USDA Natural Resources Conservation Service

Ecological site R055BY065ND
Subirrigated

Accessed: 02/08/2025

General information

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

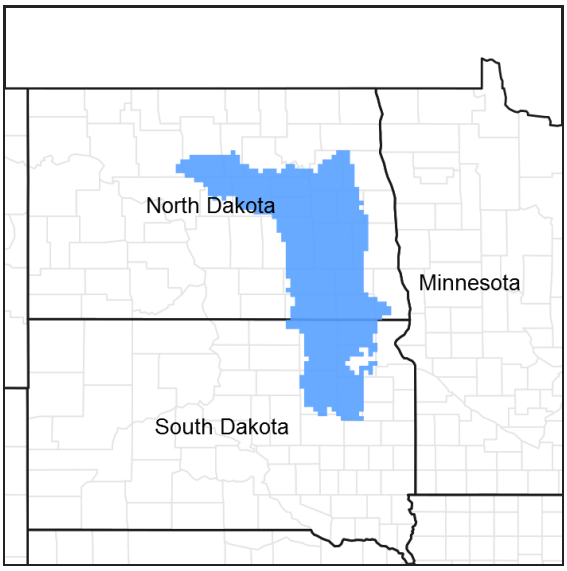


Figure 1. Mapped extent

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

Classification relationships

Level IV Ecoregions of the Conterminous United States: 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**
R055BY059ND	**Loamy Overflow**
R055BY060ND	**Saline Lowland**
R055BY070ND	**Shallow Marsh**
R055BY071ND	**Wet Meadow**

Similar sites

R055BY059ND	**Loamy Overflow** (053BY059ND) – Loamy Overflow (LOv) [Moderately well drained soils in intermittent drainage ways, swales and areas that frequently receive additional moisture throughout the growing season, with no apparent water table. Indicator species: big bluestem with western wheatgrass and green needlegrass, American licorice, and western snowberry. The site has no switchgrass or prairie cordgrass, less big bluestem, more green needlegrass and western wheatgrass; less production, no water table.]

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Andropogon gerardii* (2) *Panicum virgatum*

Physiographic features

This site occurs on nearly level, slightly concave and gently undulating lowlands.

Table 2. Representative physiographic features

Landforms	(1) Till plain (2) Lake plain
Flooding duration	Very brief (4 to 48 hours)
Flooding frequency	Occasional
Elevation	1,000–2,100 ft
Slope	0–3%
Water table depth	18–24 in
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)	21 in

Influencing water features

Cowardin, et al., 1979

Soil features

These are very deep, somewhat poorly drained, coarse to moderately fine textured soils. Saturated hydraulic conductivity is moderate to moderately slow and available water capacity is low to high. Salinity is none to very slight and sodicity is none. These soils have a high water table (1.5 to 3.5 feet from the surface) which keeps the rooting zone moist for most of the growing season. This site is on flats and swales on alluvial plains, lake plains and till plains. Slope ranges from 0 to 6 percent. This site should show slight to no evidence of rills, wind scoured areas or pedestalled plants. No water flow paths are seen on this site. 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) Loam (2) Silt loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained
Permeability class	Moderately slow to moderate
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–12 in
Calcium carbonate equivalent (0-40in)	0–20%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–20%
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 Big Bluestem/Switchgrass 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 Big Bluestem/Switchgrass 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.

