

Ecological site R054XY042ND Sandy Terrace

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General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.



Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 43a – Missouri Plateau.

Associated sites

R054XY023ND	Loamy Overflow
R054XY025ND	Sands
R054XY026ND	Sandy
R054XY034ND	Choppy Sands
R054XY041ND	Loamy Terrace

Similar sites

R054XY023ND	Loamy Overflow
	[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 no prairie sandreed and sand bluestem, far more big bluestem, frequent flooding events,
	more production.]

R054XY026ND	Sandy [Does not receive additional moisture. Found on dry uplands upslope from sandy terraces or loamy overflow sites, down slope from limy sands or shallow sandy sites. Similar landscape position as loamy, sands, clayey sites; will ribbon up to 1 inches. Indicator species are prairie sandreed with western wheatgrass and green needlegrass intermixed. This site has less production, different landscape position and no potential to flood, similar species composition with less silver sagebrush and/or western snowberry and sporadic trees.]
R054XY041ND	Loamy Terrace [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. Down slope from loamy, sandy, clayey, and sands, and upslope form subirrigated ecological sites. Indicator species are western wheatgrass evenly mixed with green needlegrass, American vetch, and western snowberry or silver sagebrush, and with possible trees. This site has no prairie sandreed, sand bluestem, less sedges and shrubs, more green needlegrass, western wheatgrass, blue grama, similar production, and landscape position.]
R054XY034ND	Choppy Sands [Deep entisol found on knobs and ridges of level to choppy sand blown plains; will not ribbon, found upslope from sands and sandy terrace sites; won't ribbon. Indicator species: Sand bluestem, prairie sandreed and needleandthread evenly mixed, some Canada wildrye, penstemon, lemon scurfpea western ragweed, yucca, silky prairie clover and leadplant. This site has less production, thin "A" horizon and has a non-mollic epipedon, more little bluestem, less prairie sandreed, green needlegrass and shrubs, no trees, can be in the same landscape positions, but has very little potential to receive additional moisture through occasional flooding.]
R054XY027ND	Sandy Claypan [Well drained soils on uplands and terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Subsoil will ribbon up to 1 inch. Indicator species are western wheatgrass intermixed with areas of prairie sandreed both dominating with an understory of needleandthread and blue grama, heath aster, cudweed sagewort and western yarrow along with fringed sagewort. This site has dense sodic subsoil below 6 inches with salts below 16 inches, far more western wheatgrass, blue grama, less prairie sandreed, and sand bluestem, with less silver sagebrush and/or western snowberry and no sporadic trees, less production.]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) Calamovilfa longifolia

Physiographic features

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

Landforms	(1) Flood plain(2) Terrace(3) Natural levee
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	0–6%
Ponding depth	0 cm
Water table depth	137–183 cm
Aspect	Aspect is not a significant factor

Table 2. Representative physiographic features

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 fine sandy loam to sandy loam-textured subsoils and slopes of 1 to 6 percent. The soils in this site are well to somewhat excessively drained and formed from alluvium. The loamy fine sand to loam surface layer is 3 to 7 inches thick. The soils have a rapid to moderately rapid 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 water and wind 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) Fine sandy loam(2) Loamy fine sand(3) Loam
Family particle size	(1) Loamy

Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	5–25%
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 needleandthread, red threeawn, blue grama and sedges will initially increase while sand bluestem and/or big bluestem, and sideoats grama have disappeared and prairie sandreed and green needlegrass have decrease in frequency and production. Heavy continuous grazing causes blue grama, sedges and forbs to increase.

In time, heavy continuous grazing will likely cause upland sedges and 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. Under 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. In time, shrubs and trees such as western snowberry, chokecherry and green ash will likely increase.

The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model



CGB w/ CG - cropped go-back with continuous grazing; 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; NU/NF - extended period of non-use & no fire; PB - prescribed burning followed by prescribed grazing; PG - prescribed grazing; RD - removal of disturbance; RS - range seeding with prescribed grazing.

