USDA Natural Resources Conservation Service

Ecological site R102CY046NE
Subirrigated

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.

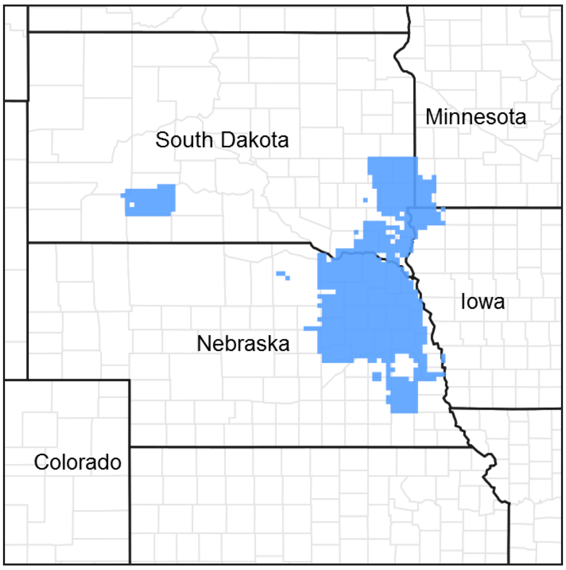

Figure 1. Mapped extent

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

"Subirrigated" range sites for NE NRCS Vegetation Zones 3 & 4

NE Natural Heritage Program/NE Game & Parks Commission: "Lowland Tallgrass Prairie"

General information for MLRA 102C:

Fenneman (1916) Physiographic Regions
Division - Interior Plains
East:
Province - Central Lowland
Section - Till Plains
West:
Province - Great Plains
Section - High Plains

USFS (2007) Ecoregions
Domain - Humid Temperate
Division - Prairie
Province - Prairie Parkland (Temperate)

Section - North-Central Glaciated Plains (251B)

EPA Ecoregions (Omernik 1997)
I - Great Plains (9)
II - Temperate Prairies (9.2)
III - Western Corn Belt Plains (9.2.3) IV - Loess Prairies (47a)
IV - Northeastern Nebraska Loess Hills (47k)
IV - Transitional Sandy Plain (47l)

Ecological site concept

This site has a seasonally high water table from 1.5 to 3.5 feet, with additional moisture received from higher adjacent areas as run-on. This increases plant production while also “buffering” variability caused by fluctuating weather conditions. However, relatively minor changes in local elevation can dramatically affect the plant community and this site often occurs in a complex with other sites straddling this water table depth range.

Associated sites

R102CY044NE	**WET LAND** This site typically occurs in the lowest areas, or where hydrology otherwise supports a community heavily dominated by hydrophytic vegetation.
R102CY045NE	**WET SUBIRRIGATED** This site occurs on lower relief with a seasonally high water table within 24" and a marked increase in hydrophytic vegetation.
R102CY048NE	**Loamy Overflow** This site occurs on surrounding higher areas with significantly lower production.

Similar sites

R102CY044NE	**WET LAND** This site is saturated at or near the surface and often ponded. Gleying is common.
R102CY048NE	**Loamy Overflow** This site does not show evidence of a seasonally high water table within 42" of the surface. Defining hydrologic influences are driven by occasional to frequent flooding.
R102CY045NE	**WET SUBIRRIGATED** This site is seasonally saturated 0-24" of the surface but not normally ponded.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site predominantly occurs on nearly level to gently sloping floodplains and interdunes on sandhill valleys (0-3% slopes). A few areas are in swales, stream terraces, alluvial fans, and on foot slopes. It predominantly receives runoff from adjacent sites, has a seasonally high water table from 43 to 102 centimeters from November-May, does not pond, and may flood occasionally for a brief duration.

Refer to the 102C Ecosite Key for field verification.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Interdune (3) Swale
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	183–457 m
Slope	0–3%
Water table depth	61–107 cm
Aspect	Aspect is not a significant factor

Climatic features

Most of the rainfall occurs as high-intensity, convective thunderstorms during the growing season. Peak precipitation occurs from the middle of spring to early in autumn. Winter precipitation occurs as snow (USDA/NRCS 2006).

