USDA Natural Resources Conservation Service

Ecological site R054XY026ND
Sandy

Accessed: 05/12/2025

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.

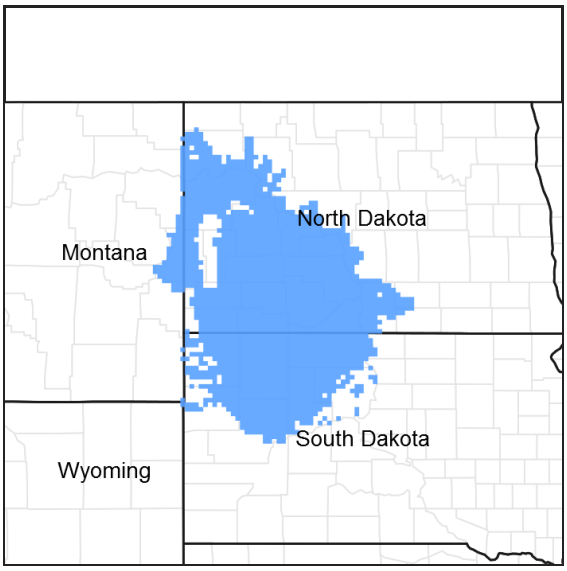


Figure 1. Mapped extent

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**
R054XY027ND	**Sandy Claypan**
R054XY031ND	**Loamy**
R054XY042ND	**Sandy Terrace**
R054XY043ND	**Shallow Sandy**
R054XY045ND	**Limy Sands**

Similar sites

R054XY025ND	**Sands** (054XY025ND) – Sands (Sa) [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, sandy, and clayey sites. Won't form a ribbon; indicator species are sand bluestem and prairie sandreed evenly mixed, some Canada wildrye, penstemon, and leadplant and western snowberry. This site has more sand bluestem, needleandthread and sedges, less blue grama, green needlegrass and western wheatgrass, slightly more production, similar landscape position.]
R054XY043ND	**Shallow Sandy** (054XY043ND) – Shallow Sandy (SwS) [Some what excessively well drained soils more than 10 less than 20 inches to sedimentary sandstone bedrock and/or gravels that restricts root penetration. Surface layer will ribbon less than 1 inch unless above gravels than more than 1 but less than 2 inches. Upslope from thin loamy, limy sands, sands or sandy sites and some times down slope form very shallow ecological sites. Indicator species: little bluestem, prairie sandreed, sand bluestem, and needle grasses, with dotted gayfeather, pasqueflower, purple coneflower and purple prairie clover, and shrubs like prairie rose and yucca. This site has less production, a limiting layer above 20 inches, more little bluestem, plains muhly, sideoats grama, less prairie sandreed, usually different landscape positions.]
R054XY031ND	**Loamy** (054XY031ND) – Loamy (Lo) [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 no prairie sandreed or sand bluestem, less needleandthread and sedges, more blue grama, green needlegrass and western wheatgrass, similar production, similar landscape position, different soil texture.]
R054XY042ND	**Sandy Terrace** (054XY042ND) – Sandy Terrace (SyT) [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 production, different landscape position and more potential to flood occasionally, similar species composition with more silver sagebrush and/or western snowberry and sporadic trees.]
R054XY045ND	**Limy Sands** (054XY045ND) – Limy Sands (LSa) [Moderately deep entisol, usually calcareous within 4 inches to the surface, found on knobs and/or sideslopes of hills and buttes; will not form a ribbon; up slope of sands or sandy and down slope from shallow sandy ecological sites. Indicator species: Little bluestem, sand bluestem, and prairie sandreed, along with penstemon, silverleaf scurfpea, purple coneflower, yucca, creeping juniper, and leadplant. This site has less production, thin "A" horizon, no mollic epipedon, lime within 6 inches to the surface, more little bluestem, plains muhly, sideoats grama, less prairie sandreed, different landscape positions.]
R054XY034ND	**Choppy Sands** (054XY034ND) – Thin Sands (TSa) [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, no mollic epipedon, different soil texture, lime within 6 inches to the surface, less sand bluestem and prairie sandreed, more western wheatgrass, blue grama and green needlegrass, similar landscape positions.]
R054XY027ND	**Sandy Claypan** (054XY027ND) – Sandy Claypan (SCp) [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 a dense sodic subsoil below 6 inches with salts below 16 inches, far more western wheatgrass, blue grama, less prairie sandreed, and sand bluestem, less production.]

Table 1. Dominant plant species

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

Physiographic features

This site occurs on gently undulating to rolling sedimentary uplands.