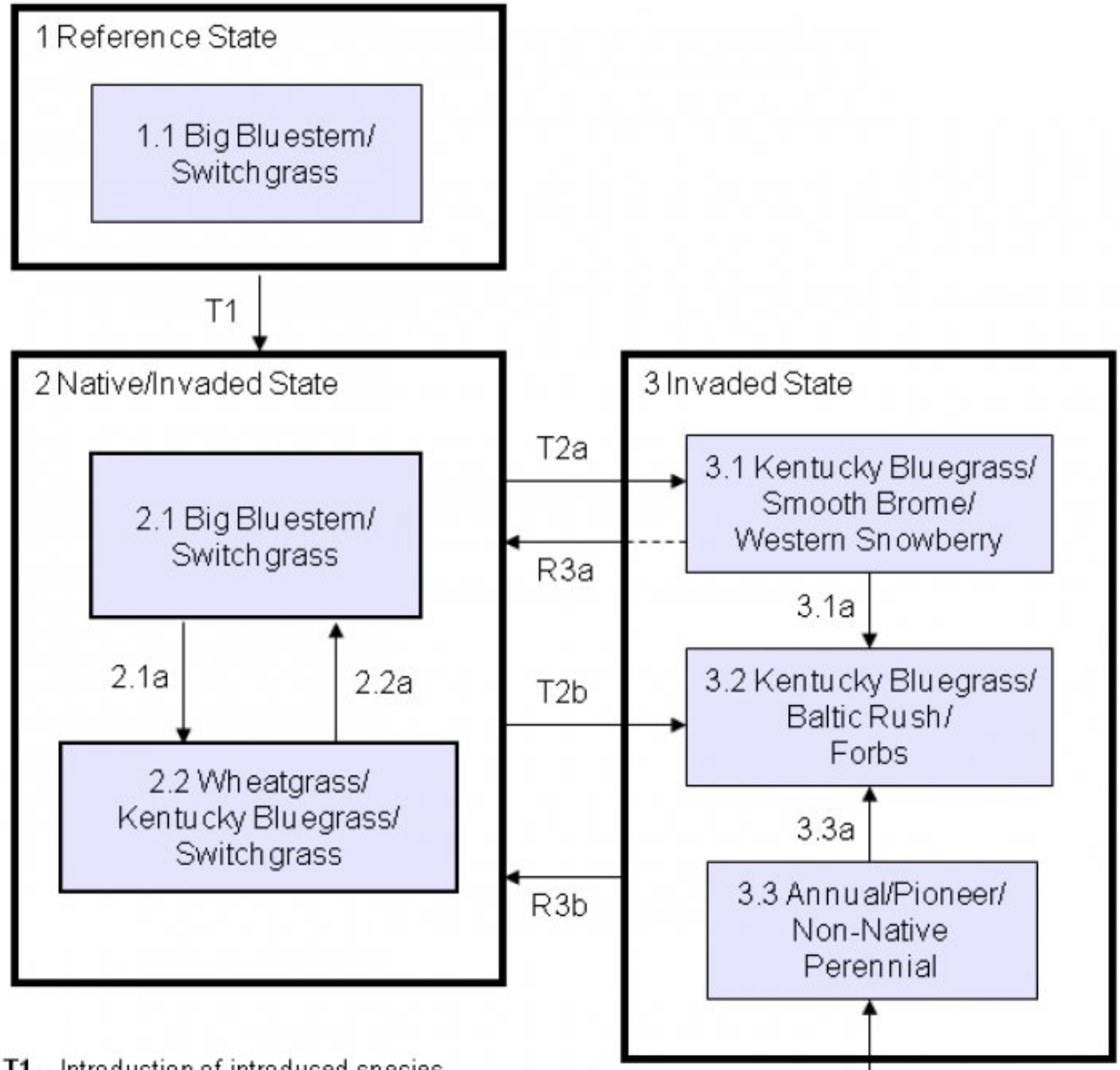
The natural disturbance regime consisted of sporadic fires caused both by natural and Native American ignition sources. These fires occurred during any season of the year, but were concentrated in the spring and late summer or early fall. Lightening fires occurred most frequently in July and August while 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. 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 bromegrass. In time, shrubs such as western snowberry and chokecherry will likely increase and become co-dominant with the Kentucky bluegrass and smooth bromegrass.