The average annual temperature gradient trends higher from north (45°F/7°C) to south (51°F/11°C).

The average annual precipitation gradient trends higher from northwest (25”/64cm) to southeast (31”/79cm).

The annual snowfall ranges from about 24" (60cm) in the southern part of the area to 34" (85cm) in the northern part.

The following data summary includes weather stations representing the full geographic extent of the MLRA, and is based on 70% probabilities (NOAA/UNL) meaning that actual observed climate conditions may fall outside these ranges 30% of the time. Furthermore, climatic events can manifest many different ways. For example, abnormally dry periods could occur as 3 consecutive drought years out of 10, 3 individual years separated by “normal” years, or some combination. Tree-ring records indicate that portions of the Great Plains have also historically experienced droughts lasting several decades, so plant community response will largely depend on the manner in which climatic variability is realized in interaction with past and current land management.

Table 3. Representative climatic features

Frost-free period (average)	161 days
Freeze-free period (average)	181 days
Precipitation total (average)	787 mm

Influencing water features

The soil profile is endosaturated by an unperched water table produced by lateral subsurface flow from surrounding higher areas and/or adjacent water bodies.

Soil features

These are predominantly very deep, somewhat poorly to moderately well drained soils. The surface texture is predominantly silt loam, loam, or silty clay loam from 0 to 18 centimeters and the Subsurface Texture Groups are Loamy or Sandy from 18 to 203 centimeters.

Rills, gullies, and water flow patterns are not inherent to this site. Pedestalling is none to slight. Soil aggregate stability should be high.

Major soils assigned to this site include Ackmore, Boel, Coleridge, Els, Elsmere, Gibbon, Lamo, Ord, Primghar,

Table 4. Representative soil features

Surface texture	(1) Silty clay loam (2) Silt loam (3) Loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Slow to very rapid
Soil depth	203 cm
Surface fragment cover <=3"	0–7%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	4.83–23.88 cm
Calcium carbonate equivalent (0-101.6cm)	0–3%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	5.6–9
Subsurface fragment volume <=3" (Depth not specified)	0–8%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

The foremost driver influencing this site is a water table that serves to bolster production, especially in times of reduced precipitation. Relatively minor changes in local elevation can dramatically affect the plant community, and this site often occurs in a complex with other sites straddling this water table depth range, particularly Loamy Lowland, Loamy Overflow, and Wet Subirrigated. Plant community composition may also experience similar changes through disturbances that affect the water table itself, such as extended dry or wet cycles. Local and regional anthropogenic factors can further influence the water table through drainage, flow regulation, stream channelization, etc.

This site developed with occasional fires being part of the ecological processes. It is presumed that the historic fires generally occurred every 3-4 years and ameliorated the relatively rapid accumulation of excessive litter. It is also believed that pre-European inhabitants may have used fire as a management tool for attracting herds of large migratory herbivores (bison, elk, and/or deer.) The impact of fire over the past 100 years has been relatively insignificant due to the human control of wildfires and the lack of acceptance of prescribed fire as a management tool.

The degree of herbivory (feeding on herbaceous plants) has a significant impact on the dynamics of the site. Historically, periodic grazing by herds of large migratory herbivores was a primary influence. Secondary influences of herbivory by species such as grasshoppers and root feeding organisms impacted the vegetation historically, and continue to this day. The management of herbivory by humans through grazing of domestic livestock and/or manipulation of wildlife populations has been a major influence on the ecological dynamics of the site. This management coupled with climate largely dictates the plant communities for the site.

The plant community for this site is dynamic due to the complex interaction of many ecological processes. The interpretive plant community for this site is the reference state. The reference state has been determined by the study of rangeland relic areas, areas protected from excessive disturbance and areas under compatible grazing strategies. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts have also been used.

