USDA Natural Resources Conservation Service

Ecological site R055BY066ND
Thin Claypan

Accessed: 05/21/2024

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.

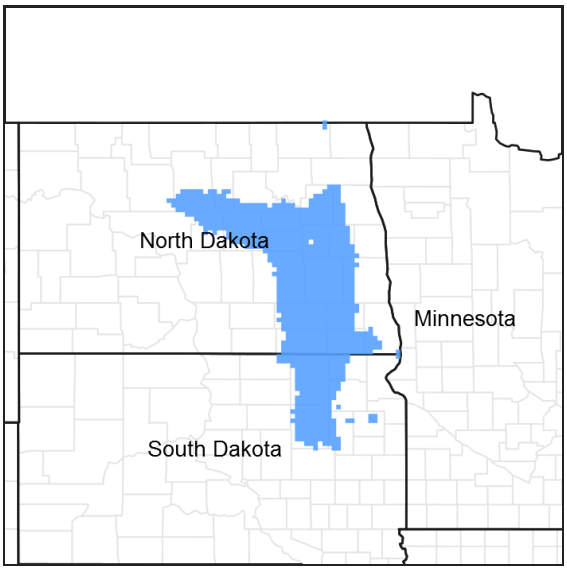


Figure 1. Mapped extent

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

R055BY056ND	**Clayey**
R055BY057ND	**Claypan**
R055BY064ND	**Loamy**

Similar sites

R055BY057ND	**Claypan** (R055BY057ND) – Claypan [more needlegrasses; less blue grama; higher production]

Table 1. Dominant plant species

Tree	Not specified

Shrub	Not specified
Herbaceous	(1) *Pascopyrum smithii* (2) *Bouteloua gracilis*

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
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare
Elevation	305–640 m
Slope	2–30%
Water table depth	91–203 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

Soil features

These are deep to very deep, moderately well and well drained, moderately coarse to fine textured soils. The thin surface layer is underlain by dense sodic subsoil. Saturated hydraulic conductivity is very slow and available water capacity is low to moderate. Salinity is moderate to strong at depths of less than 16 inches and sodicity is high. This

site is on nearly level to strongly sloping lake plains and till plains. Slope ranges from 0 to 15 percent. Wet surface compaction can occur with heavy traffic. Waterflow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers, and there is a high risk of rills and eventually gullies if vegetative cover is not adequate. Cryptobiotic crusts are present and a moderate pedestalling of plants occur.
These soils are mainly susceptible to water erosion. 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: FOTG – http://www.nrcs.usda.gov/technical/efotg/; Web Soil Survey – http://websoilsurvey.nrcs.gov/app/