Community 1.1 Prairie Sandreed/Bluestem (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, 15% forbs, 10% shrubs, and 2% trees. Major grasses include prairie sandreed, bluestems and needlegrasses. Other grasses occurring on this community include bearded wheatgrass, Canada wildrye, sideoats grama, blue grama, western wheatgrass and sedge. Major forbs and shrubs include American vetch, cudweed sagewort, western yarrow, sunflower, leadplant, western snowberry, chokecherry 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 in production depending on growing conditions (timing/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	1917	2640	3374
Forb	247	420	560
Shrub/Vine	163	252	364
Tree	28	50	73
Total	2355	3362	4371

Figure 5. Plant community growth curve (percent production by month). ND5403, Missouri Slope, Native Grasslands, Warm-season dominant. Warm-season dominant.

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

State 2 Needleandthread/Prairie Sandreed

Community 2.1 Needleandthread/Prairie Sandreed

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. Needleandthread and prairie sandreed are the dominant species. Prairie sandreed and green needlegrass have been reduced. Big bluestem, sand bluestem, porcupine grass, sideoats grama, spiderwort and prairie clover have greatly reduced. Forb species include green sagewort, cudweed sagewort, prairie coneflower, silverleaf scurfpea, western ragweed and western salsify. Leadplant, western snowberry, chokecherry have been reduced while other woody species would tend to be heavily browsed. Fringed sagewort has increased. This plant community is relatively stable and less productive than the HCPC. Reduction of litter and plant cover results 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.

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	622	885	1149
Forb	106	140	174
Shrub/Vine	50	84	118
Tree	6	11	17
Total	784	1120	1458

Figure 7. Plant community growth curve (percent production by month). ND5402, Missouri Slope, Native Grasslands, Cool/Warm-season Mix. Coolseason/warm-season dominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	6	21	40	20	6	4	1	0	0

State 3 Excessive Litter, Shrub

Community 3.1 Excessive Litter, Shrub

This plant community develops after an extended period (10 to 20 years) of non-use or exclusion of fire. Eventually litter levels become high enough to reduce native grass vigor, diversity and density. Kentucky bluegrass, crested wheatgrass and/or smooth bromegrass tend to invade and may dominate this plant community. Common forbs include sweetclover, cudweed sagewort, green sagewort, and goldenrod species. Shrubs such as western snowberry, buffaloberry and chokecherry will increase in density and cover and eventually tree species such as green ash will also increase. 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 it 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	1440	2069	2707
Shrub/Vine	247	364	476
Forb	247	364	476
Tree	84	117	151
Total	2018	2914	3810

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	Мау	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	35	35	5	2	8	2	0	0

State 4 Needleandthread/Bluegrass/Forb

Community 4.1 Needleandthread/Bluegrass/Forb

This plant community developed with heavy continuous grazing without adequate recovery periods between grazing

events. It is made up of needleandthread, red threeawn, sand dropseed, sedges and undesirable forbs scattered within a sod of bluegrass. Low vigor western wheatgrass and prairie junegrass can be found scattered throughout the community. At this level of departure from HCPC, green needlegrass has been removed. Green sagewort, scurfpea, curlycup gumweed, ragweed, hairy goldaster, dandelion, wavyleaf thistle and sweetclover have increased. Key shrubs have been severely reduced in vigor or removed completely. Shrubs that have increase are fringed sagewort and cactus. Remnant trees remain with no regeneration apparent. This plant community is resistant to change due to grazing tolerance of red threeawn and bluegrass. 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. 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	303	572	841
Forb	112	149	185
Shrub/Vine	34	59	84
Tree	-	4	11
Total	449	784	1121

Figure 11. Plant community growth curve (percent production by month). ND5408, Missouri Slope, Sedge Dominant. Cool-season, short grasses and grass-likes.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	30	25	20	5	5	2	0	0

