

Ecological site R055BY062ND **Sandy**

Accessed: 05/19/2024

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.

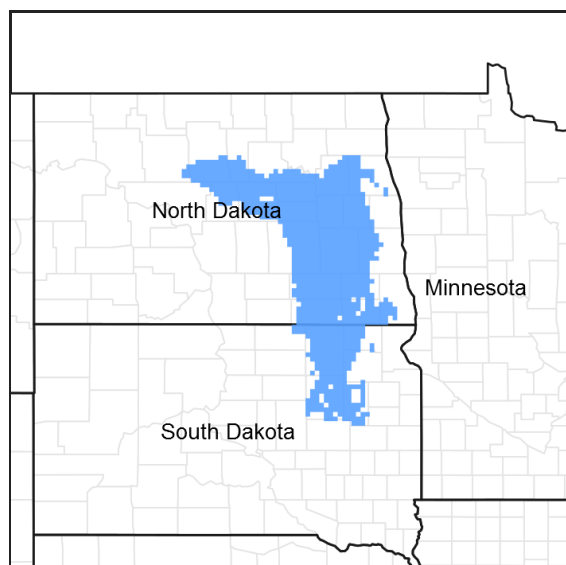


Figure 1. Mapped extent

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
R055BY059ND	Loamy Overflow
R055BY062ND	Sandy
R055BY068ND	Thin Loamy
R055BY073ND	Shallow Loamy

Similar sites

R055BY057ND	Claypan (055BY057ND) – Claypan (Cp) [Well drained soils on uplands or terraces that don't receive extra moisture with a dense sodic subsoil below 6 inches with salts below 16 inches. Indicator species are western wheatgrass with an understory of blue grama, heath aster, and western yarrow along with fringed sagewort and brittle cactus. This site has less production, less green needlegrass and shrubs, more blue grama and a dense sodic subsoils layer above 20 inches.]
R055BY056ND	Clayey (055BY056ND) – Clayey (Cy) [Does not receive additional moisture. Found on dry uplands, upslope from Loamy overflow sites, down slope from Thin Loamy or Shallow Loamy sites. Similar landscape position as Sandy, Sands, and Loamy sites. Will ribbon greater than 2 inches. Indicator species: dominated by green needlegrass and western wheatgrass. This site has more green needlegrass similar production, similar landscape position and different soil texture.]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Calamovilfa longifolia</i> (2) <i>Andropogon gerardii</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	2–15%
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

These are very deep, well to somewhat excessively drained soils. Surface soil textures range from sandy loam to fine sandy loam. Saturated hydraulic conductivity is moderately rapid to moderate and available water capacity is low to moderate. These soils are friable and susceptible to wind erosion. Low available water capacity influences the soil-water-plant relationship. This site is on nearly level to moderately to very steep outwash plains, lake plains, terraces and till plains. Slope ranges from 0 to 50 percent. 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. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration.

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

Table 4. Representative soil features

Surface texture	(1) Sandy loam (2) Fine sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderately rapid to rapid
Soil depth	203 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	10.16–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–5%

Ecological dynamics

The site developed under Northern Great Plains climatic conditions, and included natural influence of large 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