Table 2. Representative physiographic features

Landforms	(1) Alluvial fan (2) Alluvial flat (3) Hill
Flooding frequency	None
Ponding frequency	None
Elevation	488–1,097 m
Slope	2–20%
Water table depth	122–183 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)	117 days
Freeze-free period (average)	126 days
Precipitation total (average)	406 mm

Climate stations used

- (1) FT YATES 4 SW [USC00323207], Fort Yates, ND
- (2) DUPREE [USC00392429], Dupree, SD
- (3) SIDNEY [USC00247560], Sidney, MT

- (4) HETTINGER [USC00324178], Hettinger, ND

Influencing water features

No significant water features influence this site.

Soil features

The common features of soils in this site are the loamy fine sand to fine sandy loam textured subsoils and slopes of 2 to 20 percent. The soils in this site are moderately well to well drained and formed in soft sandstone or alluvium. The fine sandy loam and sandy loam surface layer is 5 to 15 inches thick. The soils have a high to 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 non-restrictive to water movement and root penetration.

These soils are susceptible to water and wind erosion. The hazard of water erosion increases on slopes greater than about 15 percent. Low available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationship. 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

Parent material	(1) Residuum–sandstone (2) Slope alluvium–sandstone (3) Eolian sands (4) Outwash
Surface texture	(1) Fine sandy loam (2) Sandy loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained to well drained
Permeability class	Moderate to moderately rapid
Soil depth	51–183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–20%

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

Ecological dynamics

This site developed under Northern Great Plains climatic conditions, and included natural influence of large herbivores and occasional fire. Changes will occur in the plant communities due to management actions and/or climatic conditions. Due to the nature of the soils, the site is considered moderately resilient. Under continued adverse impacts, a moderate decline in vegetative vigor and composition will occur. Under favorable vegetative management treatments the site can more readily return to the Reference Plant Community.

The plant community upon which interpretations are primarily based is the Reference Plant Community. The Reference 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.

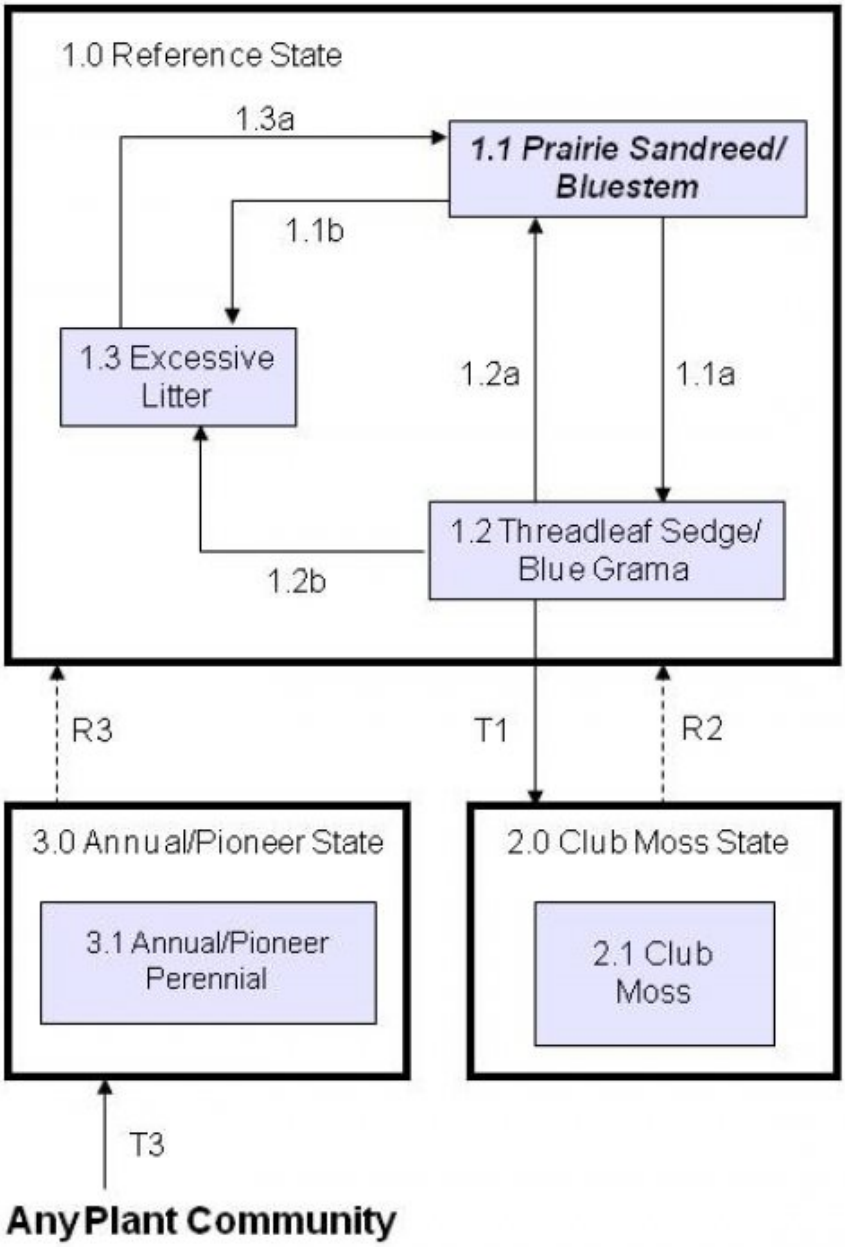
Heavy continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Reference Plant Community. Species such as prairie sandreed, big bluestem, and sand bluestem decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama to dominate and pioneer perennials, 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 Reference Plant Community. Runoff increases and infiltration will decrease. Soil erosion will be minimal.