Additional community tables

Table 9. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass	/Grasslike	•			
1	Prairie Sandreed			504–673	
	prairie sandreed	CALO	Calamovilfa longifolia	504–673	_
2	2 Bluestem			336–504	
	sand bluestem	ANHA	Andropogon hallii	168–336	_
	big bluestem	ANGE	Andropogon gerardii	0–168	_
	little bluestem	SCSC	Schizachyrium scoparium	0–67	_
3	Needlegrass	•	168–336		
	needle and thread	HECOC8	Hesperostipa comata ssp. comata	168–235	_
	green needlegrass	NAVI4	Nassella viridula	67–168	_
	porcupinegrass	HESP11	Hesperostipa spartea	34–67	_
4	Grama	•		101–168	
	blue grama	BOGR2	Bouteloua gracilis	34–101	_
	hairy grama	BOHI2	Bouteloua hirsuta	0–67	_
5	Other Native Grasses			168–504	
	western wheatgrass	PASM	Pascopyrum smithii	168–235	_
	prairie Junegrass	KOMA	Koeleria macrantha	34–67	_
	sideoats grama	BOCU	Bouteloua curtipendula	0–67	_
	O		F 1	04.07	

	Canada wildrye	ELCA4	Elymus canadensis	34–07	-
	Grass, perennial	2GP	Grass, perennial	0–67	-
	Fendler threeawn	ARPUL	Aristida purpurea var. longiseta	0–34	_
	slender wheatgrass	ELTRS	Elymus trachycaulus ssp. subsecundus	0–34	_
	Scribner's rosette grass	DIOLS	Dichanthelium oligosanthes var. scribnerianum	0–34	_
	plains muhly	MUCU3	Muhlenbergia cuspidata	0–34	_
	sand dropseed	SPCR	Sporobolus cryptandrus	0–34	-
6	Grass-Likes			135–269	
	threadleaf sedge	CAFI	Carex filifolia	67–168	_
	sun sedge	CAINH2	Carex inops ssp. heliophila	67–101	_
	Pennsylvania sedge	CAPE6	Carex pensylvanica	34–67	_
	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	34	_
Forb					
8	Forbs			336–504	
	goldenrod	SOLID	Solidago	67–101	_
	beardtongue	PENST	Penstemon	67–101	-
	stiff sunflower	HEPA19	Helianthus pauciflorus	34–67	-
	hairy false goldenaster	HEVI4	Heterotheca villosa	34–67	-
	blazing star	LIATR	Liatris	34–67	-
	tarragon	ARDR4	Artemisia dracunculus	34–67	-
	white sagebrush	ARLU	Artemisia ludoviciana	34–67	-
	prairie clover	DALEA	Dalea	34–67	-
	scurfpea	PSORA2	Psoralidium	34–67	_
	American vetch	VIAM	Vicia americana	34–67	-
	upright prairie coneflower	RACO3	Ratibida columnifera	34	-
	scarlet globemallow	SPCO	Sphaeralcea coccinea	34	-
	spiderwort	TRADE	Tradescantia	34	-
	blacksamson echinacea	ECAN2	Echinacea angustifolia	0–34	-
	sanddune wallflower	ERCAC	Erysimum capitatum var. capitatum	34	_
	scarlet beeblossom	GACO5	Gaura coccinea	34	_
	groundplum milkvetch	ASCR2	Astragalus crassicarpus	34	_
	wavyleaf thistle	CIUN	Cirsium undulatum	34	_
	rush skeletonplant	LYJU	Lygodesmia juncea	0–34	-
	spiny phlox	PHHO	Phlox hoodii	0–34	-
	cinquefoil	POTEN	Potentilla	0–34	_
	Forb, perennial	2FP	Forb, perennial	0–34	-
	common yarrow	ACMI2	Achillea millefolium	34	_
Shrub	/Vine				
9	Shrubs			168–336	
	leadplant	AMCA6	Amorpha canescens	67–101	
	western snowberry	SYOC	Symphoricarpos occidentalis	67–101	_
	rnea	RUS72	Rosa	34_67	_

