

Ecological site R055BY063ND Shallow Gravel

Accessed: 05/07/2024

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.

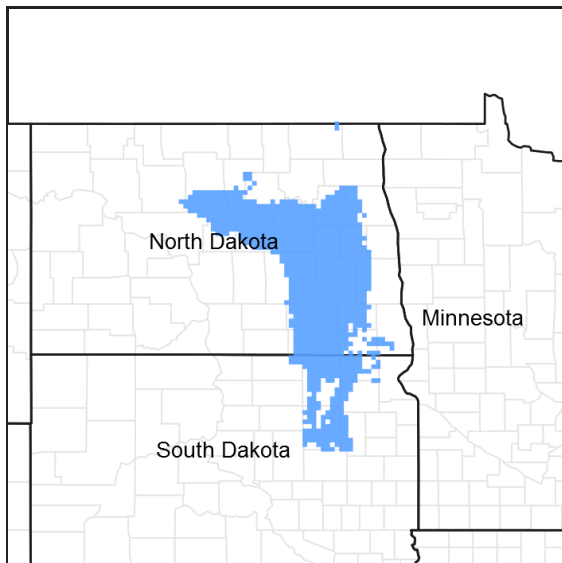


Figure 1. Mapped extent

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: 42a – Missouri Coteau; 42b – Collapsed Glacial Outwash; 42c – Missouri Coteau Slope; 42d – Northern Missouri Coteau; 42f – Southern Missouri Coteau Slope; 42g – Ponca Plains; and 42h – Southern River Breaks.

Associated sites

R055BY058ND	Limy Subirrigated
R055BY061ND	Sands
R055BY064ND	Loamy
R055BY069ND	Very Shallow

Similar sites

R055BY061ND	Sands (R055BY061ND) – Sands [more big bluestem and prairie sandreed; more production]
R055BY064ND	Loamy (R055BY064ND) – Loamy [more big bluestem and western wheatgrass; more production]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Hesperostipa comata</i> (2) <i>Nassella viridula</i>

Physiographic features

This site occurs on gently undulating to rolling and steep uplands.

Table 2. Representative physiographic features

Landforms	(1) Till plain (2) Terrace (3) Lake plain
Elevation	305–640 m
Slope	3–15%
Water table depth	203 cm
Aspect	Aspect is not a significant factor

Climatic features

MLRA 55B 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 16 to 21 inches per year. The normal average annual temperature is about 41.5° F. January is the coldest month with average temperatures ranging from about 2° F (Maddock, ND) to about 11° F (Mellette, SD). July is the warmest month with temperatures averaging from about 67° F (Maddock, ND) to about 73° F (Redfield 2 NE, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 64° F. This large annual range attests to the continental nature of this MLRA's climate. Winds 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)	140 days
Freeze-free period (average)	161 days
Precipitation total (average)	533 mm

Influencing water features

No significant water features influence this site.

Soil features

The soils on this site are shallow to layers high in gravel. This abrupt change in texture and structure often responds

like a restrictive layer even though roots can penetrate into the gravel layers. The high amounts of gravels in these layers are also very droughty and limit plant production. These soils are typically somewhat excessively drained and formed in loamy or gravelly sediments derived from glacial outwash. Surface soil textures range from sandy loam to loam. Saturated hydraulic conductivity is typically moderate in the upper layers to very rapid in the underlying gravel layers, and available water capacity is low. This site is on nearly level to strongly sloping outwash plains, terraces and till plains. Slope ranges from 3 to 15 percent.

Access Web Soil Survey (<http://websoilsurvey.nrcs.usda.gov/app/>) for specific local soils information.

Table 4. Representative soil features

Surface texture	(1) Loam (2) Fine sandy loam (3) Sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat excessively drained
Permeability class	Moderate to very rapid
Soil depth	203 cm
Surface fragment cover <=3"	0–15%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–12.7 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	10–60%
Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large herding herbivores and frequent fire. Changes will occur in the plant communities due to weather fluctuations and/or management actions. Under adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable conditions the site can return to a plant community resembling the Reference State plant community phases. Interpretations for this site are based on the Reference State. The Reference State 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. Community phases, community pathways, states, transitions, thresholds and restoration pathways have been determined through similar studies and experience.