Excessive defoliation or any type of physical disturbance can lead to serious erosion problems resulting in an increase in annual and pioneer perennial vegetation. Extended periods of non-use and/or lack of fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or smooth bromegrass.

Due to a general invasion of exotic species (such as Kentucky bluegrass and smooth bromegrass) across the MLRA within this site, returning to the 1.1 Prairie Sandreed/Bluestem Plant Community Phase may not be possible.

Following the state and transition diagram are narratives for each of the described states and community phases. These may not represent every possibility, but they are the most prevalent and repeatable states/community phases. The plant composition tables shown below have been developed from the best available knowledge at the time of this revision. As more data are collected, some of these community phases and/or states may be revised or removed, and new ones may be added. The main purpose for including the descriptions here is to capture the current knowledge and experience at the time of this revision.

State and transition model



State 1
Reference

The State narrative is under development.

Community 1.1
Prairie Sandreed/Bluestem

This is the interpretive plant community and is considered to be the Reference Plant Community. This community evolved with grazing by large herbivores and occasional prairie fire. It is well suited for grazing by domestic livestock and can be found on areas that are properly managed with prescribed grazing that allows for proper utilization, changes in season of use and adequate recovery periods following each grazing event. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs, and 5% shrubs. Dominant grasses include prairie sandreed, and sand bluestem. Other grasses and grass-likes include needleandthread, blue grama, green needlegrass, porcupine grass, western wheatgrass, and threadleaf and sun sedge. Significant forbs include penstemon, American vetch, green sagewort, silverleaf scurfpea and spiderwort. In many areas western snowberry is the principal shrub and occurs in patchy mosaics. In other areas, silver sagebrush is the dominant shrub and occurs more evenly dispersed across the site. Other shrubs include prairie rose, leadplant, fringed sagewort and yucca. This plant community is well adapted to the Northern Great Plains climatic conditions. Individual species can vary greatly in production depending on growing conditions (timing and amount of precipitation and temperature). Community dynamics, nutrient cycle, water cycle and energy flow are functioning properly. Plant litter is properly distributed with little movement off-site and natural plant mortality is very low. The diversity in species allows for high drought tolerance. Run-off from adjacent sites and moderate or high available water capacity provides a favorable soil-water-plant relationship.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1502	2381	3250
Forb	129	202	280
Shrub/Vine	50	94	140
Moss	–	13	28
Total	**1681**	**2690**	**3698**

Figure 7. 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

Community 1.2
Threadleaf Sedge/Blue Grama

This plant community is the result of long-term, heavy, continuous grazing and/or annual, early spring seasonal grazing. Threadleaf sedge and blue grama are the dominant species. Other grasses include western wheatgrass, red threeawn, sand dropseed, needleandthread and prairie junegrass. Forbs such as western ragweed, green sagewort, hairy goldaster, cudweed sagewort, scarlet globemallow and sweet clover may also be present. Annual production, and consequently litter amounts, have been reduced substantially. Nutrient cycle, water cycle and energy flow are becoming impaired. This plant community is at risk of losing all tall warm season grasses. Wind erosion is a concern where cover has been reduced or eliminated.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	510	789	1065
Forb	39	67	95
Shrub/Vine	6	27	50
Moss	6	13	22
Total	**561**	**896**	**1232**