The following is a diagram that illustrates the common plant communities that can occur on the site and the pathways among communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model

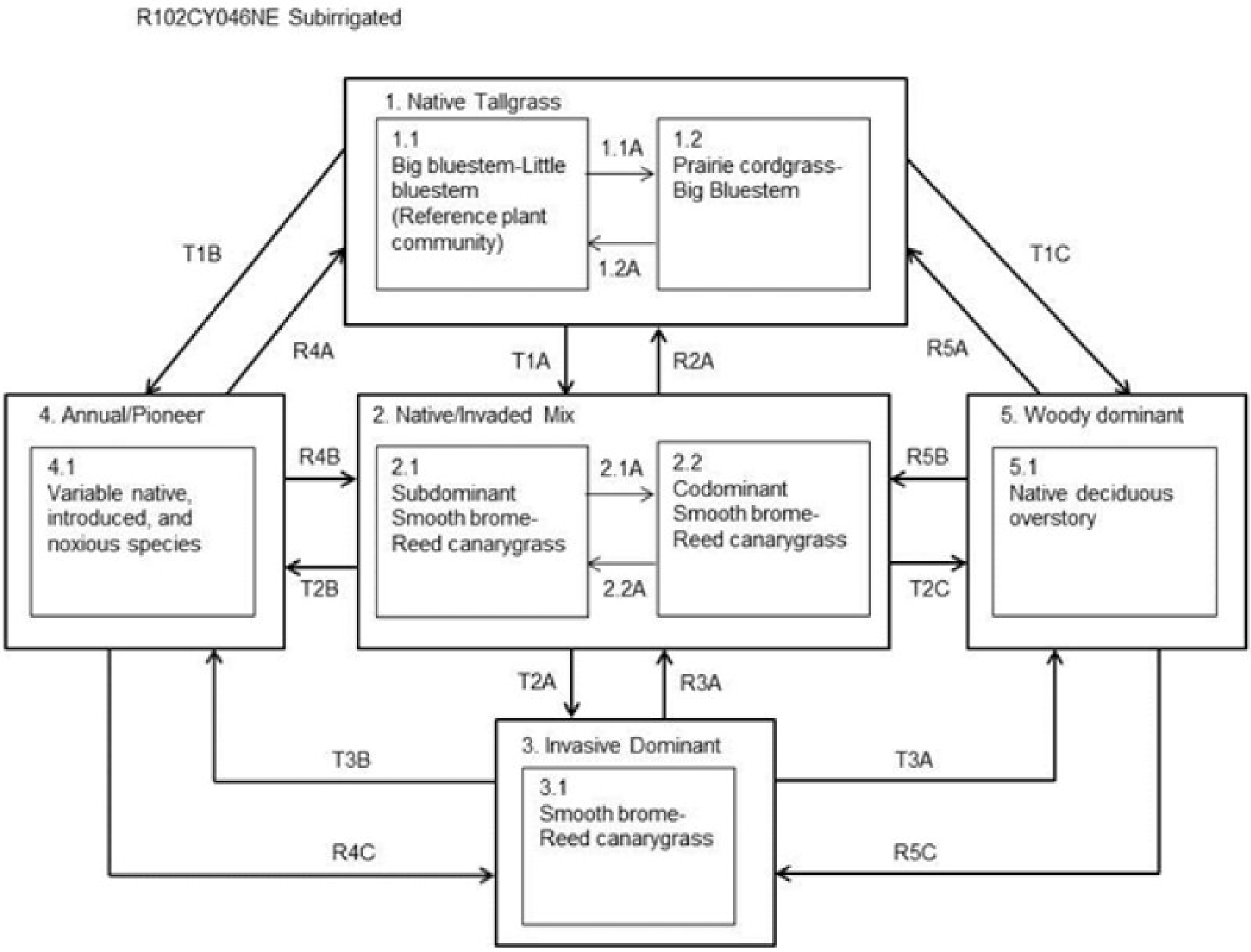

Figure 4. R102CY046NE Subirrigated

State 1
Native tallgrass

This state comprises the communities within the range of natural variability under historic conditions and disturbance regimes. Patterns created by wildlife use and fire would have created a mosaic of communities across the landscape; however, warm-season tallgrasses are dominant, with a subdominant to minor contribution from native cool-season grasses, forbs, and shrubs. Fire and bison herbivory were the dominant disturbance regimes that historically maintained the tallgrass dominance with a diverse forb component. Furthermore, bison grazing was closely linked to fire patterns as the animals preferred grazing burned areas offering lush regrowth devoid of decadence and of higher nutritive quality. Thus, historic plant communities were subjected to occasional burning and grazing, with substantial rest/recovery periods as the fuel load rebuilt to eventually start this process again. Fire return intervals of 3-4 years served to suppress woody species, particularly the various deciduous tree and shrub species prevalent in adjacent riparian corridors. The degree to which observed conditions represent this state largely depends on how closely the management has mimicked these past disturbance effects.

Community 1.1
Big bluestem-Little bluestem (Andropogon gerardii-Schizachyrium scoparium)

Figure 5. Subirrigated 1.1

This is the interpretive plant community and can be found on areas that are properly managed with prescribed grazing that allows for adequate recovery periods following each grazing event. The plant community consists of 80-95% grasses and grass-likes, 5-10% forbs and 0-5% shrubs. Dominant grasses include big bluestem, indiangrass, and switchgrass. Other grasses and grass-likes are little bluestem, sideoats grama, western wheatgrass, and sedges. Forb species are diverse and often include western ragweed and Missouri goldenrod. This plant community is diverse, stable, and productive. Plant community dynamics, nutrient cycles, water cycles, and energy flow are functioning properly. Plant litter is properly distributed with negligible movement off-site and natural plant mortality is very low. This community is resistant to many disturbances except continuous, season-long heavy grazing, tillage, or non-use. Broadcast herbicide application will dramatically reduce forb diversity and abundance. Total annual production, during an average year, ranges from 4300 to 5600 pounds per acre air-dry weight and will average 5100 pounds.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	4612	5145	5279
Forb	247	429	684
Shrub/Vine	–	143	325