The natural disturbance regime consisted of frequent fires caused both by natural and Native American ignition sources. These fires occurred during any season of the year, but were concentrated in the spring and late summer or early fall. Lightning fires occurred most frequently in July and August while fires started by Native Americans occurred in April, September and October. Large ungulate grazing was heavy and occurred often, but usually for short durations. Grazing may have been severe when occurring after a fire event. The grazing and fire interaction especially when coupled with drought events, set up the dynamics discussed and displayed in the following state

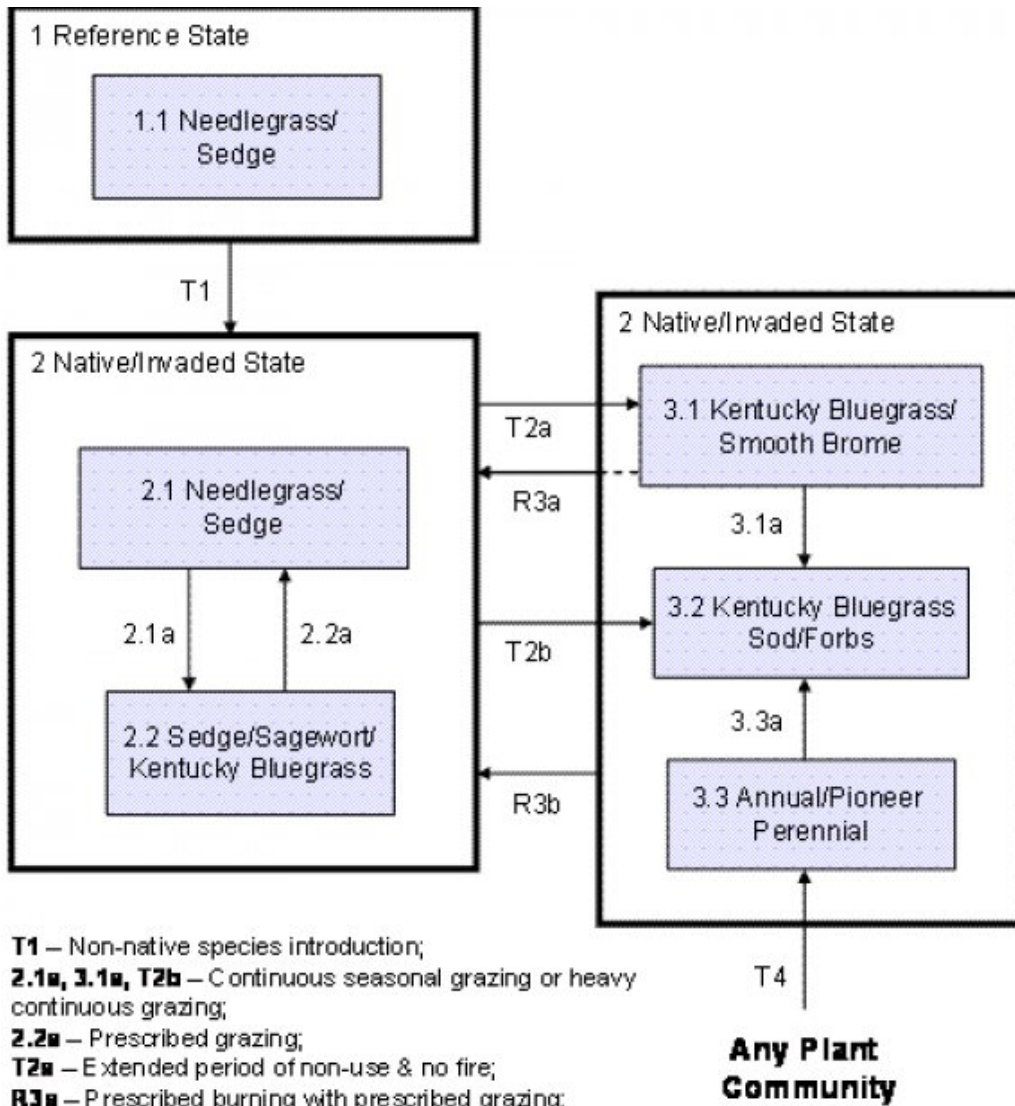
and transition diagram and descriptions.

This ecological site has been grazed by domestic livestock since introduced into the area. The introduction of domestic livestock and the use of fencing and reliable water sources have radically changed the disturbance regime of this site.