Figure 9. 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

Community 1.3
Excessive Litter

This plant community develops after an extended period of 10 or more years of non-use by herbivores and exclusion of fire. Non-native grasses, such as Kentucky bluegrass, crested wheatgrass, and smooth bromegrass tend to invade and may dominate this plant community. Other grasses present include prairie sandreed, needleandthread, prairie junegrass, western wheatgrass, and green needlegrass. The common forbs include sweetclover, green sagewort, cudweed sagewort, western salsify and western ragweed. Western snowberry and/or silver sagebrush, and prairie rose are the principal shrubs and may increase in density and cover. Litter buildup reduces plant vigor and density, and native seedling recruitment declines. Due to a lack of tiller stimulation and sunlight, native bunchgrasses typically develop dead centers and native rhizomatous grasses are limited to small colonies. This plant community is dispersed throughout the pasture, encircling spot grazed areas, and areas distant from water sources. This is a typical pattern found in properly stocked pastures grazed season-long. This plant community is resistant to change without prescribed grazing and/or fire. The combination of both grazing and fire is most effective in moving this plant community towards the Reference Plant Community. Soil erosion is low. Runoff is similar to the Reference Plant Community. Once this plant community is reached, time and external resources will be needed to see any immediate recovery in diversity.

Table 7. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1211	1973	2718
Forb	241	308	392
Shrub/Vine	118	185	252
Total	**1570**	**2466**	**3362**

Figure 11. 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

Pathway 1.1a
Community 1.1 to 1.2

Heavy, continuous grazing or continuous seasonal (spring) grazing will convert the plant community to the Threadleaf Sedge/Blue Grama Plant Community.

Pathway 1.2a
Community 1.2 to 1.1

Prescribed grazing that includes changing season of use and allowing adequate recovery periods to enhance cool season grasses will lead this plant community back to the Prairie Sandreed/Bluestem Plant Community.

Conservation practices

Prescribed Grazing

Pathway 1.2b
Community 1.2 to 1.3

Non-use (rest) and exclusion of fire over an extended period of time will move this plant community to the Excessive Litter Plant Community. This shift may take considerably longer than the corresponding transition from the Reference Plant Community, depending on how much residual cool-season mid-grasses are present upon initiation of non-use or fire exclusion.

State 2
Club Moss

The State narrative is under development.

Community 2.1
Club Moss

Grasses and grass-like plants include prairie sandreed, western wheatgrass, needleandthread, blue grama, upland sedges and prairie junegrass. Forbs commonly found in this plant community include green sagewort and hairy goldaster. When compared to the Prairie Sandreed/Bluestem Plant Community, sedges, blue grama and club moss have increased, while prairie sandreed, big bluestem and sand bluestem have decreased. This plant community typically occurs in the western portion of MLRA 54. A dense sod of club moss dominates this plant community. Club moss occupies bare soil areas within deteriorated or disturbed higher successional plant communities due to long-term repeated disturbances. Club moss cover is often 25% or greater. Club moss creates a more arid microclimate, resulting in extreme competition for available moisture. Initial runoff rates are low but then increase as clubmoss becomes saturated. Once clubmoss has been saturated then runoff increases and infiltration decreases as compared Reference Plant Community. Vigor and production of other species is reduced dramatically.

Table 8. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	392	551	824
Moss	28	50	73
Forb	28	50	73
Shrub/Vine	–	20	39
Total	**448**	**671**	**1009**

Figure 13. 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

Annual/Pionner

The State narrative is under development.

Community 3.1
Annual/Pioneer Perennial

This plant community develops under severe disturbance and/or excessive defoliation. This can result from heavy livestock or wildlife concentration, and cropping abandonment (go-back land). The dominant vegetation includes pioneer annual grasses, forbs, invaders, and early successional biennial and perennial species. Grasses may include red threeawn, smooth bromegrass, crested wheatgrass, annual brome, needleandthread, prairie junegrass, sand dropseed, sandbur, Scribner's Panicum and western wheatgrass. The dominant forbs include curlycup gumweed, marestail, salsify, kochia, field bindweed, thistles, western ragweed, pussytoes, prostrate verbena and other early successional species. Shrubs that may be present include prairie rose, fringed sagewort and broom snakeweed. Plant species from adjacent ecological sites may become minor components of this plant community. The community also is susceptible to invasion of non-native species due to severe soil disturbances and relatively high percent of bare ground. Many annual and perennial forbs, including non-native species, have invaded the site. This plant community is resistant to change, as long as soil disturbance or severe vegetation defoliation persists, thus holding back secondary plant succession. Soil erosion is potentially high in this vegetation state. Significant economic inputs, management and time would be required to move this plant community toward a higher successional stage and a more productive plant community. Secondary succession is highly variable, depending upon availability and diversity of a viable seed bank of higher successional species within the existing plant community and neighboring plant communities. This plant community can be renovated to improve the production capability, but management changes would be needed to maintain the new plant community.