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

Subirrigated – MLRA 55B (5-7-08)



T1 - Introduction of introduced species
2.1a – Continuous grazing without adequate recovery periods
3.1a,T2b – Heavy continuous grazing
2.2a – Prescribed grazing with adequate recovery periods
T2a – Non-use, no fire
3.3a – Time and grazing
R3a – Prescribed burning with prescribed grazing
R3b – Range seeding followed by prescribed grazing and possibly prescribed fire
T4 – Cropped go-back

State 1
Reference

This state represents the natural range of variability that dominates the dynamics of this ecological site. Plant community phases occurring within this state are diverse, stable, production and well adapted to the Northern Great Plains. Tall stature warm-season grasses dominated the state. The primary disturbance mechanisms for this site in the reference conditioned include frequent 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. This included declines in the tall stature warm-season grass species and a corresponding increase in mid and short stature warm- and cool-season grasses. Community dynamics, nutrient cycle, water cycle and energy flow were functioning properly. Plant litter was properly distributed with very little movement off-site and natural plant mortality was very low. The diversity in plant species allowed for a high tolerance to a fluctuating water table. Run-off from adjacent sites and moderate or high available water capacity provided a favorable soil-water-plant relationship.

Community 1.1
Big Bluestem/Switchgrass

This community phase was the most dominant both temporally and spatially. The prevailing climate and weather patterns favored the development of this community phase dominated by tall warm-season such as big bluestem, switchgrass, Indiangrass, and prairie cordgrass. Other grass and grass-likes species occurring include little bluestem, northern reedgrass, slender wheatgrass western wheatgrass, Canada wildrye, sedges and rushes. A wide variety of perennial forbs were present but only in slight amounts. Forbs included American licorice, goldenrods, Maximilian sunflower, and western yarrow. Shrub species would have included rose, western snowberry and willow. 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.

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3235	4206	5250
Forb	220	353	500
Shrub/Vine	45	141	250
Total	**3500**	**4700**	**6000**

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 very infrequent fires. Timing of 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
Big Bluestem/Switchgrass

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 big bluestem, switchgrass, Indiangrass, northern reedgrass and slender wheatgrass. Other grass and grass-likes species occurring include little bluestem, western wheatgrass, Canada wildrye, and sedge. A wide variety of 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 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3235	4206	5250
Forb	220	353	500
Shrub/Vine	45	141	250
Total	**3500**	**4700**	**6000**

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
Wheatgrass/Kentucky Bluegrass/Switchgrass

Grazing pressure reduces the tall, less grazing tolerant species, while the mid and short stature grazing tolerant species increase. Litter amounts are reduced, and energy capture shifts to earlier in the growing season due to a decline in the warm-season grass component. Non-native grasses, such as Kentucky bluegrass tend to increase and may begin to dominate this community phase. Mid stature cool-season grasses such as western wheatgrass, northern reedgrass and slender wheatgrass still dominate with Kentucky bluegrass approaching co-dominance. The tall stature warm season species have been significantly reduced but still may be present in minor amounts. The common forbs include American licorice, goldenrod, heath aster, scurfpea, sunflower and western yarrow. Western snowberry, 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, 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 Big Bluestem/Switchgrass 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 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. This change will favor the mid and short stature grazing tolerant species over the tall, less grazing tolerant warm-season grasses. 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 mid June through July to mid May through June. 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.

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. 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
Kentucky Bluegrass/Smooth Bromegrass/Western Snowberry

This community phase is dominated by the shade tolerant cool-season sodgrasses including smooth brome and Kentucky bluegrass. Common forbs include goldenrod, American licorice, scurfpea, heath aster, and western yarrow. Western snowberry can increase and become a major component in this community phase. Chokecherry and rose may also increase in density and cover. Native trees such as green ash and introduced species such as Siberian elm and Russian olive may become scattered across the site. Remnants of native warm- and cool-season grasses are still present, but greatly reduced in vigor and production. Infiltration is reduced and runoff is increased when compared to the Reference State but soil erosion remains low. Nutrient cycling is limited by the rooting depth of these species, the lack of leguminous forbs, and the alteration of the soil biotic community. Organic matter oxidizes in the air rather than being incorporated into the soil due to lack of animal impact and reduced soil biological activity. Energy capture into the system is restricted to a short window provided by the early season species and the high amount of dead standing plant material. This community phase is somewhat resistant to change. Once reached, time and external resources will be needed to see any immediate recovery. The combination of both prescribed grazing and prescribed fire is the most effective in moving this plant community towards State 2.