Heavy continuous grazing and/or continuous seasonal (spring) grazing, without adequate recovery periods following each grazing occurrence, coupled with the introduction of non-native invasive species causes this site to depart from the Reference State. As this site deteriorates, species such as blue grama, sand dropseed, red threeawn and sedge will increase. Grasses such as needleandthread, green needlegrass, western wheatgrass and plains muhly will decrease in frequency and production. Perennial forbs increase under poor management, and if management persists, annual forbs and shrubs will also increase as grasses decrease. This site is extremely responsive to high moisture years when additional moisture is received during the growing season. The associated coarse textured soils have low moisture holding capability, which generally limits plant growth. With additional moisture, the interpretive plant community can significantly increase its production when compared to the production of a normal year.

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

This state represents the natural range of variability that dominated the dynamics of this ecological site. This state was dominated by native cool-season bunchgrasses. The primary disturbance mechanisms for this site in the reference condition include frequent fire and grazing by large herding ungulates. Timing of fires and grazing coupled with weather events dictate the dynamics that occur within the natural range of variability. Mid and tall stature grass species can decline and a corresponding increase in short stature warm-season grasses and cool-season grass-like species will occur.

Community 1.1 Needlegrass/Sedge Plant Community

This community phase was the most dominant both temporally and spatially. The prevailing climate and weather patterns favor the development of this community phase dominated by mid and tall cool-season bunchgrass such as needleandthread and green needlegrass. Other grass and grass-like species occurring include threadleaf sedge, porcupine grass, plains muhly, blue grama, western wheatgrass, little bluestem, prairie dropseed, prairie junegrass, sand dropseed and red threeawn. The vegetation consists of about 85 to 95 percent grass and grass-like species, 2 to 10 percent forbs, and 2 to 5 percent shrubs. A variety of leguminous and non-leguminous perennial forbs are present in minor amounts. This is the interpretive plant community phase and is described in the "Plant Community Composition and Group Annual Production" portion of this ecological site description. This is a naturally nitrogen deficient plant community.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1154	1927	2471
Forb	39	128	219
Shrub/Vine	39	75	112
Total	1232	2130	2802

**Figure 5. Plant community growth curve (percent production by month).
ND5502, Central Black Glaciated Plains, cool-season dominant, warm-season sub-dominant.. Cool-season dominant, warm-season sub-dominant..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	7	23	42	15	5	4	1	0	0

State 2 Native/Invaded

This state is very similar to the Reference State. The invasion of introduced cool-season sodgrasses has altered the natural range of variability for this ecological site. This state still has a strong component of cool-season bunchgrass species, but invasive introduced cool-season sodgrasses are now present in all community phases of this state. The primary disturbance mechanisms for this state include grazing by domestic livestock and infrequent fires. Timing of fires and grazing coupled with weather events dictate the dynamics that occur within this state. The cool season native grass can decline and an increase in introduced sod grasses will occur. Many times, this state appears as a mosaic of community phases caused primarily by continuous season-long grazing.

Community 2.1 Needlegrass/Sedge

This community phase most closely resembles the Reference State in appearance and ecological functions (e.g., hydrologic, biotic and soil/site stability). The cool-season dominated community is maintained with grazing systems that allow for adequate recovery periods following grazing events, and potentially the combination of grazing and prescribed burning which closely mimics the natural disturbance regime. This community phase closely resembles the Reference State community phase 1.1 (see narrative for 1.1 Needlegrass/Sedge). The basic difference between this community phase and 1.1 of the Reference State is the presence of minor amounts of introduced cool-season grasses and forbs. This is likely a naturally nitrogen deficient plant community, but perhaps less so than the Reference State. A change in the nutrient cycle on this ecological site possibly due to the introduction of non-native species may be a causative factor leading to the eventual dominance of cool-season introduced grasses in the Invaded State.