Total	**4859**	**5717**	**6288**

Figure 7. Plant community growth curve (percent production by month). NE1021, 102C Warm-season. Warm-season grass, MLRA 102C.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	7	18	23	26	16	6	2	0	0

Community 1.2

Prairie cordgrass-Big bluestem (Spartina pectinata-Andropogon gerardii)

Figure 8. Subirrigated 1.2

Prairie cordgrass has replaced big bluestem as the dominant species. Other species, such as reed canarygrass, little bluestem, and western wheatgrass have also increased. While still within the range of natural variability, energy capture, nutrient cycling, and hydrology are not functioning at their full potential relative to the reference condition.

Figure 9. Plant community growth curve (percent production by month). NE1021, 102C Warm-season. Warm-season grass, MLRA 102C.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	7	18	23	26	16	6	2	0	0

Pathway 1.1A
Community 1.1 to 1.2

Big bluestem-Little bluestem (Andropogon gerardii-Schizachyrium scoparium)

Prairie cordgrass-Big bluestem (Spartina pectinata-Andropogon gerardii)

Grazing management which does not provide adequate recovery periods will cause a shift from big bluestem and Indiangrass towards less palatable species, particularly prairie cordgrass.

Pathway 1.2A
Community 1.2 to 1.1

Prairie cordgrass-Big bluestem (Spartina pectinata-Andropogon gerardii)

Big bluestem-Little bluestem (Andropogon gerardii-Schizachyrium scoparium)

Management that provides adequate recovery periods and does not annually prevent tallgrass seedset or otherwise impair vigor will facilitate a return to community phase 1.1. In the case of dought, the return to more typical precipitation patterns will promote shift towards tallgrass species.

State 2
Native/invaded mix

This state can manifest three ways: 1) the appearance of introduced cool-season grasses, 2) the expansion of deciduous shrubs and/or trees, or 3) some combination of these. Kentucky bluegrass and smooth brome are the primary cool-season grass invaders in this region, commonly found in roadsides, disturbed areas, and pastures intentionally seeded for cool-season forage. Management practices and/or environmental conditions that are not favorable to native grass vigor may allow introduced grasses to invade the site thereby decreasing native diversity and abundance, particularly of forbs. While reed canarygrass is a native, it may act in much the same way as the introduced species. In the absence of the historic fire regime, woody deciduous species may also expand to become an influential component of the community. The invasive component tends to have very high reslience, is extremely difficult to eradicate, and what might be considered a new "contemporary" range of natural variability is seen as competition between the native grasses and introduced/woody species for space and resources.