	1030	NOORD	1050	001	
	silver buffaloberry	SHAR	Shepherdia argentea	34–67	-
	prairie sagewort	ARFR4	Artemisia frigida	34–67	-
	creeping juniper	JUHO2	Juniperus horizontalis	0–34	-
	pricklypear	OPUNT	Opuntia	34	-
	chokecherry	chokecherry PRVI Prunus virginiana		34	-
	skunkbush sumac	RHTR	Rhus trilobata	0–34	-
	Subshrub (<.5m)	2SUBS	Subshrub (<.5m)	34	-
	dwarf false indigo	AMNA	Amorpha nana	34	-
Tree		-			
10	Trees			34–67	
	Tree	2TREE	Tree	0–67	-
	green ash	FRPE	Fraxinus pennsylvanica	0–67	-
	plains cottonwood	PODEM	Populus deltoides ssp. monilifera	0–67	-
	bur oak	QUMA2	Quercus macrocarpa	0–67	-
	American elm	ULAM	Ulmus americana	0–67	-
-					

Table 10. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass	/Grasslike	•			
1	Prairie Sandreed			56–112	
	prairie sandreed	CALO	Calamovilfa longifolia	56–112	-
2	Bluestem	-		0–11	
	little bluestem	SCSC	Schizachyrium scoparium	0–11	_
3	Needlegrass			168–280	
	needle and thread	HECOC8	Hesperostipa comata ssp. comata	168–280	-
	green needlegrass	NAVI4	Nassella viridula	0–11	-
4	Grama			56–90	
	blue grama	BOGR2	Bouteloua gracilis	34–90	-
	hairy grama	BOHI2	Bouteloua hirsuta	0–34	
5	Other Native Grasses	56–112			
	Fendler threeawn	ARPUL	Aristida purpurea var. longiseta	34–45	_
	sand dropseed	SPCR	Sporobolus cryptandrus	34–45	_
	mat sandbur	CELO3	Cenchrus longispinus	11–22	-
	Scribner's rosette grass	DIOLS	Dichanthelium oligosanthes var. scribnerianum	11–22	_
	prairie Junegrass	KOMA	Koeleria macrantha	11–22	_
	western wheatgrass	PASM	Pascopyrum smithii	11–22	_
	Grass, perennial	2GP	Grass, perennial	11–22	_
	saltgrass	DISP	Distichlis spicata	0–11	_
	Canada wildrye	ELCA4	Elymus canadensis	0–11	_
6	Grass-Likes			56–112	
	threadleaf sedge	CAFI	Carex filifolia	56–112	
	sun sedge	CAINH2	Carex inops ssp. heliophila	22–34	_
		ſ			

	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	11–22	–
7	Non-Native Grasses	·		56–112	
	bluegrass	POA	Poa	56–112	
	crested wheatgrass	AGCR	Agropyron cristatum	0–22	-
	smooth brome	BRIN2	Bromus inermis	0–22	-
	cheatgrass	BRTE	Bromus tectorum	0–22	
Forb					
8	Forbs			112–168	
	tarragon	ARDR4	Artemisia dracunculus	45–90	
	hairy false goldenaster	HEVI4	Heterotheca villosa	34–56	
	sweetclover	MELIL	Melilotus	11–56	
	wavyleaf thistle	CIUN	Cirsium undulatum	34–56	
	Cuman ragweed	AMPS	Ambrosia psilostachya	34–45	
	upright prairie coneflower	RACO3	Ratibida columnifera	34–45	
	goldenrod	SOLID	Solidago	34–45	
	scurfpea	PSORA2	Psoralidium	22–34	
	common dandelion	TAOF	Taraxacum officinale	22–34	
	white sagebrush	ARLU	Artemisia ludoviciana	22–34	
	curlycup gumweed	GRSQ	Grindelia squarrosa	11–34	
	common sunflower	HEAN3	Helianthus annuus	11–22	
	pussytoes	ANTEN	Antennaria	11–22	
	Forb (herbaceous, not grass nor grass-like)	2FORB	Forb (herbaceous, not grass nor grass-like)	11–22	_
	Rocky Mountain beeplant	CLSE	Cleome serrulata	11–22	
	Canadian horseweed	COCA5	Conyza canadensis	11–22	
	yellow salsify	TRDU	Tragopogon dubius	11–22	
	common yarrow	ACMI2	Achillea millefolium	11–22	
	scarlet globemallow	SPCO	Sphaeralcea coccinea	11–22	
	blacksamson echinacea	ECAN2	Echinacea angustifolia	0–11	
	Forb, perennial	2FP	Forb, perennial	0–11	_
	spiny phlox	РННО	Phlox hoodii	11	
	rush skeletonplant	LYJU	Lygodesmia juncea	11	
Shrub	/Vine				
9	Shrubs			56–112	
	prairie sagewort	ARFR4	Artemisia frigida	34–112	
	creeping juniper	JUHO2	Juniperus horizontalis	11–22	
	pricklypear	OPUNT	Opuntia	11–22	
	rose	ROSA5	Rosa	11–22	
	silver buffaloberry	SHAR	Shepherdia argentea	11	
	western snowberry	SYOC	Symphoricarpos occidentalis	0–11	
	soapweed yucca	YUGL	Yucca glauca	0–11	
	Subshrub (<.5m)	2SUBS	Subshrub (<.5m)	0–11	
	chokecherry	PRVI	Prunus virginiana	0–11	
	skunkbush sumac	RHTR	Rhus trilobata	0–11	-