**Figure 6. Plant community growth curve (percent production by month).
ND5502, Central Black Glaciated Plains, cool-season dominant, warm-season sub-dominant.. Cool-season dominant, warm-season sub-dominant..**

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	7	23	42	15	5	4	1	0	0

Community 2.2 Sedge/Sagewort/Kentucky Bluegrass

Grazing pressure reduces the mid/tall, less grazing tolerant species, while the shorter more grazing tolerant species increase. Litter amounts are reduced, and energy capture shifts to slightly earlier in the growing season due to a decline in the later maturing native grass component and an increase in the earlier maturing grass-likes and non-native grasses. Kentucky bluegrass increases and may approach dominance in this community. Vegetation consists of about 80 to 90 percent grass and grass-like species, 5 to 15 percent forbs, and 2 to 5 percent shrubs. Sedge, cudweed sagewort, green sagewort, and fringed sagewort are the dominant species in the early stages of this community phase. Significant grass species include Kentucky bluegrass, needleandthread, red threeawn and sand

dropseed. Other grasses present include blue grama, western wheatgrass, green needlegrass, and prairie junegrass. The common forbs include cudweed sagewort, goldenrod, green sagewort, western salsify, heath aster, and scurfpea. Western snowberry, fringed sagewort, and rose are the principal shrubs. This community phase is often dispersed throughout the pasture, in an overgrazed/undergrazed pattern, typically referred to as patch grazing. Some areas (overgrazed) will exhibit the impacts of heavy use, while other areas (undergrazed) will have a build-up of litter and a high amount of plant decadence. This is a typical pattern found in properly stocked pastures grazed season-long. In the undergrazed patches, 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. In the overgrazed patches, plant vigor is reduced and the competitive advantage goes towards the grazing tolerant short statured species such as Kentucky bluegrass and sedge. This community phase is approaching the threshold which would readily lead to the Invaded State. If management is significantly altered, this community phase can still be reverted back to the Needlegrass/Sedge community. Grazing management that allows for adequate recovery periods will tend to restore the ecological functions of this site. Fire can play a role in reducing the introduced cool-season species. The combination of grazing and fire may be the most effective in moving this community phase towards a community resembling the Reference State. Soil erosion is low. Infiltration is reduced, while runoff is increased compared to the Reference State.

Figure 7. Plant community growth curve (percent production by month). ND5501, Central Black Glaciated Plains, cool-season dominant. Cool-season 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

Pathway 2.1a Community 2.1 to 2.2

This community pathway is triggered by a change in the natural disturbance regime, most often caused by either heavy, continuous season-long grazing or continuous seasonal grazing without adequate recovery periods (grazing at the same season of year for extended periods during the active growing season of the dominant native grasses). Along this pathway, the timing of energy capture shifts from early to mid summer to spring and early summer. The change in plant functional and structural groups and the composition and distribution of the vegetation causes a decrease in production and an increase in runoff with a corresponding decrease in infiltration. Nutrient cycling is restricted as the rooting depth of the vegetation decreases with the change in functional and structural groups. Plant community diversity is reduced with a loss of some native forbs and minor grasses.

Pathway 2.2a Community 2.2 to 2.1

This community pathway is initiated by implementation of prescribed grazing management which includes adequate recovery periods following each grazing event, and stocking levels which match the available resources. If properly implemented, this will shift the competitive advantage from the introduced cool-season species to the native cool-season bunchgrasses. The addition of prescribed burning may expedite this shift.

State 3 Invaded

This state is the result of invasion and dominance of introduced cool-season sodgrasses. This state is characterized by the dominance of Kentucky bluegrass and/or smooth brome and an increasing thatch layer that effectively blocks introduction of other plants into the system. Once the state is well established, even drastic events such as high intensity fires driven by high fuel loads of litter and thatch will not result in more than a very short term reduction of these two species. These events may reduce the dominance of the sodgrasses, but due to the large amount of rhizomes in the soil there is no opportunity for the native species to establish and dominate before the sodgrasses rebound and again dominate the system. This state also includes the Annual, Pioneer Perennial community phase which is highly variable depending on the disturbance which causes this transition (T4). Over time, the Annual, Pioneer Perennial community phase will likely become dominated by introduced cool-season grasses, and shift to the Kentucky Bluegrass community phase (3.2).