State 4
Invaded State

This state is the result of invasion and dominance of exotic cool-season grasses (e.g., Kentucky bluegrass, crested wheatgrass and smooth brome). This state is characterized by exotic cool-season grasses and an increasing thatch layer that, if invaded with Kentucky bluegrass, effectively blocks introduction of other plants into the system. Once the state is well established, single disturbance events such as high-intensity fires or severe grazing, will not result in more than a very short-term reduction of exotic cool-season grasses. These events may reduce the dominance of the exotic cool-season grasses, but due to the resilience of the exotic there is no opportunity for the native species to establish and dominate before the exotics rebound and again dominate the system.

Characteristics and indicators. To Be Added

Resilience management. To Be Added

Community 4.1
Exotic Cool-Season Grasses/Shrubs

This plant community phase is characterized by dominance of exotic cool-season grasses with remnant amounts (<5%) of native warm- (e.g., blue grama, prairie sandreed, sand dropseed) and cool-season grasses (e.g., needlegrasses, western wheatgrass, prairie Junegrass) and forbs (e.g., blazing star, purple prairie clover, prairie coneflower). The opportunity for high-intensity spring burns is severely reduced by early green-up due to increased moisture and humidity at the soil surface. Grazing pressure alone cannot cause a reduction in exotic grass dominance. Production is limited to the exotic species. Infiltration continues to decrease and runoff increases, energy capture into the system is restricted to early season low producing species. Nutrient cycling is limited by root depth and structure of the dominant species.

Resilience management. To Be Added

Dominant plant species

- Kentucky bluegrass (*Poa pratensis*), grass
- crested wheatgrass (*Agropyron cristatum*), grass
- smooth brome (*Bromus inermis*), grass

State 5
Go-Back State

This state is the result of severe soil disturbance such as cropping, recreational activity, or concentrated livestock activity for a prolonged time period. Following cessation of disturbances, the resulting plant community is dominated by early pioneer annual and perennial plant species. The composition and production of this state is highly variable.

Characteristics and indicators. To Be Added

Resilience management. To Be Added

Community 5.1
Annual/Pioneer Perennial Exotics

This plant community is characterized by a dominance of early pioneer annual and perennial plant species. Plant species composition and production is highly variable.

Resilience management. To Be Added

Transition T1
State 1 to 2

Heavy, continuous grazing may cause further deterioration resulting in a shift to the Club Moss Plant Community.

Transition T3
State 2 to 3

Excessive defoliation (i.e., areas of heavy animal concentration) or cropped go-back land with continuous grazing will convert the plant community to the Annual/Pioneer Perennial Plant Community.

Restoration pathway R5A
State 5 to 4

This restoration pathway may be initiated when attempts to reseed abandoned cropland fails and exotic cool-season species or other introduced species dominate the system.

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**			269–673	
	prairie sandreed	CALO	*Calamovilfa longifolia*	269–673	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–135	–
2	**Bluestem**			269–538	
	big bluestem	ANGE	*Andropogon gerardii*	135–538	–
	sand bluestem	ANHA	*Andropogon hallii*	135–538	–
3	**Needlegrasses**			135–242	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	135–242	–
	green needlegrass	NAVI4	*Nassella viridula*	54–135	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–81	–
4	**Grama**			135–215	

	blue grama	BOGR2	*Bouteloua gracilis*	135–215	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–135	–
5	**Other Native Grasses**			135–404	
	western wheatgrass	PASM	*Pascopyrum smithii*	81–161	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–135	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	27–54	–
	Grass, perennial	2GP	*Grass, perennial*	0–54	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	27–54	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	27–54	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	27–54	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	0–54	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–27	–
6	**Grass-Likes**			108–188	
	threadleaf sedge	CAFI	*Carex filifolia*	81–161	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	54–81	–
	Pennsylvania sedge	CAPE6	*Carex pensylvanica*	0–27	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–27	–
Forb					
8	**Forbs**			135–269	
	scurfpea	PSORA2	*Psoralidium*	27–54	–
	goldenrod	SOLID	*Solidago*	27–54	–
	tarragon	ARDR4	*Artemisia dracunculus*	27–54	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	27–54	–
	prairie clover	DALEA	*Dalea*	27–54	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	27–54	–
	blazing star	LIATR	*Liatris*	27–54	–
	beardtongue	PENST	*Penstemon*	27–54	–
	spiny phlox	PHHO	*Phlox hoodii*	0–27	–
	cinquefoil	POTEN	*Potentilla*	0–27	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	0–27	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–27	–
	Forb, perennial	2FP	*Forb, perennial*	0–27	–
	common yarrow	ACMI2	*Achillea millefolium*	27	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–27	–
	sanddune wallflower	ERCAC	*Erysimum capitatum var. capitatum*	27	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	27	–
	groundplum milkvetch	ASCR2	*Astragalus crassicarpus*	27	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	0–27	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–27	–
	spiderwort	TRADE	*Tradescantia*	27	–
	American vetch	VIAM	*Vicia americana*	0–27	–
	upright prairie	RACO3	*Ratibida columnifera*	27	–