Ecological dynamics

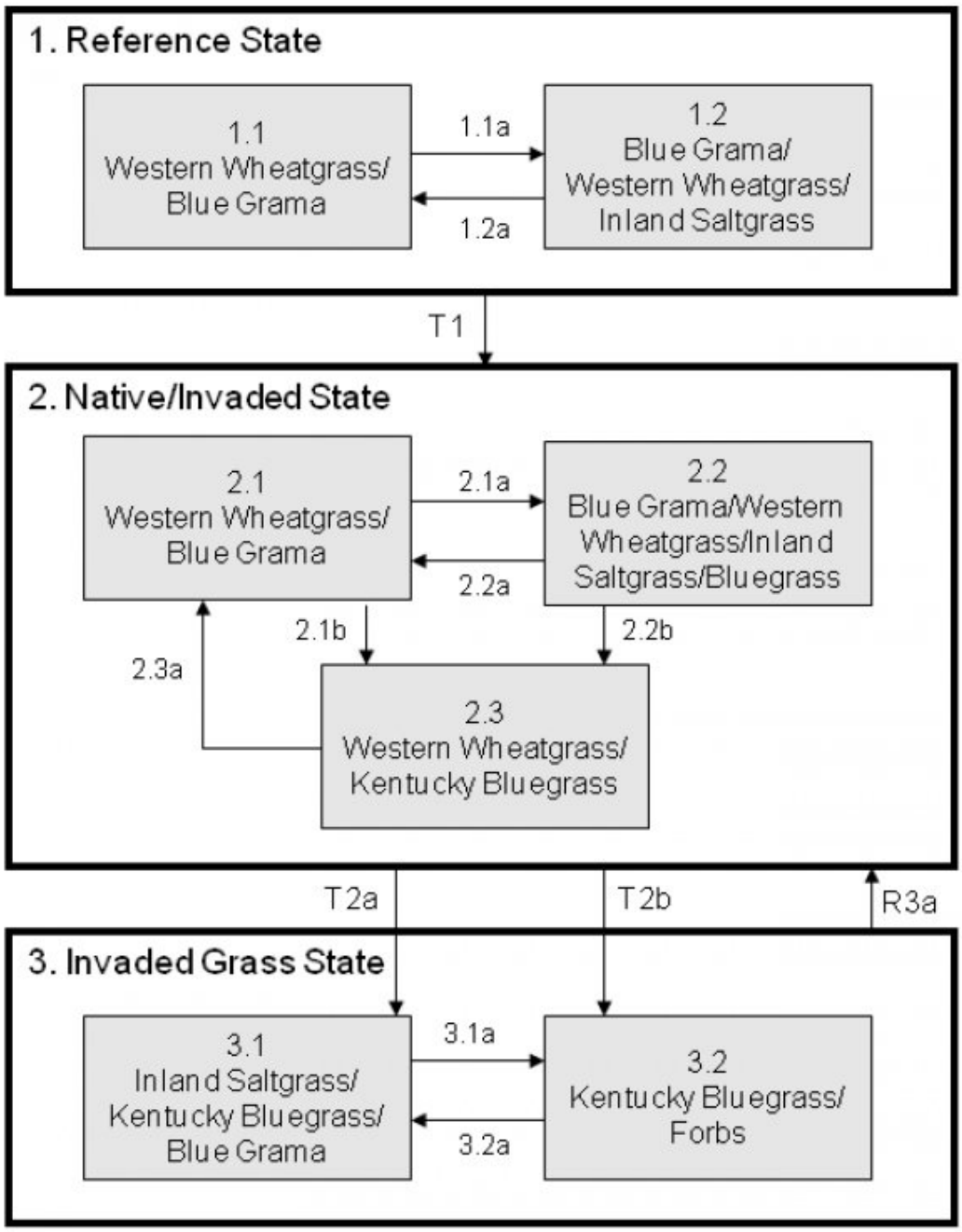
The site developed under Northern Great Plains climatic conditions, and included natural influence of large herding herbivores and frequent fire. Changes will occur in the plant communities due to weather fluctuations and/or management actions. Under adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable conditions the site has the potential to resemble the reference state. Interpretations for this site are based on the Western Wheatgrass/Blue Grama Plant Community Phase (1.1). Under favorable conditions the site has the potential to resemble the Western Wheatgrass/Blue Grama Plant Community Phase. This community phase and 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 sporadic 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. Lightening 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 causes this site to depart from the reference plant community. Blue grama and Kentucky bluegrass if present, will begin to increase. Western wheatgrass will increase initially and then begin to decrease. Green needlegrass will decrease in frequency and production. In time, heavy continuous grazing will likely cause upland sedges and blue grama and/or Kentucky bluegrass if present to dominate and pioneer perennials and annuals to increase. The resulting plant community is relatively stable and competitive advantage prevents other species from establishing. 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. Shrubs such as western snowberry increase in this situation, especially in areas prone to snow accumulation and drift.

The following diagram illustrates the common states, community phases, community pathways, transitions and restoration pathways that can occur on the site.

State and transition model

MLRA 55B Thin Claypan Ecological Site – 2/3/09



Refer to narratives in the Plant Community Section for detailed descriptions of these transitions/pathways. **1.1a** – Spring fire followed by intensive grazing ; **1.2a** – Return to normal fire & grazing frequencies; **T1** – Introduction of non-native species; **2.1a** – Heavy continuous grazing (normally late season or season-long, inadequate recovery periods); **2.1b** – Non-use and no fire for extended periods; **2.2a** – Prescribed grazing (including adequate recovery periods); **2.2b** – No fire, non-use; **2.3a** – Prescribed burning in conjunction with prescribed grazing; **T2a** – Heavy continuous grazing; **T2b** – Non-use and no fire for extended periods; **R3a** – Range seeding with native species with management to control invasive species; **3.1a** – No fire, non use.