Community 2.1
Subdominant Smooth brome-Reed canarygrass (Bromus inermis-Phalaris arundinaceae)

While native warm-season grasses still dominate the site, introduced cool-season species have established a foothold in the system and can be found interspersed throughout the stand. The stand may still have a native tallgrass appearance overall, but brome and/or reed canarygrass can be easily found. Deciduous shrub/tree species may also have begun to expand into areas where they did not persist historically, but the overall appearance can vary depending on the propagation method of a particular species.

Figure 10. Plant community growth curve (percent production by month). NE1022, Warm-season dominant, cool-season subdominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	9	19	23	24	13	7	3	0	0

Community 2.2
Codominant Smooth brome-Reed canarygrass (Bromus inermis-Phalaris arundinaceae)

Figure 11. Subirrigated 2.2

This community is comprised of a relatively even mix of native grasses and invasive species overall. This may manifest as a well-distributed interspersion of natives and invaders, as distinct patches wherein competitors dominate locally, or some combination. Forb diversity and abundance is further diminished.

Figure 12. Plant community growth curve (percent production by month). NE1023, Warm-season, cool-season codominant.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	10	23	26	16	10	7	4	1	0

Pathway 2.1A
Community 2.1 to 2.2

Management and/or environmental conditions have afforded a persisting competitive advantage to introduced cool-season grasses, and they begin to dominate the ecological dynamics of the site. The robust invasive component is able to quickly and effectively exploit opportunities to outcompete and displace natives. Repeated summer use of an area will place the bulk of stressor impacts on native plants, reducing native vigor and allowing invaders to thrive. Likewise, a climate pattern limiting natural moisture to the spring and fall months coincides with peak cool-season growth and may support a similar process.

Pathway 2.2A
Community 2.2 to 2.1

The native component remains in an abundance that can facilitate a return towards more historic conditions if management is modified to shift stressor impacts to the invasive species, and promote warm-season grass vigor. Environmental conditions and/or disturbance regimes that strongly favor warm-season grasses can also trend the site towards the reference.

State 3
Invasive dominant

Introduced cool-season invasion has progressed to the point that native species comprise a negligible portion of the community and the aggressively rhizomatous invasives preclude native germination and seedling survival. The native component may be completely absent, and the site resembles a seeded pasture. Alternatively, the dominant invasives may be deciduous woody species. Woody competitiveness for sunlight, water, space, and other resources continues to increase as desirable herbaceous species are shaded out, crowded out, or otherwise suppressed.

Community 3.1
Smooth brome-Reed Canarygrass (Bromus inermis-Phalaris arundinaceae)

Figure 13. Subirrigated 3.1

This community is typically composed of smooth brome with bluegrass interspersed among the brome tillers. Warm-season natives, if present, are sparse yet often conspicuous due to pronounced differences in growth habits and metabolic pathways. Community structure and function have been dramatically simplified relative to the reference condition, and very few biotic functional groups are represented in amounts that would influence ecological function. The invasive grass root skein provides good site stability; however, replacement of the deeper roots and complex bunchgrass canopy with the shallower roots and erect tiller canopy of the invaders results in reduced interception and infiltration rates.

Figure 14. Plant community growth curve (percent production by month).
NE1024, Cool-season. Smooth brome/Kentucky bluegrass.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	13	25	28	8	6	9	5	2	0

State 4
Annual/pioneer

Nutrient cycling, hydrologic function, and/or soil stability have been severely altered, and possibly compromised. This is a highly variable state in which the specific plants observed will depend largely on the original community and the nature of the disturbance. This condition encompasses (but is not necessarily limited to) events such as severe fire impacts, heavy continuous grazing, heavy nutrient inputs, and abandoned cropland.