	coneflower				
Shrub/Vine					
9	**Shrubs**			54–135	
	leadplant	AMCA6	*Amorpha canescens*	54–81	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–81	–
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	0–54	–
	silver sagebrush	ARCA13	*Artemisia cana*	0–54	–
	prairie sagewort	ARFR4	*Artemisia frigida*	27–54	–
	pricklypear	OPUNT	*Opuntia*	0–27	–
	rose	ROSA5	*Rosa*	27	–
	soapweed yucca	YUGL	*Yucca glauca*	0–27	–
Moss					
10	**Cryptogams**			0–27	
	lesser spikemoss	SEDE2	*Selaginella densa*	0–27	–

Table 10. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				18–45	
	prairie sandreed	CALO	*Calamovilfa longifolia*	18–45	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–27	–
3	**Needlegrasses**			18–90	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	18–90	–
4	**Grama**			135–224	
	blue grama	BOGR2	*Bouteloua gracilis*	135–224	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–45	–
5	**Other Native Grasses**			45–72	
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	45–72	–
	western wheatgrass	PASM	*Pascopyrum smithii*	45–72	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	18–45	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	18–45	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	18–27	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–9	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	0–9	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–9	–
	Grass, perennial	2GP	*Grass, perennial*	0–9	–
6	**Grass-Likes**			179–296	
	threadleaf sedge	CAFI	*Carex filifolia*	135–296	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	45–63	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	9–27	–
7	**Non-Native Grasses**			0–18	
	crested wheatgrass	AGCR	*Agropyron cristatum*	0–18	–

	smooth brome	BRIN2	*Bromus inermis*	0–18	–
	cheatgrass	BRTE	*Bromus tectorum*	0–18	–
	bluegrass	POA	*Poa*	0–18	–
Forb					
8	**Forbs**			45–90	
	tarragon	ARDR4	*Artemisia dracunculus*	27–45	–
	sweetclover	MELIL	*Melilotus*	9–45	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	27–36	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	18–27	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	18–27	–
	Canadian horseweed	COCA5	*Conyza canadensis*	9–27	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	9–27	–
	scurfpea	PSORA2	*Psoralidium*	18–27	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	18–27	–
	common dandelion	TAOF	*Taraxacum officinale*	18–27	–
	yellow salsify	TRDU	*Tragopogon dubius*	9–18	–
	common yarrow	ACMI2	*Achillea millefolium*	9–18	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	9–18	–
	common sunflower	HEAN3	*Helianthus annuus*	9–18	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	9–18	–
	pussytoes	ANTEN	*Antennaria*	9–18	–
	Forb, annual	2FA	*Forb, annual*	9–18	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	9–18	–
	Rocky Mountain beeplant	CLSE	*Cleome serrulata*	9–18	–
	Forb, perennial	2FP	*Forb, perennial*	0–9	–
	spiny phlox	PHHO	*Phlox hoodii*	9	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	9	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–9	–
	goldenrod	SOLID	*Solidago*	9	–
Shrub/Vine					
9	**Shrubs**			9–45	
	prairie sagewort	ARFR4	*Artemisia frigida*	27–54	–
	pricklypear	OPUNT	*Opuntia*	9–27	–
	soapweed yucca	YUGL	*Yucca glauca*	9–27	–
	rose	ROSA5	*Rosa*	9–18	–
	creeping juniper	JUHO2	*Juniperus horizontalis*	9–18	–
	silver sagebrush	ARCA13	*Artemisia cana*	0–18	–
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	0–9	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–9	–
Moss					
10	**Cryptogams**			9–18	
	lesser spikemoss	SEDE2	*Selaginella densa*	9–18	–