State 1
Reference

This state description represents the natural range of variability that dominated the dynamics of this ecological site. Historically, this state ranged from a mid statured, rhizomatous cool season grass dominated with lesser amounts of short statured, warm season grasses site to one dominated by a short statured, warm season grasses with lesser amounts of the mid statured cool season rhizomatous grass, depending upon disturbance regime. The primary disturbance mechanisms for this site in the reference condition included periodic fire and grazing by large herding ungulates. Timing of fires and grazing coupled with weather events dictated the dynamics that occurred within the natural range of variability. Dominance within this state shifted between warm-season and cool-season grasses. This change would have shifted the timing of energy capture and slightly altered the hydrologic function between plant community phases within the Reference State. Plant community phases within the Reference state were very resilient and able to recover ecological function following disturbances. Overall, the ecological processes were functioning at near optimum levels within this State. However, prolonged drought and heavy grazing pressure, like that associated with perennial water sources, may have resulted in a complete elimination of the mid statured cool season grass component from this state. Although not illustrated on the diagram, this would have resulted in the crossing of a threshold to a warm season short grass dominated steady state.

Community 1.1
Western Wheatgrass/Blue Grama

The plant community upon which interpretations are primarily based is the Western Wheatgrass/Blue Grama Plant Community Phase. This site evolved with grazing by large herbivores and occasional prairie fires. The potential vegetation is about 85% grasses or grass-like plants, 10% forbs and 5% shrubs. Cool season grasses dominate the site, but warm season short grasses are also prevalent. The co-dominant grasses are western wheatgrass and blue grama. Other grasses and grass-like plants occurring on the site include buffalograss, inland saltgrass, Nuttall's Alkaligrass, and needleleaf sedge. Significant forbs may include cudweed sagewort, curlycup gumweed, heath aster, scarlet globemallow, and western yarrow. Shrubs include fringed sagewort and prairie rose. 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 some movement off-site and natural plant mortality is low. The diversity in plant species allows for some drought tolerance. This is a fragile, but sustainable plant community. Low to moderate available water capacity coupled with high accumulations of sodium and slow permeability strongly influences the soil-water-plant relationships.

Table 4. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	818	1304	1777
Forb	67	110	163
Shrub/Vine	11	44	78
Total	**896**	**1458**	**2018**

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

Community 1.2
Blue Grama/Western Wheatgrass/Inland Saltgrass

This community phase resulted from a shift in dominance from mid statured, cool season rhizomatous grasses to a dominance of short statured, warm season grasses. Western wheatgrass declined as a result of grazing pressure and/or drought with a corresponding increase in blue grama, buffalograss, and inland saltgrass. Grasses and grass-likes still dominated the production but forbs such as western yarrow, curlycup gumweed, and rose pussytoes, and shrubs such as fringed sagewort increased. Overall production would have been slightly reduced, except after periods of prolonged drought when production would have been significantly reduced and time it would take to

recover would have been extended. Energy capture would have shifted from spring and early summer to early to mid summer. Infiltration rates would have been slightly reduced due to the decline in western wheatgrass and resulting increase in blue grama.

Figure 6. Plant community growth curve (percent production by month). ND5504, Central Black Glaciated Plains, warm-season dominant, cool-season sub-dominant.. Warm-season dominant, cool-season sub-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

Pathway 1.1a
Community 1.1 to 1.2

This pathway occurs when events favor the decrease of cool season, mid statured grasses and the increase of warm season, short statured grasses. Such events include early spring fires followed by severe grazing. This may have been a common occurrence in the natural range of variability. Spring and early summer drought, especially combined with early season burns or grazing could also initiate this pathway. Continuous early season burning or continuous early season grazing would also favor this pathway. Along this pathway, the dominate timing of energy capture shifts from spring and early summer to summer early fall as the plant functional groups begin to change.