Community 4.1
Variable native and introduced

Figure 15. Subirrigated 4.1

This community is heavily dominated by annual plants that thrive in disturbed areas and often includes annual ragweed, hoary verbena, or amaranths. It is also particularly vulnerable to noxious weed invasion with the most common species being musk and Canada thistles. Leafy spurge becomes more common northward in the MLRA.

State 5
Woody dominant

Under historic disturbance regimes, frequent and uncontrolled fire and wildlife browsing served to keep woody species in check. However, in the absence of fire (either wild or prescribed), it's not uncommon for the woody trees and shrubs normally limited to riparian areas to expand into the floodplains, regardless of herbaceous community composition. Wildlife may introduce a seed source to areas not associated with a waterway, such as interdunal depressions.

Community 5.1
Native deciduous overstory

Figure 16. Subirrigated 5.1a

Figure 17. Subirrigated 5.1b early encroachment

Deciduous woody species have encroached and established, typically with species such as maples, cottonwood, boxelder, green ash, and swamp oak. Eastern redcedar may also establish, but is not usually as dominant as seen on drier sites.

Transition T1A
State 1 to 2

In the presence of introduced cool-season grasses, environmental conditions and/or management that reduces native vigor and stand resilience, and frees up resources (space, sunlight, nutrients, water) will allow for colonization of Kentucky bluegrass, smooth brome and/or reed canarygrass. Likewise, similar processes may also allow for woody species to expand, particularly willows and cottonwoods.

Transition T1B
State 1 to 4

There are many possible triggers for this transition that may occur as acute events (e.g. plowing) or cumulative impacts of chronic events (e.g. long-term undermanaged grazing.) The absence of deep-rooted perennial cover exposes the site to topsoil loss, open nutrient cycle, and free space which collectively allow for opportunistic annual species to dominate.

Transition T1C
State 1 to 5

All herbaceous communities are vulnerable to woody encroachment in the absence of fire and/or browsing nad hoof action impacts. This is particularly prominent in areas adjacent to riparian corridors which supply a constant seed source. As tree establishment progresses, the conditions grow increasingly favorable for woody deciduous germination and growth.

Restoration pathway R2A
State 2 to 1

Eradication of introduced cool-season grasses from this site will require long-term, targeted management efforts to create an adverse environment during the spring and late fall when bluegrass and brome are most actively growing, with favorable conditions during the summer to promote native warm-season species. Targeted practices such as prescribed burning, flash grazing, and herbicide are often employed at strategic times of the year to set back undesirable species. The combination of practices should strive to mimic the historic disturbance regimes to which the desirable native species are best adapted.

Transition T2A
State 2 to 3

If the conditions which initiated and fomented the colonization and expansion of cool-season invasion are not removed or mitigated, stand composition will continue to shift in this direction and begin to resemble a monoculture of brome and/or canarygrass. Due to the dense rhizomatous root mat of brome and bluegrass, native species suffer decreasing opportunities to contribute propagules, and individual plants lost are not replaced by desirable natives.

Transition T2B
State 2 to 4

There are many possible triggers for this transition that may occur as acute events (e.g. plowing) or cumulative impacts of chronic events (e.g. long-term undermanaged grazing.) The absence of deep-rooted perennial cover exposes the site to topsoil loss, open nutrient cycle, and free space which collectively allow for opportunistic annual species to dominate.

Transition T2C
State 2 to 5

All herbaceous communities are vulnerable to deciduous encroachment in the absence of fire and/or browsing impacts. This is particularly prominent in areas adjacent to riparian corridors which supply a constant seed source. As tree establishment progresses, the conditions grow increasingly favorable for woody deciduous germination and growth.

Restoration pathway R3A
State 3 to 2

Aggressive intervening actions will be required to simultaneously recolonize native grasses and suppress vigor in undesirable species. Restoration follows the same principles as the R2A pathway, but may also require native range seeding if the latent seedbank is inadequate.

Transition T3B
State 3 to 4

Nutrient cycling, hydrologic function, and/or soil stability have been severely altered, and possibly compromised. This is a highly variable state in which the specific plants observed will depend largely on the original community and the nature of the disturbance.