Community 3.1

Kentucky Bluegrass/Smooth Brome

This community phase is dominated by the cool-season sodgrasses including Kentucky bluegrass and smooth brome. Remnants of native cool- and warm-season grasses are still present, but greatly reduced. Vegetation consists of about 85 to 95 percent grass and grass-like species, 2 to 5 percent forbs, and 2 to 5 percent shrubs. Dominant grasses include Kentucky bluegrass and smooth brome. Significant forbs include cudweed sagewort, goldenrod, western yarrow, and green sagewort. Shrubs are essentially limited to fringed sagewort and western snowberry. Infiltration is reduced and runoff is increased when compared to the Reference State. Nutrient cycling is limited by the rooting depth of these species, the lack of leguminous forbs, and the alteration of the soil biotic community. Energy capture into the system is restricted to a short window provided by the early season species.

Figure 8. Plant community growth curve (percent production by month). ND5501, Central Black Glaciated Plains, cool-season dominant. Cool-season 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

Community 3.2

Kentucky Bluegrass Sod/Forbs

This community phase is dominated by Kentucky bluegrass with lesser amounts of sedge, and forbs such as cudweed sagewort, green sagewort, western yarrow, rush skeletonweed, and goldenrod. Fringed sagewort is also prevalent. Vegetation consists of about 75 to 90 percent grass and grass-like species, 5 to 15 percent forbs, and 5 to 10 percent shrubs. The longer this community phase exists the more resilient it becomes. Natural or management disturbances that reduce the cover of Kentucky bluegrass are very short lived due to the abundance of rhizomes of Kentucky bluegrass in the soil and the lack of propagules of other species present. Production is limited to the sod forming species. Energy capture into this system is limited to one early growing species. Runoff increases and is the highest of any plant community phase on this ecological site. Nutrient cycling is severely limited to the rooting depth of the Kentucky bluegrass and production is limited.

Community 3.3

Annual/Pioneer Perennial

The Annual, Pioneer Perennial community phase is highly variable depending on the level and duration of disturbance related to the T4 transitional pathway. In this MLRA, the most probable origin of this phase is secondary succession following cropland abandonment. This plant community will initially include a variety of annual forbs and grasses. Over time, the introduced cool-season perennial grasses will begin to establish on this site.

Pathway 3.1a

Community 3.1 to 3.2

This pathway is initiated by heavy continuous season-long grazing. The heavy continuous grazing favors those plants which can tolerate repeated defoliation (Kentucky bluegrass and sedges). Smooth brome will decrease with heavy use due to its elevated growth point. Grazing pressure will reduce litter cover resulting in elevated soil surface temperatures increasing evaporation rates and reducing biological activity.

Pathway 3.3a

Community 3.3 to 3.2

With grazing and time, the grazing tolerant Kentucky bluegrass will continue to increase leading to community phase 3.2. In the absence of grazing, this pathway will lead to a community phase resembling 3.1 with the primary difference being the lack of remnant native grass species.

Transition T1

State 1 to 2

This is the transition from the native cool-season grass dominated Reference State to a state that has been invaded by introduced cool-season grass species. When propagules of Kentucky bluegrass are present, this transition occurs as natural and/or management actions favor a decline in the composition of native cool-season bunchgrasses and an increase in cool-season sodgrasses. This transition is compounded by a change in the historic grazing and fire regime where native herbivores would follow periodic fires with grazing. This historic grazing/fire sequence has largely been replaced chronic season-long or heavy late season grazing. Complete rest from grazing and suppression of fire can also lead to this transition. The threshold between states is crossed when Kentucky bluegrass, smooth brome, and other introduced species become established on the site. These species typically are part of functional/structural groups that were not present in the Reference State.

Transition T4 State 1 to 3

This transition occurs with cessation of cropping practices being applied to any plant community phase on this ecological site.

Transition T4 State 2 to 3

This transition occurs with cessation of cropping practices being applied to any plant community phase on this ecological site.

Transition T4 State 2 to 3

This transition occurs with cessation of cropping practices being applied to any plant community phase on this ecological site.

Transition T2a State 2 to 3

Complete rest from grazing and elimination of fire are the two major contributors to this transition, especially when smooth brome is present. The opportunity for high intensity spring burns is severely reduced by early green up, and increased moisture and humidity at the soil surface. Plant litter accumulation tends to favor the more shade tolerant introduced grass species. The nutrient cycle is also impaired, and the result is typically a higher level of nitrogen which also favors the introduced species. Increasing plant litter decreases the amount of sunlight reaching plant crowns thereby shifting competitive advantage to shade tolerant introduced grass species. Studies indicate that soil biological activity is altered, and this shift apparently exploits the soil microclimate and encourages growth of the introduced grass species. Once the threshold is crossed, a change in grazing management alone cannot cause a reduction in sodgrass dominance. Preliminary studies would tend to indicate this threshold may exist when Kentucky bluegrass exceeds 30% of the plant community and native grasses represent less than 40% of the plant community composition.

