USDA Natural Resources Conservation Service

Ecological site R071XY029NE
Loamy Overflow

Accessed: 05/17/2024

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.

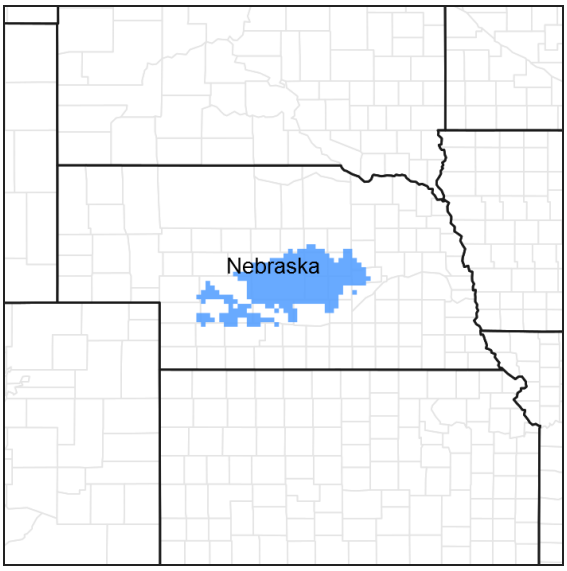


Figure 1. Mapped extent

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.

MLRA notes

Major Land Resource Area (MLRA): 071X–Central Nebraska Loess Hills

This PROVISIONAL ECOLOGICAL SITE has been developed to meet the standards established in the National Ecological Site Handbook. The information associated with this ecological site does not meet the Approved Ecological Site Description Standard, but it has been through a Quality Control and Quality Assurance processes to assure consistency and completeness. Further investigations, reviews and correlations are necessary before it becomes an Approved Ecological Site Description.

MLRA 71 is named “The Central Nebraska Loess Hills”, and is located exclusively in Nebraska. The approximately 5.3 million acre landscape covers all or parts of 21 counties, primarily Custer, Dawson, Buffalo, Sherman, Howard, Valley, Greeley and Hall. The physical appearance of the landscape is dominated by loess hills dissected by the North, Middle and South Loup Rivers and their tributaries. The Platte River defines the southern border.
The elevation in MLRA 71 ranges from over 3,000 to less than 1,700 feet above sea level, with average local relief stretching from 20 to 200 feet. The predominate soil orders are mesic, udic Mollisols and Entisols, commonly represented by the Coly, Uly, Cozad, Hord, Hall and Holdredge soil series.
Loess overlays the surface of almost all of the uplands in this MLRA. Alluvial clay, silt, sand, and gravel are deposited in the stream and river valleys, and can be extensive in the major drainages. Terraces are common in the valleys along the river systems.
The matrix vegetation type is mixed-grass prairie, with big and little bluestem, switchgrass, Indiangrass, and sideoats and blue grama making up the bulk of the warm-season species, while western wheatgrass is the