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. Common forbs would include goldenrod, western yarrow, aster, western ragweed and a variety of introduced forbs. The longer this community phase persists, the more resistant and 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. Production is limited to the sod forming species. Energy capture into this system is limited to single, 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.

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 reduces litter cover resulting in elevated soil surface temperatures increasing evaporation rates and further 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 T1
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 and/or smooth bromegrass are present, this transition occurs as natural and/or management actions favor a decline in the composition of warm-season 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 with 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 occupy 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 fine 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. However, the initial application of prescribed fire can have detrimental effects on remnant native bunchgrass crowns. Damage may be reduced by adjusting prescription parameters. Some previous efforts have shown promise with properly timed 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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall & Mid Warm-Season Grasses**			1175–2350	
	big bluestem	ANGE	*Andropogon gerardii*	940–1880	–
	switchgrass	PAVI2	*Panicum virgatum*	470–940	–
	Indiangrass	SONU2	*Sorghastrum nutans*	235–470	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0–235	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–235	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–235	–
2	**Cool-season Grasses**			235–1175	
	Grass, perennial	2GP	*Grass, perennial*	47–470	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	47–470	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	47–470	–
	western wheatgrass	PASM	*Pascopyrum smithii*	47–235	–
	Canada wildrye	ELCA4	*Elymus canadensis*	47–235	–
3	**Grass-likes**			94–470	
	sedge	CAREX	*Carex*	94–376	–
	rush	JUNCU	*Juncus*	47–235	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–235	–
Forb					
4	**Forbs**			235–470	
	Forb, native	2FN	*Forb, native*	47–235	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	47–141	–
	scurfpea	PSORA2	*Psoralidium*	47–141	–
	western dock	RUAQ	*Rumex aquaticus*	0–94	–
	ragwort	SENEC	*Senecio*	47–94	–

	stiff sunflower	HEPA19	*Helianthus pauciflorus*	47–94	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	47–94	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	47–94	–
	Canadian anemone	ANCA8	*Anemone canadensis*	47–94	–
	Indianhemp	APCA	*Apocynum cannabinum*	47–94	–
	showy milkweed	ASSP	*Asclepias speciosa*	47–94	–
	aster	ASTER	*Aster*	47–94	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	47–94	–
	white heath aster	SYER	*Symphyotrichum ericoides*	47–94	–
	vervain	VERBE	*Verbena*	47–94	–
	mint	MENTH	*Mentha*	47–94	–
	stiff goldenrod	OLRI	*Oligoneuron rigidum*	47–94	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	47–94	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–94	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	0–47	–
	cinquefoil	POTEN	*Potentilla*	0–47	–
	horsetail	EQUIS	*Equisetum*	0–47	–
	northern bedstraw	GABO2	*Galium boreale*	0–47	–
	gentian	GENTI	*Gentiana*	0–47	–
	stickseed	HACKE	*Hackelia*	0–47	–
	wood lily	LIPH	*Lilium philadelphicum*	0–47	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–47	–
Shrub/Vine					
5	**Shrubs**			47–235	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–141	–
	rose	ROSA5	*Rosa*	47–141	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	47–141	–
	willow	SALIX	*Salix*	0–47	–