Pathway 1.2a
Community 1.2 to 1.1

The climate of the northern Great Plains favors this pathway. Time and natural events that favor a decrease in warm season grasses and an increase in cool season grasses will initiate this pathway. Summer fires and/or short duration severe summer grazing will favor this pathway. These events were common within the natural range of variability.

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 is still dominated by native cool and warm season grasses, but 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 grazing coupled with weather events dictate the dynamics that occur within this state. The native grasses 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
Western Wheatgrass/Blue Grama

This plant community phase is similar to the 1.1 Western Wheatgrass/Needlegrass/Blue Grama Plant Community Phase, but it also contains minor amounts of non-native invasive grass species such as Kentucky bluegrass and smooth bromegrass (up to about 10 percent by air-dry weight). The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs, and 5 percent shrubs. The community is dominated by cool-season grasses, with warm-season grasses being subdominant. The major grasses include western wheatgrass, blue grama, and Nuttall’s Alkaligrass. Other grass or grass-like species include buffalograss, inland saltgrass, prairie junegrass and needleleaf sedge. Forbs would include cudweed sagewort, curlycup gumweed, heath aster, scarlet globemallow, and western yarrow. This plant community is resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. This is a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	818	1304	1777
Forb	67	110	163
Shrub/Vine	11	44	78
Total	**896**	**1458**	**2018**

Figure 8. 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
Blue Grama/Western Wheatgrass/Inland Saltgrass/Bluegrass

This plant community is a result of heavy continuous grazing, continuous season-long grazing or from over utilization during extended drought periods. The potential plant community is made up of approximately 70 percent grasses and grass-like species, 25 percent forbs, and 5 percent shrubs. Dominant grasses include western wheatgrass, blue grama, inland saltgrass with minor amounts of Kentucky bluegrass. Grasses of secondary importance include needleandthread, buffalograss, tumblegrass and sedge. Forbs commonly found in this plant community include cudweed sagewort, prairie coneflower, and western yarrow. When compared to the Western Wheatgrass/Needlegrass/Blue Grama Plant Community Phase (1.1), blue grama and inland saltgrass have increased and Kentucky bluegrass has invaded. Needleandthread and prairie junegrass production has been reduced. This plant community is moderately resistant to change. The herbaceous species present are well adapted to grazing; however, species composition can be altered through long-term overgrazing. If the herbaceous component is intact, it tends to be resilient if the disturbance is not long-term. The increase of shorter-statured, more compact rooted species will result in somewhat higher runoff and decreased infiltration. This will cause the site to become drier. These species will also more competitive.

Figure 9. 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 2.3
Western Wheatgrass/Kentucky Bluegrass

This plant community is a result of continuous season-long grazing, typically at light levels, or prolonged periods (multiple years) of complete rest from grazing and elimination of fire. This community phase is characterized by an increase in the introduced cool-season sodgrass, Kentucky bluegrass. This community phase is the most dominant both temporally and spatially. Kentucky bluegrass has become nearly co-dominant with western wheatgrass and green needlegrass. Warm season grasses are present but minor and tap rooted perennial forbs have decreased. Production and infiltration both decrease and this community phase is at risk of transitioning across a state threshold. With natural or management actions that decrease the composition of the cool-season bunchgrasses and increase the composition of Kentucky bluegrass, transition T2b will be initiated.

Figure 10. 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

Pathway 2.1a
Community 2.1 to 2.2

This pathway occurs as a result of heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season, and often at the same time of year each year), or continuous season-long grazing, or a combination of disturbances such as extended periods of below average precipitation coupled with periodic heavy grazing. This pathway will lead to the 2.2 Western Wheatgrass/Blue Grama/Kentucky Bluegrass Plant Community Phase.