Transition T3A
State 3 to 5

All herbaceous communities are vulnerable to deciduous encroachment in the absence of fire and/or browsing impacts. This is particularly prominent in areas adjacent to riparian corridors which supply a constant seed source. As tree establishment progresses, the conditions grow increasingly favorable for woody deciduous germination and growth.

Restoration pathway R4A/B/C
State 4 to 1

Restoration strategies will depend on the nature of the disturbance and the viability of the seedbank. On pastures, changes to gazing management and favorable moisture conditions may produce a perennial community. However, in abandoned cropland range seeding will likely be necessary to recolonize desirable perennial species.

Restoration pathway R5A/B/C
State 5 to 1

The combination of tree size, reduced herbaceous understory, and more mesic conditions makes it increasingly difficult for natural disturbances to restore/maintain the historic tallgrass community, and mature woodlands can no longer be restored with fire. Intensive brush management will be required to mechanically remove the established overstory. Woody control and maintenance will be an ongoing process and may also require chemical methods if sprouting species are present.

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	**Tall warm-season**			2572–4287	
	big bluestem	ANGE	*Andropogon gerardii*	1429–2287	–
	Indiangrass	SONU2	*Sorghastrum nutans*	572–1143	–
	switchgrass	PAVI2	*Panicum virgatum*	286–857	–
	prairie cordgrass	SPPE	*Spartina pectinata*	286–572	–
2				857–2001	
	little bluestem	SCSC	*Schizachyrium scoparium*	857–1143	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	0–572	–
3	**Cool-season**			286–1143	
	Canada wildrye	ELCA4	*Elymus canadensis*	0–286	–
	western wheatgrass	PASM	*Pascopyrum smithii*	0–286	–
	reed canarygrass	PHAR3	*Phalaris arundinacea*	0–286	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–286	–
	foxtail barley	HOJU	*Hordeum jubatum*	0–286	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–118	–
	prairie wedgescale	SPOB	*Sphenopholis obtusata*	0–118	–
	needle and thread	HECO26	*Hesperostipa comata*	0–118	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–118	–
4	**Grass-like**			286–572	
	Graminoid (grass or grass-like)	2GRAM	*Graminoid (grass or grass-like)*	57–286	–
	sedge	CAREX	*Carex*	0–286	–
	broom sedge	CASC11	*Carex scoparia*	0–286	–
	awlfruit sedge	CAST5	*Carex stipata*	0–286	–
	rush	JUNCU	*Juncus*	0–286	–
	cloaked bulrush	SCPA8	*Scirpus pallidus*	0–286	–
	common threesquare	SCPU10	*Schoenoplectus pungens*	0–286	–
Forb					
5				286–572	
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–286	–
	Forb (herbaceous, not grass nor grass-like)	2FORB	*Forb (herbaceous, not grass nor grass-like)*	0–286	–
	Illinois bundleflower	DEIL	*Desmanthus illinoensis*	0–286	–
	scouringrush horsetail	EQHY	*Equisetum hyemale*	0–286	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–286	–
	Maximilian sunflower	HEMA2	*Helianthus maximiliani*	0–286	–
	stiff sunflower	HEPA19	*Helianthus pauciflorus*	0–286	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–286	–
	blackeyed Susan	RUHI2	*Rudbeckia hirta*	0–286	–

	giant goldenrod	SOGI	*Solidago gigantea*	0–286	–
	swamp verbena	VEHA2	*Verbena hastata*	0–286	–
	white heath aster	SYER	*Symphyotrichum ericoides*	0–118	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–118	–
	stiff goldenrod	OLRI	*Oligoneuron rigidum*	0–118	–
	Virginia strawberry	FRVI	*Fragaria virginiana*	0–118	–
	onion	ALLIU	*Allium*	0–118	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–118	–
	false boneset	BREU	*Brickellia eupatorioides*	0–118	–
	white prairie clover	DACA7	*Dalea candida*	0–118	–
	purple prairie clover	DAPU5	*Dalea purpurea*	0–118	–
Shrub/Vine					
6				0–286	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–286	–
	leadplant	AMCA6	*Amorpha canescens*	0–286	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–286	–
	eastern poison ivy	TORA2	*Toxicodendron radicans*	0–196	–
	prairie rose	ROAR3	*Rosa arkansana*	0–196	–

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 browsing livestock such as goats or sheep that will more heavily utilize invasive forbs and brush. Carrying capacity and production estimates are conservative estimates that should be used only as guidelines in initial stages of grazing lands planning.