Tree					
10	Trees			11	
	Tree	2TREE	Tree	11	-
	green ash	FRPE	Fraxinus pennsylvanica	11	-
	plains cottonwood	PODEM	Populus deltoides ssp. monilifera	11	
	bur oak	QUMA2	Quercus macrocarpa	11	-
	American elm	ULAM	Ulmus americana	11	-

Table 11. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass	/Grasslike		••	•	
1	Prairie Sandreed			0–58	
	prairie sandreed	CALO	Calamovilfa longifolia	0–58	_
2	Bluestem		•	0–29	
	big bluestem	ANGE	Andropogon gerardii	0–29	_
	sand bluestem	ANHA	Andropogon hallii	0–29	_
3	Needlegrass	-		58–87	
	needle and thread	HECOC8	Hesperostipa comata ssp. comata	29–87	_
	porcupinegrass	HESP11	Hesperostipa spartea	0–58	_
	green needlegrass	NAVI4	Nassella viridula	29–58	_
4	Grama			0–29	
	blue grama	BOGR2	Bouteloua gracilis	0–29	_
	hairy grama	BOHI2	Bouteloua hirsuta	0–29	_
5	Other Native Grasses			58–146	
	prairie Junegrass	KOMA	Koeleria macrantha	29–58	_
	western wheatgrass	PASM	Pascopyrum smithii	29–58	_
	sand dropseed	SPCR	Sporobolus cryptandrus	29	_
	Grass, perennial	2GP	Grass, perennial	0–29	_
	Fendler threeawn	ARPUL	Aristida purpurea var. longiseta	0–29	_
	Canada wildrye	ELCA4	Elymus canadensis	0–29	_
	slender wheatgrass	ELTRS	Elymus trachycaulus ssp. subsecundus	0–29	_
6	Grass-Likes			58–87	
	threadleaf sedge	CAFI	Carex filifolia	58–87	_
	sun sedge	CAINH2	Carex inops ssp. heliophila	0–29	_
	Pennsylvania sedge	CAPE6	Carex pensylvanica	0–29	_
	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	0–29	_
7	Non-Native Grasses			1020–1457	
	bluegrass	POA	Poa	583–1311	_
	smooth brome	BRIN2	Bromus inermis	0–1020	_
	crested wheatgrass	AGCR	Agropyron cristatum	0–874	_
	cheatgrass	BRTE	Bromus tectorum	0–291	_
Forb	Γ				