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Tall & Mid Warm-Season Grasses**			1175–2350	
	big bluestem	ANGE	*Andropogon gerardii*	940–1880	–
	switchgrass	PAVI2	*Panicum virgatum*	470–940	–
	Indiangrass	SONU2	*Sorghastrum nutans*	235–470	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0–235	–
	prairie cordgrass	SPPE	*Spartina pectinata*	0–235	–
	little bluestem	SCSC	*Schizachyrium scoparium*	0–235	–
2	**Cool-season Grasses**			235–1175	
	Grass, perennial	2GP	*Grass, perennial*	47–470	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	47–470	–
	slender wheatgrass	ELTR7	*Elymus trachycaulus*	47–470	–

	western wheatgrass	PASM	*Pascopyrum smithii*	47–235	–
	Canada wildrye	ELCA4	*Elymus canadensis*	47–235	–
3	**Grass-likes**			94–470	
	sedge	CAREX	*Carex*	94–376	–
	rush	JUNCU	*Juncus*	47–235	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–235	–
4	**Non-Native Grasses**			47–94	
	smooth brome	BRIN2	*Bromus inermis*	47–94	–
	Kentucky bluegrass	POPR	*Poa pratensis*	47–94	–
	Grass, perennial	2GP	*Grass, perennial*	0–47	–
Forb					
5	**Forbs**			235–470	
	Forb, native	2FN	*Forb, native*	47–235	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	47–141	–
	scurfpea	PSORA2	*Psoralidium*	47–141	–
	western dock	RUAQ	*Rumex aquaticus*	0–94	–
	ragwort	SENEC	*Senecio*	47–94	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	47–94	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	47–94	–
	western yarrow	ACMIO	*Achillea millefolium var. occidentalis*	47–94	–
	Canadian anemone	ANCA8	*Anemone canadensis*	47–94	–
	Indianhemp	APCA	*Apocynum cannabinum*	47–94	–
	showy milkweed	ASSP	*Asclepias speciosa*	47–94	–
	aster	ASTER	*Aster*	47–94	–
	wavyleaf thistle	CIUN	*Cirsium undulatum*	47–94	–
	white heath aster	SYER	*Symphyotrichum ericoides*	47–94	–
	vervain	VERBE	*Verbena*	47–94	–
	mint	MENTH	*Mentha*	47–94	–
	stiff goldenrod	OLRI	*Oligoneuron rigidum*	47–94	–
	Canada goldenrod	SOCA6	*Solidago canadensis*	47–94	–
	giant goldenrod	SOGI	*Solidago gigantea*	0–94	–
	Missouri goldenrod	SOMI2	*Solidago missouriensis*	0–47	–
	cinquefoil	POTEN	*Potentilla*	0–47	–
	horsetail	EQUIS	*Equisetum*	0–47	–
	northern bedstraw	GABO2	*Galium boreale*	0–47	–
	gentian	GENTI	*Gentiana*	0–47	–
	stickseed	HACKE	*Hackelia*	0–47	–
	wood lily	LIPH	*Lilium philadelphicum*	0–47	–
	blue-eyed grass	SISYR	*Sisyrinchium*	0–47	–
Shrub/Vine					
6	**Shrubs**			47–235	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–141	–
	rose	ROSA5	*Rosa*	47–141	–

	western snowberry	SYOC	*Symphoricarpos occidentalis*	47–141	–
	willow	SALIX	*Salix*	0–47	–

Animal community

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.

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (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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USDA, NRCS. 2001. The PLANTS Database, Version 3.1 (http://plants.usda.gov). National Plant Data Center, Baton Rouge, LA 70874-4490 USA.
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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.

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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% or less.

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):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. 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 rhizomatous grasses >>

    Sub-dominant: Mid cool-season grasses >

    Other: Grass-likes = forbs > shrubs = mid warm-season bunchgrasses

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

13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** None.

14. **Average percent litter cover (%) and depth (in):**

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Representative value = 4700 lbs/ac air dry with a range of 3500 to 6000 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 bromegrass, Russian olive, Siberian elm

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.