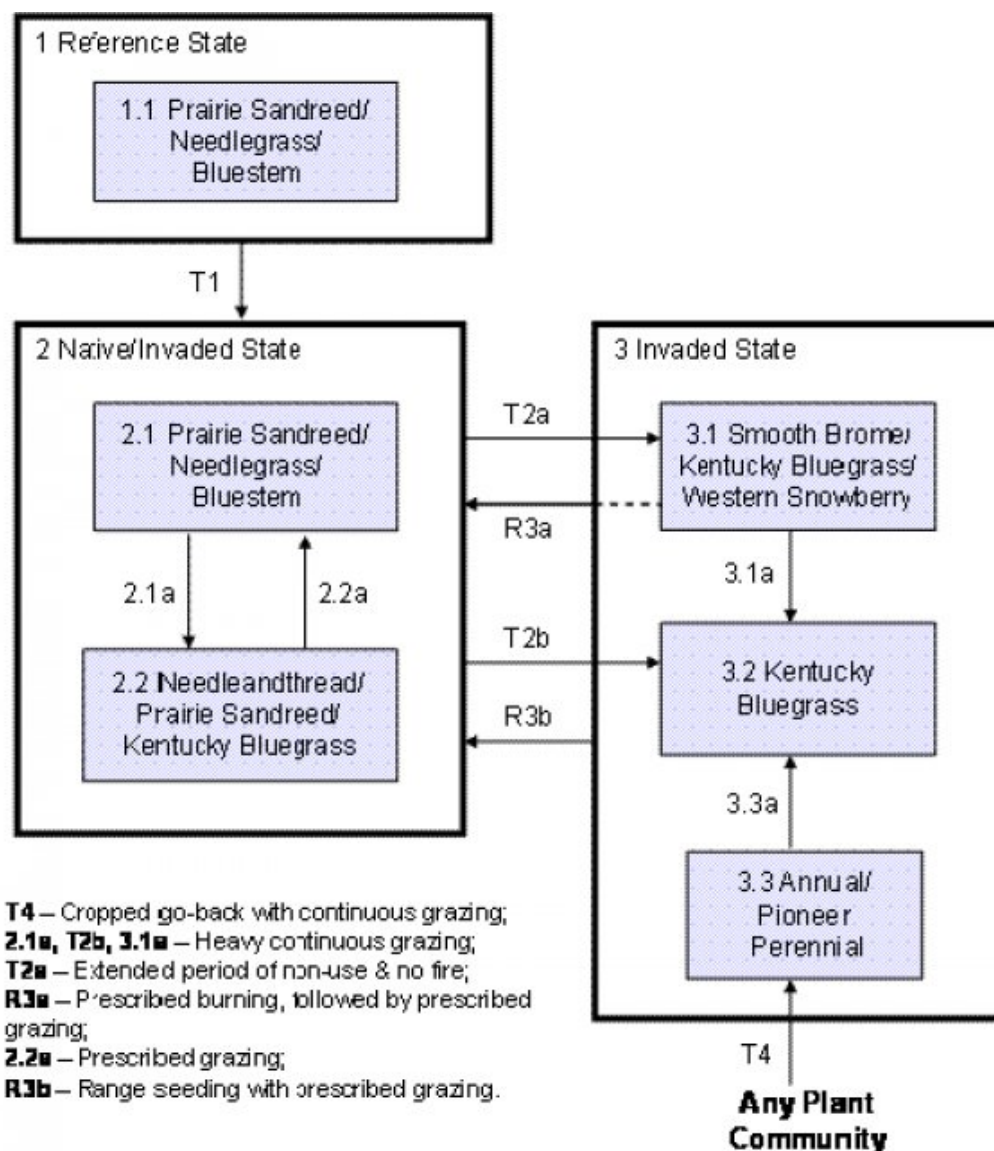
on the Prairie Sandreed/Needlegrass/Bluestem Plant Community Phase (1.1). Under adverse impacts, a slow decline in vegetative vigor and composition will occur. Under favorable conditions the site has the potential to resemble the Prairie Sandreed/Needlegrass/Bluestem Plant Community Phase. This community 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. 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. Continuous grazing without adequate recovery periods following each grazing occurrence over several years causes this site to depart from the Reference State. Species such as western wheatgrass and blue grama will initially increase. Big bluestem, green needlegrass, and sideoats grama will decrease in frequency and production. In time, heavy continuous grazing will likely cause a stable dominance of Kentucky bluegrass and blue grama. These species then will have a competitive advantage which prevents other species from establishing or increasing. This plant community is less productive than the Reference State. Runoff increases and infiltration will decrease. Soil erosion will be minimal. Extended periods of non-use and/or lack of fire will result in a plant community having high litter levels, which favors an increase in Kentucky bluegrass and/or smooth brome grass. In time, shrubs such as western snowberry and chokecherry will likely increase and become co-dominant with the Kentucky bluegrass and smooth brome grass.