Often, the 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. Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide year-long forage for cattle, sheep, or horses. During the dormant period, the protein levels of the forage may be lower than the minimum needed to meet livestock (primarily cattle and sheep) requirements.

Suggested stocking rates (carrying capacity*) for cattle under continuous season-long grazing under normal growing conditions are listed below:

- 1.1 Big bluestem-Little bluestem; 5100 lbs/acre production and 1.40 AUM/acre

- 1.2 Prairie cordgrass-Big bluestem; 4050 lbs/acre production and 1.11 AUM/acre

- 2.1 Subdominant smooth brome-reed canarygrass; 4350 lbs/acre production and 1.19 AUM/acre

- 2.2 Codominant smooth brome-reed canarygrass; 4650 lbs/ac and 1.27 AUM/acre with 50% or more introduced cool-season component

- 3.1 Smooth brome-Reed canarygrass; 3900 lbs/ac and 1.07 AUM/ac, unfertilized, non-irrigated naturalized community. Refer to Forage Suitability Groups for cool-season pasture under a higher management level.

*Carrying capacity based on continuous season-long grazing by cattle under average growing conditions, 25% harvest efficiency. Air dry forage requirements based on 3% of animal body weight, or 912 lbs/AU/month.

If grazing distribution problems occur, stocking rates must be reduced to maintain plant health and vigor. Carrying capacity and production estimates are conservative estimates that should be used only as guidelines in the initial stages of the conservation planning process. Utilizing a rotational grazing system that allows for adequate rest and recovery will increase plant vigor and carrying capacity. Often, the current plant composition does not entirely match any particular plant community (as described in this ecological site description). Because of this, a field visit is recommended to document plant composition and production. More precise carrying capacity estimates can be calculated based on actual site information along with animal preference data, particularly when livestock other than cattle are involved. With consultation of the land manager, more intensive grazing management may result in improved harvest efficiencies and increased carrying capacity.

Inventory data references

Information presented here has been derived from RANGE-417 archives, Rangeland NRI, and other inventory data. Field observations from range-trained personnel were also used. In addition to the multitude of NRCS field office employees and private landowners that helped with site visits and local knowledge, those involved in developing this site include:

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Contributors

Stu McFarland

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)	Stu McFarland, Nadine Bishop
Contact for lead author	
Date	08/01/2013
Approved by	Nadine Bishop
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% as very small (<2”) patches, however, bare ground can be expected to be much higher if litter has been consumed by recent fire.

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 stability rating of 6

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** More stable locations typically have a mollic epipedon. In alluvial settings, A horizon can be much more variable. Refer to the Official Series Description for the range of characteristics of site-specific soils.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Robust herbaceous canopy provides nearly 100% coverage reducing raindrop energy, and abundant litter slows overland flow for improved 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: warm-season tallgrasses >>

    Sub-dominant: warm-season midgrasses >

    Other: cool-season grasses = grasslikes = forbs > shrubs

Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Slight evidence of perennial decadence or mortality.

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14. **Average percent litter cover (%) and depth (in):** However, litter cover could be much lower if consumed by recent fire.

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Production ranges from 4,300 - 5,600 lbs/ac (air-dry weight) depending on climatic conditions. The reference representative value production is 5,100 lbs/ac (air-dry weight).

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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:** Eastern redcedar, Kentucky bluegrass, smooth brome, Canada thistle, roughleaf dogwood, buckbrush, and Siberian elm are some of the more common invaders.

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17. **Perennial plant reproductive capability:** Flowering, seed production, and rhizomatous/stoloniferous growth are apparent and not hindered by plant stress/reduced vigor.