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8	Forbs			291–437	
	sweetclover	MELIL	Melilotus	0–291	_
	goldenrod	SOLID	Solidago	87–117	_
	tarragon	ARDR4	Artemisia dracunculus	58–87	_
	white sagebrush	ARLU	Artemisia ludoviciana	29–58	_
	wavyleaf thistle	CIUN	Cirsium undulatum	29–58	_
	Forb (herbaceous, not grass nor grass-like)	2FORB	Forb (herbaceous, not grass nor grass-like)	29–58	_
	common yarrow	ACMI2	Achillea millefolium	29–58	_
	Cuman ragweed	AMPS	Ambrosia psilostachya	29–58	_
	common sunflower	HEAN3	Helianthus annuus	29–58	-
	hairy false goldenaster	HEVI4	Heterotheca villosa	29–58	_
	common dandelion	TAOF	Taraxacum officinale	29–58	-
	yellow salsify	TRDU	Tragopogon dubius	29–58	-
	cinquefoil	POTEN	Potentilla	29–58	_
	scurfpea	PSORA2	Psoralidium	29–58	_
	upright prairie coneflower	RACO3	Ratibida columnifera	29–58	_
	beardtongue	PENST	Penstemon	0–29	_
	American vetch	VIAM	Vicia americana	0–29	_
	scarlet globemallow	SPCO	Sphaeralcea coccinea	0–29	_
	blazing star	LIATR	Liatris	0–29	_
	rush skeletonplant	LYJU	Lygodesmia juncea	0–29	_
	stiff sunflower	HEPA19	Helianthus pauciflorus	0–29	_
	Forb, perennial	2FP	Forb, perennial	0–29	_
	Rocky Mountain beeplant	CLSE	Cleome serrulata	0–29	_
	Canadian horseweed	COCA5	Conyza canadensis	0–29	_
	prairie clover	DALEA	Dalea	0–29	_
	blacksamson echinacea	ECAN2	Echinacea angustifolia	0–29	_
	sanddune wallflower	ERCAC	Erysimum capitatum var. capitatum	0–29	_
	curlycup gumweed	GRSQ	Grindelia squarrosa	0–29	_
Shrub)/Vine				
9	Shrubs			291–437	
	western snowberry	SYOC	Symphoricarpos occidentalis	146–291	-
	skunkbush sumac	RHTR	Rhus trilobata	29–87	_
	silver buffaloberry	SHAR	Shepherdia argentea	58–87	_
	chokecherry	PRVI	Prunus virginiana	29–58	_
	rose	ROSA5	Rosa	29–58	_
	prairie sagewort	ARFR4	Artemisia frigida	29–58	_
	Subshrub (<.5m)	2SUBS	Subshrub (<.5m)	29–58	_
	leadplant	AMCA6	Amorpha canescens	29–58	_
	dwarf false indigo	AMNA	Amorpha nana	29	-
	creeping juniper	JUHO2	Juniperus horizontalis	0–29	_
	pricklypear	OPUNT	Opuntia	0–29	_
	soapweed yucca	YUGL	Yucca glauca	0–29	_

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Tree		-			
10	Trees		87–146		
	Tree	2TREE	Tree	0–146	-
	green ash	FRPE	Fraxinus pennsylvanica	58–146	-
	plains cottonwood	PODEM	Populus deltoides ssp. monilifera	0–146	-
	bur oak	QUMA2	Quercus macrocarpa	0–146	-
	American elm	ULAM	Ulmus americana	0–146	-

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)		
Grass	Grass/Grasslike						
1	Prairie Sandreed			0–8			
	prairie sandreed	CALO	Calamovilfa longifolia	0–8	_		
3	Needlegrass		39–78				
	needle and thread	HECOC8	Hesperostipa comata ssp. comata	39–78	_		
4	Grama			39–78			
	blue grama	BOGR2	Bouteloua gracilis	39–78	_		
	hairy grama	BOHI2	Bouteloua hirsuta	0–8	_		
5	Other Native Grasses			78–118			
	Fendler threeawn	ARPUL	Aristida purpurea var. longiseta	39–78	_		
	sand dropseed	SPCR	Sporobolus cryptandrus	39–78	_		
	mat sandbur	CELO3	Cenchrus longispinus	16–24	_		
	Scribner's rosette grass	DIOLS	Dichanthelium oligosanthes var. scribnerianum	16–24	_		
	saltgrass	DISP	Distichlis spicata	8–16	_		
	prairie Junegrass	KOMA	Koeleria macrantha	8–16	_		
	western wheatgrass	PASM	Pascopyrum smithii	8–16	_		
	Grass, perennial	2GP	Grass, perennial	0–8	_		
6	Grass-Likes			39–78			
	threadleaf sedge	CAFI	Carex filifolia	39–78	_		
	Grass-like (not a true grass)	2GL	Grass-like (not a true grass)	0–8	_		
7	Non-Native Grasses	•		118–157			
	bluegrass	POA	Poa	118–157	_		
	cheatgrass	BRTE	Bromus tectorum	0–39	_		
	crested wheatgrass	AGCR	Agropyron cristatum	0–16	_		
	smooth brome	BRIN2	Bromus inermis	0–16	_		
Forb	Forb						
8	Forbs			118–180			
	sweetclover	MELIL	Melilotus	8–78	_		
	Cuman ragweed	AMPS	Ambrosia psilostachya	39–78	_		
	tarragon	ARDR4	Artemisia dracunculus	39–78	_		
	wavyleaf thistle	CIUN	Cirsium undulatum	31–63	_		
	hairy false goldenaster	HEVI4	Heterotheca villosa	31–63	_		