The following diagram illustrates the common states, community phases, community pathways, transitions and restoration pathways that can occur on the site. These are the most common plant community phases and states based on current knowledge and experience, and changes may be made as more data is collected. Narratives following the diagram contain more detail pertaining to the ecological processes.

State and transition model



State 1 Reference

This state represents the natural range of variability that dominates the dynamics of this ecological site. This state is dominated by warm- and cool-season grasses. 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 Prairie Sandreed/Needlegrass/Bluestem

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 tall warm-season and mid cool-season grasses such as prairie sandreed, needleandthread, porcupine grass, big bluestem, and little bluestem. Other grass and grass-like species occurring include green needlegrass, sideoats grama, prairie Junegrass, western wheatgrass, slender wheatgrass, bearded wheatgrass, blue grama, and sedge. A variety of leguminous and non-leguminous perennial forbs are present but only in slight amounts. This is the reference 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	1950	2809	3536
Forb	151	235	336
Shrub/Vine	28	94	163
Total	2129	3138	4035

Figure 5. 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

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 warm-season grass 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 warm-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 Prairie Sandreed/Needlegrass/Bluestem

This community phase most closely resembles the Reference State in appearance and ecological functions (e.g., hydrologic, biotic and soil/site stability). The warm-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 is dominated by tall warm-season and mid cool-season grasses such as prairie sandreed, needleandthread, porcupine grass, big bluestem, and little bluestem. Other grass and grass-likes species occurring include green needlegrass, sideoats grama, prairie Junegrass, western wheatgrass, slender wheatgrass, bearded wheatgrass, blue grama, and sedge. A variety of leguminous and non-leguminous perennial forbs are present but only in slight amounts. 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 leguminous forb species may be a causative factor leading to the eventual dominance of cool-season introduced grasses in the Invaded State.

Table 6. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	1950	2809	3536
Forb	151	235	336
Shrub/Vine	28	94	163
Total	2129	3138	4035

Figure 7. 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

Community 2.2

Needleandthread/Prairie Sandreed/Kentucky Bluegrass

Grazing pressure reduces the 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 warm-season grass component. Non-native grasses, such as Kentucky bluegrass and smooth brome tend to increase and may begin to dominate this plant community. Needleandthread and prairie sandreed are still the dominant grasses in the early stages of this transition. Significant grass species include needleandthread, prairie sandreed, and Kentucky bluegrass. Other grasses present include big bluestem, porcupine grass, sideoats grama, green needlegrass, prairie junegrass, western wheatgrass, blue grama, sedge, and possibly smooth brome. The common forbs include cudweed sagewort, goldenrod, green sagewort, western salsify, heath aster, scurfpea and western ragweed. Western snowberry, fringed sagewort, and prairie 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, blue grama, 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 Prairie Sandreed/Needlegrass/Bluestem community. Grazing management that allow 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 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

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 continuous grazing without adequate recovery periods. Chronic heavy grazing for extended periods during the growing season will also favor this shift. Included with areas affected by a lack of adequate recovery periods may be areas that receive little or no grazing, which may also lead to the increase of introduced cool-season species. 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 native leguminous forbs and minor grass components.

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 tall and mid warm-season grass species. The addition of prescribed burning may expedite this shift.

State 3
Invaded

This state is the result of invasion and dominance of Kentucky bluegrass and/or smooth brome grass. This state is characterized by these two species 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
Smooth Brome/Kentucky Bluegrass/Western Snowberry

This community phase is dominated by the cool-season sodgrasses including smooth brome and Kentucky bluegrass. Western snowberry can increase and become a major component in this community phase. Remnants of native warm- and cool-season grasses are still present, but greatly reduced. 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 9. 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

This community phase is dominated by Kentucky bluegrass with lesser amounts of sedge. The longer this community phase persists, 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 shallow rooting depth of the Kentucky bluegrass and production is limited.

Figure 10. 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 3.3
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. Overtime, 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. Western snowberry will experience mechanical damage and will decrease in production and cover. 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 western snowberry and remnant native grass species.