Table 11. Community 1.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				0–74	
	prairie sandreed	CALO	*Calamovilfa longifolia*	0–74	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–49	–
2	**Bluestem**			0–49	
	big bluestem	ANGE	*Andropogon gerardii*	0–49	–
	sand bluestem	ANHA	*Andropogon hallii*	0–25	–
3	**Needlegrasses**			49–99	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	49–74	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–49	–
	green needlegrass	NAVI4	*Nassella viridula*	25–49	–
4	**Grama**			0–49	
	blue grama	BOGR2	*Bouteloua gracilis*	0–49	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–25	–
5	**Other Native Grasses**			49–123	
	prairie Junegrass	KOMA	*Koeleria macrantha*	25–49	–
	western wheatgrass	PASM	*Pascopyrum smithii*	25–49	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	25	–
	Grass, perennial	2GP	*Grass, perennial*	0–25	–
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	0–25	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–25	–
6	**Grass-Likes**			49–99	
	threadleaf sedge	CAFI	*Carex filifolia*	49–99	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	0–25	–
	Pennsylvania sedge	CAPE6	*Carex pensylvanica*	0–25	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–25	–
7	**Non-Native Grasses**			863–1356	
	crested wheatgrass	AGCR	*Agropyron cristatum*	616–1356	–
	smooth brome	BRIN2	*Bromus inermis*	616–1356	–
	bluegrass	POA	*Poa*	616–1356	–
	cheatgrass	BRTE	*Bromus tectorum*	247–370	–
Forb					
8	**Forbs**			247–370	
	sweetclover	MELIL	*Melilotus*	0–247	–
	tarragon	ARDR4	*Artemisia dracunculus*	49–74	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	25–49	–
	Forb, annual	2FA	*Forb, annual*	25–49	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	25–49	–
	common sunflower	HEAN3	*Helianthus annuus*	25–49	–

	upright prairie coneflower	RACO3	*Ratibida columnifera*	25–49	–
	goldenrod	SOLID	*Solidago*	25–49	–
	common dandelion	TAOF	*Taraxacum officinale*	25–49	–
	yellow salsify	TRDU	*Tragopogon dubius*	25–49	–
	American vetch	VIAM	*Vicia americana*	0–25	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	0–25	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	0–25	–
	beardtongue	PENST	*Penstemon*	0–25	–
	scurfpea	PSORA2	*Psoralidium*	0–25	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	0–25	–
	blazing star	LIATR	*Liatris*	0–25	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–25	–
	pussytoes	ANTEN	*Antennaria*	0–25	–
	Forb, perennial	2FP	*Forb, perennial*	0–25	–
	common yarrow	ACMI2	*Achillea millefolium*	0–25	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	0–25	–
	Rocky Mountain beeplant	CLSE	*Cleome serrulata*	0–25	–
	Canadian horseweed	COCA5	*Conyza canadensis*	0–25	–
	prairie clover	DALEA	*Dalea*	0–25	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–25	–
	sanddune wallflower	ERCAC	*Erysimum capitatum var. capitatum*	0–25	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	0–25	–
Shrub/Vine					
9	**Shrubs**			123–247	
	western snowberry	SYOC	*Symphoricarpos occidentalis*	99–148	–
	silver sagebrush	ARCA13	*Artemisia cana*	99–148	–
	prairie sagewort	ARFR4	*Artemisia frigida*	25–49	–
	creeping juniper	JUHO2	*Juniperus horizontalis*	0–25	–
	pricklypear	OPUNT	*Opuntia*	0–25	–
	rose	ROSA5	*Rosa*	0–25	–
	soapweed yucca	YUGL	*Yucca glauca*	25	–
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	0–25	–
	leadplant	AMCA6	*Amorpha canescens*	0–25	–

Table 12. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1				13–34	
	prairie sandreed	CALO	*Calamovilfa longifolia*	13–34	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–20	–
3	**Needlegrass**			13–67	
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	13–67	–
4	**Grama**			67–135	

	blue grama	BOGR2	*Bouteloua gracilis*	67–135	–
	hairy grama	BOHI2	*Bouteloua hirsuta*	0–34	–
5	**Other Native Grasses**			34–54	
	Fendler threeawn	ARPUL	*Aristida purpurea var. longiseta*	34–54	–
	western wheatgrass	PASM	*Pascopyrum smithii*	34–54	–
	sand dropseed	SPCR	*Sporobolus cryptandrus*	13–34	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	13–34	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	13–20	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–7	–
	plains muhly	MUCU3	*Muhlenbergia cuspidata*	0–7	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–7	–
	Grass, perennial	2GP	*Grass, perennial*	0–7	–
6	**Grass-Likes**			135–202	
	threadleaf sedge	CAFI	*Carex filifolia*	101–202	–
	sun sedge	CAINH2	*Carex inops ssp. heliophila*	34–47	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	7–20	–
7	**Non-Native Grasses**			0–13	
	crested wheatgrass	AGCR	*Agropyron cristatum*	0–13	–
	smooth brome	BRIN2	*Bromus inermis*	0–13	–
	cheatgrass	BRTE	*Bromus tectorum*	0–13	–
	bluegrass	POA	*Poa*	0–13	–
Forb					
8	**Forbs**			34–67	
	tarragon	ARDR4	*Artemisia dracunculus*	20–34	–
	sweetclover	MELIL	*Melilotus*	7–34	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	20–27	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	13–20	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	13–20	–
	Canadian horseweed	COCA5	*Conyza canadensis*	7–20	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	7–20	–
	scurfpea	PSORA2	*Psoralidium*	13–20	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	13–20	–
	common dandelion	TAOF	*Taraxacum officinale*	13–20	–
	yellow salsify	TRDU	*Tragopogon dubius*	7–13	–
	common yarrow	ACMI2	*Achillea millefolium*	7–13	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	7–13	–
	common sunflower	HEAN3	*Helianthus annuus*	7–13	–
	purple locoweed	OXLA3	*Oxytropis lambertii*	7–13	–
	pussytoes	ANTEN	*Antennaria*	7–13	–
	Forb, annual	2FA	*Forb, annual*	7–13	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	7–13	–
	Rocky Mountain	CLSE	*Cleome serrulata*	7–13	