Pathway 2.1b
Community 2.1 to 2.3

Prolonged periods (multiple years) of continuous season-long grazing, or complete rest from grazing or grazing at very light levels coupled with elimination of fire results in increase litter levels and decreased vigor of less shade tolerant species. These factors favor cool-season species, and lead to the 2.3 Western Wheatgrass/Needlegrass/Kentucky Bluegrass Plant Community Phase. When continuous or light grazing is involved, this community will often occur in a patchy mosaic pattern, often referred to as patch grazing.

Pathway 2.2a
Community 2.2 to 2.1

The implementation of prescribed grazing including adequate recovery periods between grazing events and season of use change will initiate this pathway by shifting the competitive advantage away from the short statured grasses to the taller cool-season grasses. These factors favor cool-season species, and lead back to the 2.1 Western Wheatgrass/Blue Grama Plant Community Phase.

Pathway 2.2b
Community 2.2 to 2.3

Prolonged periods (multiple years) of complete rest from grazing or grazing at very light levels coupled with elimination of fire results in increase litter levels and decreased vigor of less shade tolerant species. These factors favor cool-season species, and lead to the 2.3 Western Wheatgrass/Kentucky Bluegrass Plant Community Phase.

Pathway 2.3a
Community 2.3 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. The use of prescribed burning may also be necessary to properly initiate this pathway and shift the competitive advantage to the native cool-season grasses.

State 3
Invaded

This state is the result of invasion and dominance of introduced species with remnant amounts of native, short statured grasses and forbs. This state is characterized by the dominance of Kentucky bluegrass and possibly smooth bromegrass, and an increasing thatch layer that effectively blocks introduction of other plants into the system. Due to soil chemistry and structure issues, remnant populations of inland saltgrass and blue grama may be present on those areas where the claypan occurs in close proximity to the soil surface. In appearance, this plant community phase may resemble a site with “spot grazing” issues even when no grazing has occurred. 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 the invasive grass dominance. 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 Kentucky bluegrass. These events may reduce the dominance of Kentucky bluegrass, but due to the large amount of rhizomes in the soil there is no opportunity for the native species to establish and dominate before Kentucky bluegrass rebounds and again dominates the system.

Community 3.1
Kentucky Bluegrass/Sedge/Blue Grama

This plant community phase is a result of heavy, continuous seasonal grazing or heavy, continuous season-long grazing. It is characterized by a dominance of very grazing tolerant species such as Kentucky bluegrass, inland saltgrass, blue grama, sedges and forbs. The dominance is at times so complete that other species are difficult to find on the site. Nutrient cycling is greatly reduced, and mid-statured native plants have great difficulty becoming established. Infiltration is greatly reduced and runoff is high. Production will be significantly reduced when compared to the interpretive plant community. Energy capture is also reduced. Biological activity in the soil is likely reduced significantly in this phase.

Figure 11. 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 3.2
Kentucky Bluegrass/Forb

This plant community phase is a result of extended periods of non-use and no fire. It is characterized by a dominance of Kentucky bluegrass and forbs. Smooth bromegrass may also be present on the site. The dominance is at times so complete that other species are difficult to find on the site. A thick duff layer also accumulates at or above the soil surface. Nutrient cycling is greatly reduced, and native plants have great difficulty becoming established. When dominated by Kentucky bluegrass, infiltration is greatly reduced and runoff is high. Production in this case will likely be significantly less than the interpretive plant community. The period that forage palatability is high is relatively short. Energy capture is also reduced due to the shorter active growth period and lack of warm season plant diversity.

Figure 12. 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 3.1a
Community 3.1 to 3.2

Prolonged periods (multiple years) of complete rest from grazing or grazing at very light levels coupled with elimination of fire results in increase litter levels and decreased vigor of less shade tolerant short statured warm season grass species. These factors favor cool-season species, and lead to the 3.2 Kentucky Bluegrass/Forb Plant Community Phase.

Pathway 3.2a
Community 3.2 to 3.1

This pathway occurs as a result of heavy continuous grazing (stocking levels well above carrying capacity for extended portions of the growing season, and often at the same time of year each year), or continuous season-long grazing, or a combination of disturbances such as extended periods of below average precipitation coupled with periodic heavy grazing. This pathway will lead to the 3.1 Inland Saltgrass/Kentucky Bluegrass/Blue Grama Plant Community Phase.