Transition T1a

State 1 to 2

This is the transition from the native warm-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 warm-season rhizomatous grasses 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 by 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 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tall Warm-season Grasses			471–1098	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	314–785	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	157–628	–
2	Needlegrass			314–628	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	157–471	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	157–471	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	31–157	–
3	Mid Warm-season Grasses			157–314	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	31–314	–

	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	157–314	–
	prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	0–157	–
4	Wheatgrass			31–157	
	slender wheatgrass	ELTRS	<i>Elymus trachycaulus</i> ssp. <i>subsecundus</i>	31–157	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i>	31–157	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	31–157	–
5	Other Native Grasses			31–157	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–157	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	31–157	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	31–157	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–94	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthes</i> var. <i>scribnerianum</i>	0–94	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–94	–
6	Grass-likes			157–314	
	sedge	CAREX	<i>Carex</i>	157–314	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–157	–
Forb					
7	Forbs			157–314	
	Forb, native	2FN	<i>Forb, native</i>	31–157	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	31–94	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	31–94	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	31–94	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	31–63	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	31–63	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–63	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	31–63	–
	scarlet beebllossom	GACO5	<i>Gaura coccinea</i>	31–63	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	31–63	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	31–63	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	31–63	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	31–63	–
	soft-hair marbleseed	ONBEB	<i>Onosmodium bejariense</i> var. <i>bejariense</i>	31–63	–
	scurfpea	PSORA2	<i>Psoraleidium</i>	31–63	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	31–63	–
	goldenrod	SOLID	<i>Solidago</i>	31–63	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	31–63	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	31–63	–
	American vetch	VIAM	<i>Vicia americana</i>	31–63	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–31	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–31	–
	tall blazing star	LIAS	<i>Liatris aspera</i>	0–31	–

Shrub/Vine					
8	Shrubs			31–157	
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	31–94	–
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–94	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	31–94	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	31–63	–
	rose	ROSA5	<i>Rosa</i>	31–63	–
	white meadowsweet	SPAL2	<i>Spiraea alba</i>	31–63	–

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass/Grasslike					
1	Tall Warm-season Grasses			471–1098	
	prairie sandreed	CALO	<i>Calamovilfa longifolia</i>	314–785	–
	big bluestem	ANGE	<i>Andropogon gerardii</i>	157–628	–
2	Needlegrass			314–628	
	needle and thread	HECOC8	<i>Hesperostipa comata ssp. comata</i>	157–471	–
	porcupinegrass	HESP11	<i>Hesperostipa spartea</i>	157–471	–
	green needlegrass	NAVI4	<i>Nassella viridula</i>	31–157	–
3	Mid Warm-season Grasses			157–314	
	sideoats grama	BOCU	<i>Bouteloua curtipendula</i>	31–314	–
	little bluestem	SCSC	<i>Schizachyrium scoparium</i>	157–314	–
	prairie dropseed	SPHE	<i>Sporobolus heterolepis</i>	0–157	–
4	Wheatgrass			31–157	
	slender wheatgrass	ELTRS	<i>Elymus trachycaulus ssp. subsecundus</i>	31–157	–
	slender wheatgrass	ELTRT	<i>Elymus trachycaulus ssp. trachycaulus</i>	31–157	–
	western wheatgrass	PASM	<i>Pascopyrum smithii</i>	31–157	–
5	Other Native Grasses			31–157	
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–157	–
	blue grama	BOGR2	<i>Bouteloua gracilis</i>	31–157	–
	prairie Junegrass	KOMA	<i>Koeleria macrantha</i>	31–157	–
	sand dropseed	SPCR	<i>Sporobolus cryptandrus</i>	0–94	–
	Scribner's rosette grass	DIOLS	<i>Dichanthelium oligosanthos var. scribnerianum</i>	0–94	–
	Canada wildrye	ELCA4	<i>Elymus canadensis</i>	0–94	–
6	Grass-likes			157–314	
	sedge	CAREX	<i>Carex</i>	157–314	–
	Grass-like (not a true grass)	2GL	<i>Grass-like (not a true grass)</i>	0–157	–
7	Non-Native Grasses			31–126	
	smooth brome	BRIN2	<i>Bromus inermis</i>	31–63	–
	Kentucky bluegrass	POPR	<i>Poa pratensis</i>	31–63	–
	Grass, perennial	2GP	<i>Grass, perennial</i>	0–31	–
Forb					

