
-