	Rocky Mountain beeplant	CLSE	*Cleome serrulata*	7–13	–
	Forb, perennial	2FP	*Forb, perennial*	0–7	–
	spiny phlox	PHHO	*Phlox hoodii*	7	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	7	–
	blacksamson echinacea	ECAN2	*Echinacea angustifolia*	0–7	–
	goldenrod	SOLID	*Solidago*	7	–
Shrub/Vine					
9	**Shrubs**			7–34	
	prairie sagewort	ARFR4	*Artemisia frigida*	20–40	–
	pricklypear	OPUNT	*Opuntia*	7–20	–
	soapweed yucca	YUGL	*Yucca glauca*	7–20	–
	rose	ROSA5	*Rosa*	7–13	–
	creeping juniper	JUHO2	*Juniperus horizontalis*	7–13	–
	silver sagebrush	ARCA13	*Artemisia cana*	0–13	–
	Subshrub (<.5m)	2SUBS	*Subshrub (<.5m)*	0–7	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–7	–
Moss					
10	**Cryptogams**			34–67	
	lesser spikemoss	SEDE2	*Selaginella densa*	34–67	–

Hydrological functions

Water is the principal factor limiting production on this site. The soils are dominated by hydrologic group B, and localized areas in hydrologic group C. Infiltration varies from moderate to moderately rapid and runoff potential varies from very low to low for this site 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. Greatest potential for reduced infiltration and high runoff are areas with ground cover of less than 50% (refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves).

Recreational uses

This site provides hunting opportunities for upland game species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

Wood products

No appreciable wood products are present on the site.

Other products

Seed harvest of native plant species can provide additional income on this site.

Inventory data references

Information presented here has been derived from NRCS clipping and other inventory data. Also, field knowledge of range-trained personnel was used. All descriptions were peer reviewed and/or field tested by various private, state and federal agency specialists. Those involved in developing this site description include: Dennis Froemke, NRCS Range Management Specialist; Dean Chamrad, NRCS State Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; L. Michael Stirling, NRCS Range Management Specialist; Stan Boltz, NRCS

Range Management Specialist; Josh Saunders, NRCS Range Management Specialist; Darrell Vanderbusch, NRCS Resource Soil Scientist; Michael D. Brand, State Land Dept. Director Surface Management; David Dewald, NRCS State Biologist; and Brad Podoll, NRCS Biologist.
Data Source Number of Records Sample Period State County
SCS-RANGE-417 9 1978 – 1979 ND Adams, Grant, Hettinger
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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.

Author(s)/participant(s)	J. Printz, S. Boltz, R. Kilian, D. Froemke, M. Rasmusson
Contact for lead author	jeff.printz@nd.usda.gov
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.

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2. **Presence of water flow patterns:** Barely observable.

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3. **Number and height of erosional pedestals or terracettes:** Essentially non-existent.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is 15 to 20%. Bare ground will occur as small areas less than 2 inches in diameter.

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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.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Little to no plant litter movement. Plant litter remains in place and is not moved by erosional forces.

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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 80% or greater of soil surface and maintains soil surface integrity. Stability class anticipated to be 5 or greater.

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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.

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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. Infiltration rate is moderate to moderately rapid.

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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: Tall, warm-season rhizomatous grasses >

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

    Other: mid, warm-season bunchgrasses = short, warm-season grasses = grass-likes > shrubs.

    Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth bromegrass 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 = 2400 lbs/ac with a range of 1600 lbs/ac to 3400 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, Kentucky bluegrass, smooth bromegrass

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