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	Canadian horseweed	COCA5	Conyza canadensis	31–47	-	
	scurfpea	PSORA2	Psoralidium	31–39	-	
	common sunflower	HEAN3	Helianthus annuus	24–31	-	
	white sagebrush	ARLU	Artemisia Iudoviciana	24–31	-	
	pussytoes	ANTEN	Antennaria	16–24	-	
	common yarrow	ACMI2	Achillea millefolium	16–24	-	
	curlycup gumweed	GRSQ	Grindelia squarrosa	16–24	-	
	upright prairie coneflower	RACO3	Ratibida columnifera	16–24	_	
	goldenrod	SOLID	Solidago	16–24	-	
	scarlet globemallow	SPCO	Sphaeralcea coccinea	16–24	-	
	common dandelion	TAOF	Taraxacum officinale	16–24	-	
	yellow salsify	TRDU	Tragopogon dubius	16–24	-	
	rush skeletonplant	LYJU	Lygodesmia juncea	8–16	-	
	Forb, perennial	2FP	Forb, perennial	0–8	-	
	blacksamson echinacea	ECAN2	Echinacea angustifolia	0–8	_	
	spiny phlox	РННО	Phlox hoodii	8	-	
Shrub	/Vine					
9	Shrubs			39–78		
	prairie sagewort	ARFR4	Artemisia frigida	31–63	-	
	pricklypear	OPUNT	Opuntia	16–31	-	
	soapweed yucca	YUGL	Yucca glauca	0–24	-	
	creeping juniper	JUHO2	Juniperus horizontalis	8–16	-	
	rose	ROSA5	Rosa	8–16	-	
	Subshrub (<.5m)	2SUBS	Subshrub (<.5m)	0–8	-	
Tree	Tree					
10	Trees			0–8		
	Tree	2TREE	Tree	0–8	-	
	green ash	FRPE	Fraxinus pennsylvanica	0–8	-	
	plains cottonwood	PODEM	Populus deltoides ssp. monilifera	0–8	-	
	bur oak	QUMA2	Quercus macrocarpa	0–8	-	
	American elm	ULAM	Ulmus americana	0–8		

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 on this site. The site is dominated by soils in hydrologic groups A and B, with localized areas in hydrologic group D. Infiltration varies from rapid to moderately rapid and runoff potential varies from negligible to very low 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.

Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Stan Boltz, NRCS Range Management Specialist and Darrell VanderBusch, NRCS Resource Soil Scientist. Data Source Number of Records Sample Period State County SCS-RANGE-417 0 Ocular estimates 3 1998 -2001 ND; SD Dunn, Morton, Stark

Other references

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Fort Collins, CO 80526. (http://nasis.nrcs.usda.gov)

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Contributors

Jeff Printz Jeff Printz/Stan Boltz

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	05/13/2011
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 15%.
- 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 85% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be 5 or greater.

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.

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

Dominant: Tall, warm-season rhizomatous grasses >

Sub-dominant: mid-stature, cool-season bunchgrasses > forbs >

Other: shrubs > grass-likes > mid, cool-season rhizomatous grasses > short, warm-season grasses > trees

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

13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence): 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 annualproduction): Representative value = 3000 lbs/ac with a range from 2100 lbs/ac to 3900 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 weeds, smooth bromegrass, Kentucky bluegrass, Rocky Mountain Juniper.
- 17. Perennial plant reproductive capability: All species are capable of reproducing.