Transition T2b State 2 to 3

Heavy continuous season-long grazing is the primary driver of this transition. The very grazing tolerant species have the competitive advantage during this transition. The opportunity for high intensity spring burns (which can serve to reduce the introduced cool-season species) is severely reduced by early green up and the lack of fuel. The nutrient cycle is impaired due to a shift from perennial native legumes to introduced biennial legumes and the lack of available carbon for soil biota due to accumulation in the surface layer root mat. These two factors result in reduced soil biological activity. Studies indicate that soil biological activity is altered, and this shift apparently exploits the soil microclimate and encourages growth of the introduced grass species. Once the threshold is crossed, a change in grazing management alone cannot cause a reduction in sodgrass dominance. Preliminary studies would tend to indicate this threshold may exist when Kentucky bluegrass exceeds 30% of the plant community and native grasses represent less than 40% of the plant community composition.

Restoration pathway R3a

State 3 to 2

This restoration pathway may be initiated with the combination of prescribed burning followed by high levels of prescribed grazing management. The success of this restoration pathway depends on the presence of a remnant population of native grasses in community phase 3.1. This remnant population may not be readily apparent without close inspection. The application of prescribed burning may be needed at relatively short intervals in the early phases of this restoration process. Some previous efforts have shown promise with early season prescribed burning; however, fall burning may also be effective under certain circumstances. Both prescribed grazing and prescribed burning are necessary to successfully initiate this restoration pathway.

Restoration pathway R3b

State 3 to 2

It may be possible using selected plant materials and agronomic practices to approach something very near the functioning of the Native/Invaded State (State 2). Application of chemical herbicides and the use of mechanical seeding methods using adapted varieties of the dominant native grasses are possible and can be successful. After establishment of the native grasses, management objectives must include the maintenance of those species, the associated reference state functions and continued treatment of the introduced sodgrasses.

Additional community tables

Table 6. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Needlegrass			213–958	
	needle and thread	HECOC8	<i>Hesperostipa comata</i> ssp. <i>comata</i>	426–745	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	43–213	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	0–106	–
2	Warm-season Grasses			43–319	
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	21–106	–
	plains muhly	MUCU3	<i>Muhlenbergia cuspidata</i>	21–106	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	0–64	–
	Fendler threeawn	ARPUL	<i>Aristida purpurea</i> var. <i>longiseta</i>	21–64	–
	prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	0–64	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–43	–
3	Other Native Grasses			43–213	
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	21–106	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–64	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	21–43	–
4	Grass-likes			106–319	
	threadleaf sedge	CAFI	<i>Carex filifolia</i>	43–213	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	43–170	–
Forb					
5	Forbs			43–213	
	goldenrod	SOLID	<i>Solidago</i>	21–64	–
	Forb. perennial	2FP	<i>Forb. perennial</i>	21–64	–

	prairie clover	DALEA	<i>Dalea</i>	21–64	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	21–43	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	21–43	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	21–43	–
	western yarrow	ACMIO	<i>Achillea millefolium var. occidentalis</i>	21–43	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	21–43	–
	blazing star	LIATR	<i>Liatris</i>	21–43	–
	lacy tansyaster	MAPI	<i>Machaeranthera pinnatifida</i>	21–43	–
	scurfpea	PSORA2	<i>Psoralegium</i>	21–43	–
	Forb, annual	2FA	<i>Forb, annual</i>	0–43	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	21–43	–
	scarlet globemallow	SPCO	<i>Sphaeralcea coccinea</i>	21–43	–
	white heath aster	SYER	<i>Symphotrichum ericoides</i>	21–43	–
	cutleaf anemone	PUPAM	<i>Pulsatilla patens ssp. multifida</i>	0–21	–
	spiny phlox	PHHO	<i>Phlox hoodii</i>	0–21	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–21	–
	onion	ALLIU	<i>Allium</i>	0–21	–
	pussytoes	ANTEN	<i>Antennaria</i>	0–21	–
	milkvetch	ASTRA	<i>Astragalus</i>	0–21	–
	blanketflower	GAAR	<i>Gaillardia aristata</i>	0–21	–
Shrub/Vine					
6	Shrubs			43–106	
	leadplant	AMCA6	<i>Amorpha canescens</i>	21–64	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	21–64	–
	rose	ROSA5	<i>Rosa</i>	21–64	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	0–21	–
	spiny star	ESVIV	<i>Escobaria vivipara var. vivipara</i>	0–21	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–21	–