8	Forbs			157–314	
	Forb, native	2FN	<i>Forb, native</i>	31–157	–
	stiff sunflower	HEPA19	<i>Helianthus pauciflorus</i>	31–94	–
	field sagewort	ARCA12	<i>Artemisia campestris</i>	31–94	–
	white sagebrush	ARLU	<i>Artemisia ludoviciana</i>	31–94	–
	wavyleaf thistle	CIUN	<i>Cirsium undulatum</i>	31–63	–
	purple prairie clover	DAPU5	<i>Dalea purpurea</i>	31–63	–
	blacksamson echinacea	ECAN2	<i>Echinacea angustifolia</i>	0–63	–
	sanddune wallflower	ERCAC	<i>Erysimum capitatum</i> var. <i>capitatum</i>	31–63	–
	scarlet beeblossom	GACO5	<i>Gaura coccinea</i>	31–63	–
	hairy false goldenaster	HEVI4	<i>Heterotheca villosa</i>	31–63	–
	western yarrow	ACMIO	<i>Achillea millefolium</i> var. <i>occidentalis</i>	31–63	–
	Cuman ragweed	AMPS	<i>Ambrosia psilostachya</i>	31–63	–
	dotted blazing star	LIPU	<i>Liatris punctata</i>	31–63	–
	soft-hair marbleseed	ONBEB	<i>Onosmodium bejariense</i> var. <i>bejariense</i>	31–63	–
	scurfpea	PSORA2	<i>Psoraleidum</i>	31–63	–
	upright prairie coneflower	RACO3	<i>Ratibida columnifera</i>	31–63	–
	goldenrod	SOLID	<i>Solidago</i>	31–63	–
	white heath aster	SYER	<i>Symphyotrichum ericoides</i>	31–63	–
	longbract spiderwort	TRBR	<i>Tradescantia bracteata</i>	31–63	–
	American vetch	VIAM	<i>Vicia americana</i>	31–63	–
	purple locoweed	OXLA3	<i>Oxytropis lambertii</i>	0–31	–
	rush skeletonplant	LYJU	<i>Lygodesmia juncea</i>	0–31	–
	tall blazing star	LIAS	<i>Liatris aspera</i>	0–31	–
Shrub/Vine					
9	Shrubs			31–157	
	Shrub (>.5m)	2SHRUB	<i>Shrub (>.5m)</i>	0–94	–
	leadplant	AMCA6	<i>Amorpha canescens</i>	31–94	–
	western snowberry	SYOC	<i>Symphoricarpos occidentalis</i>	31–94	–
	prairie sagewort	ARFR4	<i>Artemisia frigida</i>	31–63	–
	rose	ROSA5	<i>Rosa</i>	31–63	–
	white meadowsweet	SPAL2	<i>Spiraea alba</i>	31–63	–

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 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; 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.

There are 15 SCS-RANGE-417's collected from 1969-1972 in Foster, Sargent and Stutsman Counties, ND

Other references

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(<http://hpccsun.unl.edu>)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224.
(<http://wcc.nrcs.usda.gov>)

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The Nature of Eastern North Dakota: Pre-1880 Historical Ecology. 2006. Severson, Kieth E. and Carolyn Hull Sieg. North Dakota Institute for Regional Studies.

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):** Bare ground is < 5%. Patch size 2 inches or less and not connected.

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):** None.
-
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Average 5 to 6 rating. 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 & tall 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: Tall, warm-season grasses >
- Sub-dominant: Mid, cool-season bunchgrasses >
- Other: Mid, warm-season grasses = grass-likes = forbs > mid, cool-season rhizomatous grasses = shrubs = short, warm-season grasses = short, cool-season grasses
- 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):** Little to no plant mortality or decadence.
-
14. **Average percent litter cover (%) and depth (in):** Plant litter 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 = 2800 lbs/ac air dry with a range of 1900 to 3600 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 weeds, 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.
-