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 cool and warm season native grasses and an increase in cool season introduced sodgrasses. Chronic season long or heavy late season grazing facilitate this transition. Complete rest from grazing and no fire events can also lead to this transition. The threshold between states is crossed when Kentucky bluegrass or other non-native grasses become established on the site.

Transition T2b
State 2 to 3

Complete rest from grazing and elimination of fire are the two major contributors to this transition. 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. The opportunity for high intensity spring burns is severely reduced by early green up and increased moisture and humidity at the soil surface and grazing pressure cannot cause a reduction in sodgrass dominance. Production is limited to the sod forming 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 of the dominant species. This transition typically leads to the 3.2 Kentucky Bluegrass/Forb Plant Community Phase.

Transition T2a
State 2 to 3

This represents the transition from the more native dominated Native/Invaded State to a plant community phase dominated by a dense Kentucky bluegrass sod and grazing tolerant forbs. Heavy continuous season-long grazing is the major contributor to this transition. 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. This transition typically leads to the 3.1 Inland Saltgrass/Kentucky Bluegrass/Blue Grama Plant Community Phase.

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	**Wheatgrass**			364–656	
	western wheatgrass	PASM	*Pascopyrum smithii*	364–656	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–73	–
2	**Short Warm-season Grasses**			219–364	
	blue grama	BOGR2	*Bouteloua gracilis*	146–291	–
	saltgrass	DISP	*Distichlis spicata*	15–73	–
	buffalograss	BODA2	*Bouteloua dactyloides*	15–73	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–29	–
	tumblegrass	SCPA	*Schedonnardus paniculatus*	0–29	–
3	**Cool-season Bunchgrasses**			15–73	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	15–73	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–44	–
4	**Other Native Grasses**			15–73	
	Graminoid (grass or grass-	2GRAM	*Graminoid (grass or grass-like)*	0–73	–

	like)				
	prairie Junegrass	KOMA	*Koeleria macrantha*	15–44	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–15	–
5	**Grass-likes**			15–73	
	needleleaf sedge	CADU6	*Carex duriuscula*	15–73	–
	Pennsylvania sedge	CAPE6	*Carex pensylvanica*	0–29	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–29	–
Forb					
6	**Forbs**			73–146	
	Forb, native	2FN	*Forb, native*	15–58	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	15–29	–
	textile onion	ALTE	*Allium textile*	15–29	–
	white heath aster	SYER	*Symphyotrichum ericoides*	15–29	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	15–29	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	15–29	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	15–29	–
	bladderpod	LESQU	*Lesquerella*	0–15	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–15	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	0–15	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–15	–
	bushy knotweed	PORA3	*Polygonum ramosissimum*	0–15	–
	lemon scurfpea	PSLA3	*Psoralidium lanceolatum*	0–15	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–15	–
	pussytoes	ANTEN	*Antennaria*	0–15	–
	field sagewort	ARCA12	*Artemisia campestris*	0–15	–
Shrub/Vine					
7	**Shrubs**			15–73	
	prairie sagewort	ARFR4	*Artemisia frigida*	15–44	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–29	–
	prairie rose	ROAR3	*Rosa arkansana*	0–29	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–29	–

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	**Wheatgrass**			364–656	
	western wheatgrass	PASM	*Pascopyrum smithii*	364–656	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	0–73	–
2	**Short Warm-season Grasses**			219–364	
	blue grama	BOGR2	*Bouteloua gracilis*	146–291	–
	saltgrass	DISP	*Distichlis spicata*	15–73	–
	buffalograss	BODA2	*Bouteloua dactyloides*	15–73	–
	scratchgrass	MUAS	*Muhlenbergia asperifolia*	0–29	–