Animal community

Animal Community – Wildlife Interpretations

Major Land Resource Area (MLRA) 55B lies within the Northern mixed-grass prairie ecosystem. Prior to European settlement, this area consisted of diverse grassland habitats interspersed with varying densities of depressional wetlands and limited woody riparian corridors. These habitats provided critical life cycle components for many of its users. Many species of grassland birds and herds of roaming bison, elk, and pronghorn were among the inhabitants. These species, as well as several small mammal and insect species, were the primary consumers linking the grassland resources to predators such as wolves, mountain lions, and grizzly bears as well as smaller carnivores such as coyotes, bobcats, foxes and raptors. In addition, a wide variety of small mammals, reptiles, amphibians and insects were adapted to this semi-arid climate.

Historically, the Northern mixed-grass prairie was a disturbance-driven ecosystem with fire, herbivory and climate functioning as the primary disturbance factors either singly or in combination. Following European settlement, widespread conversion to cropland, elimination of fire, and habitat fragmentation influenced species composition and abundance. Introduced and invasive species further impacted plant and animal communities. Bison were historically a keystone species but have been extirpated as a free-ranging herbivore. The loss of bison and fire as ecological drivers greatly influenced the character of the remaining native plant community and the habitats that

they provide. Fragmentation has reduced habitat quality for area-sensitive species.

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 group B. Infiltration varies from moderately slow to moderately rapid and runoff potential varies from negligible to high for this site depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75% ground cover have the greatest potential for high infiltration and lower runoff. An exception would be where shortgrasses and grass-like forms 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 and other federal/state agency clipping and 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: Stan Boltz, NRCS Range Management Specialist; Michael D. Brand, State Land Dept., Director Surface Management; David Dewald, NRCS State Biologist; Jody Forman, NRCS Range Management Specialist; Jeff Printz, NRCS State Range Management Specialist; Kevin Sedivec, Extension Rangeland Management Specialist; Shawn Dekeyser, North Dakota State University; Rob Self, The Nature Conservancy and Lee Voigt, NRCS Range Management Specialist.

There are 7 SCS-RANGE-417's collected from 1969-1975 in Stutsman County, ND.

Other references

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

(<http://www.hprcc.unl.edu/>)

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

(<http://www.wcc.nrcs.usda.gov/>)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (<http://nasis.nrcs.usda.gov>)

Contributors

Jeff Printz
Megan Baxter

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)	Jeff Printz, Stan Boltz, Lee Voigt, Jody Forman
Contact for lead author	Jeff.printz@nd.usda.gov 701-530-2080
Date	04/19/2012
Approved by	Jeff Printz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None.

2. **Presence of water flow patterns:** None.

3. **Number and height of erosional pedestals or terracettes:** None.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** 5 to 15%.

5. **Number of gullies and erosion associated with gullies:** None.

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

7. **Amount of litter movement (describe size and distance expected to travel):** Plant litter remains in place. Slight movement may be visible following intense thunderstorm events particularly after extended periods of below normal precipitation.

-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 or greater. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.
-
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/surface layer.
-
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Combination of shallow and deep rooted species (mid rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.
-
11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.
-
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 and short, cool-season bunchgrasses >>
- Sub-dominant: Grass-likes >
- Other: Mid warm-season bunchgrasses = forbs = short, warm-season grasses > shrubs
- Additional: Due to differing root structure and distribution, Kentucky bluegrass and smooth brome grass 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):** None.
-
14. **Average percent litter cover (%) and depth (in):** In contact with soil surface.
-
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 1900 lbs/ac air dry with a range of 1100 to 2500 lbs/acre air dry 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 brome grass

17. **Perennial plant reproductive capability:** All species exhibit high vigor relative to climatic conditions. Do not rate based solely on seed production. Perennial grasses should have vigorous rhizomes or tillers.