	tumblegrass	SCPA	*Schedonnardus paniculatus*	0–29	–
3	**Cool-season Bunchgrasses**			15–73	
	Nuttall's alkaligrass	PUNU2	*Puccinellia nuttalliana*	15–73	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	0–44	–
4	**Other Native Grasses**			15–73	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	0–73	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	15–44	–
	Sandberg bluegrass	POSE	*Poa secunda*	0–15	–
5	**Grass-likes**			15–73	
	needleleaf sedge	CADU6	*Carex duriuscula*	15–73	–
	Pennsylvania sedge	CAPE6	*Carex pensylvanica*	0–29	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–29	–
6	**Non-Native Grasses**			15–29	
	Kentucky bluegrass	POPR	*Poa pratensis*	15–29	–
	Grass, perennial	2GP	*Grass, perennial*	0–15	–
	smooth brome	BRIN2	*Bromus inermis*	0–15	–
Forb					
7	**Forbs**			73–146	
	Forb, native	2FN	*Forb, native*	15–58	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	15–29	–
	textile onion	ALTE	*Allium textile*	15–29	–
	white heath aster	SYER	*Symphyotrichum ericoides*	15–29	–
	scarlet globemallow	SPCO	*Sphaeralcea coccinea*	15–29	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	15–29	–
	curlycup gumweed	GRSQ	*Grindelia squarrosa*	15–29	–
	bladderpod	LESQU	*Lesquerella*	0–15	–
	rush skeletonplant	LYJU	*Lygodesmia juncea*	0–15	–
	leafy wildparsley	MUDI	*Musineon divaricatum*	0–15	–
	woolly plantain	PLPA2	*Plantago patagonica*	0–15	–
	bushy knotweed	PORA3	*Polygonum ramosissimum*	0–15	–
	lemon scurfpea	PSLA3	*Psoralidium lanceolatum*	0–15	–
	Pursh seepweed	SUCA2	*Suaeda calceoliformis*	0–15	–
	pussytoes	ANTEN	*Antennaria*	0–15	–
	field sagewort	ARCA12	*Artemisia campestris*	0–15	–
Shrub/Vine					
8	**Shrubs**			15–73	
	prairie sagewort	ARFR4	*Artemisia frigida*	15–44	–
	broom snakeweed	GUSA2	*Gutierrezia sarothrae*	0–29	–
	prairie rose	ROAR3	*Rosa arkansana*	0–29	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–29	–

Animal community

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.

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; Paul Drayton, NRCS District Conservationist; Jody Forman, NRCS Range Management Specialist; Dennis Froemke, 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.

Other references

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Contributors

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Rangeland health reference sheet

Interpreting Indicators of Rangeland Health is a qualitative assessment protocol used to determine ecosystem condition based on benchmark characteristics described in the Reference Sheet. A suite of 17 (or more) indicators are typically considered in an assessment. The ecological site(s) representative of an assessment location must be known prior to applying the protocol and must be verified based on soils and climate. Current plant community cannot be used to identify the ecological site.

Author(s)/participant(s)	Jeff Printz, Stan Boltz, Lee Voigt, Jody Forman
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Date	04/19/2012
Approved by	Jeff Pritnz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

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

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

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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 10 to 35% with patch size up to 6 inches and disconnected.

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

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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):** Plant litter associated with slick spots may be moved following rain events, small plant litter may move 4 to 8 inches and small accumulations of plant litter may be visible.

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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):** Average rating of 3 to 6. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water. Biological crusts and/or physical crusts may be present.

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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/surface layer.

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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 & tall rhizomatous and tufted perennial cool- and warm-season grasses) with fine and coarse roots positively influences infiltration.

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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 evident. Naturally occurring compaction layer (“claypan”) and some platy surface structure is expected for this site.

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

    Dominant: Mid, cool-season rhizomatous grasses >

    Sub-dominant: short, warm-season grasses >

    Other: Forbs > mid cool-season bunchgrasses = short, cool-season bunchgrasses = 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):** None.

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14. **Average percent litter cover (%) and depth (in):** Plant litter is in contact with soil surface.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representaive value = 1300 lbs/ac air dry with a range of 800 to 1800 lbs./acre air dry depending upon growing conditions.

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16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:** State and local noxious, Kentucky bluegrass, smooth bromegrass

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