dominant cool season species.
The primary large-patch vegetative component of the landscape is dominated by Needle-and-thread, prairie sandreed, sand and little bluestem, and blue grama grass.
The majority of the small-patch communities are associated with upland playas and the wetter sites found along the floodplains.
Forty four percent of the land in this MLRA has been broken out of native prairie and farmed; mostly corn, alfalfa and some soybeans, while forty eight percent of the grasslands remain intact. Livestock grazing, primarily cattle, is a major industry here.
Wildlife flourishes in this combination of crop and grassland environment, with both mule and white-tailed deer being the most abundant wild ungulate. A variety of smaller species, including coyote, raccoon, opossum, porcupines, muskrat, beaver, squirrel and mink thrive in the region, as well as a suite of grassland and upland birds. The rivers, streams and lakes harbor excellent fisheries.
This landscape developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores and repeated natural or man-caused wildfire. Other biotic and abiotic factors also typically influence soil/site development. This is a disturbance driven ecosystem, evolving under the influences of herbivory, fire, and variable climate. Historically, these processes created a heterogenous mosaic of plant communities and structure heights across the region. Any given site in this landscape experienced fire every 7 to 9 years. The fires were caused both by lightning strikes, and were set by native Americans, who used fire for warfare, signaling, and to refresh the native grasses. These people understood the value of fire as a tool, and that the highly palatable growth following a fire provided both excellent forage for their horses, and attracted grazing game animals such as bison and elk.
Even as post European settlement's alteration of the fire regime allows the expansion of the woody component of the native prairie, introduction of eastern red cedar as a windbreak component further facilitates invasion by this species.
While eastern red cedar is native to Nebraska, the historic population in MLRA 71 was limited to isolated pockets in rugged river drainages that were subsequently insulated from fire, or non-existent. Widespread plantings of windbreaks with eastern red cedar as a primary component has provided a seed source for the aggressive woody plant. The ensuing encroachment into the native grasslands degrades the native wildlife habit and causes significant forage loss for domestic livestock. However, since it is not a root sprouter, eastern red cedar is very susceptible to fire when under six feet tall. Management with prescribed fire is exceedingly effective if applied before this stage. Larger cedars can also be controlled with fire, but requires the use of specially designed ignition and suppression techniques.
Fragmentation of the native grasslands by conversion to cropland, transportation corridors and other development by European man has effectively disrupted the natural fire regime of this ecosystem. This has allowed encroachment by native and introduced shrubs and trees into the remnants of the native prairie throughout the MLRA. Aggressive fire suppression policies have exacerbated this process to the point that shrub and tree encroachment is a major ecological issue in the majority of both native and re-seeded grasslands.

Classification relationships

Major Land Resource Area 71 (USDA-Natural Resources Conservation Service, 2006)

Revision Notes:
A PROVISIONAL ECOLOGICAL SITE is a conceptual grouping of soil map unit components within a Major Land Resource Area (MLRA) based on the similarities in response to management. Although there may be wide variability in the productivity of the soils grouped into a Provisional Site, the soil vegetation interactions as expressed in the State and Transition Model are similar and the management actions required to achieve objectives, whether maintaining the existing ecological state or managing for an alternative state, are similar. Provisional Sites are likely to be refined into more precise group during the process of meeting the APPROVED ECOLOGICAL SITE DESCRIPTION criteria.

Ecological site concept

This site is found on active floodplains subject to inundation. Additional moisture is received as run-on originating from higher on the landscape. Occasional to frequent flooding redistributes soil and plant materials through erosion and deposition, and can locally affect production and species composition.

Associated sites

R071XY028NE	**Loamy Lowland** Loamy Lowland: Positioned upslope and adjacent to Loamy Overflow.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Andropogon gerardii* (2) *Schizachyrium scoparium*

Physiographic features

This site occurs on flood plains of river valleys and in narrow drainage ways of uplands. This site receives runoff from areas higher on the landscape. Flooding is occasional to frequent and sedimentation is common on this site.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding frequency	None
Slope	0–5%
Aspect	Aspect is not a significant factor

Climatic features

Annual precipitation averages around 26 inches per year. Occasional strong storms may bring brief periods of high winds with gusts to more than 60 miles per hour.

Growth of native cool season plants begins in early April and continues to about mid June. Native warm season plants begin growth in early June, and continue to early August. Green up of cool season plants may occur in September and October.

Table 3. Representative climatic features

Frost-free period (average)	137 days
Freeze-free period (average)	156 days
Precipitation total (average)	660 mm

Climate stations used

- (1) CANADAY STEAM PLT [USC00251450], Lexington, NE
- (2) KEARNEY 4 NE [USC00254335], Kearney, NE
- (3) LOUP CITY [USC00254985], Loup City, NE
- (4) GRAND ISLAND AP [USW00014935], Grand Island, NE
- (5) ARNOLD [USC00250355], Arnold, NE
- (6) CENTRAL CITY [USC00251560], Central City, NE
- (7) GOTHENBURG [USC00253365], Gothenburg, NE
- (8) NORTH LOUP [USC00256040], North Loup, NE
- (9) RAVENNA [USC00257040], Ravenna, NE
- (10) SAINT PAUL [USC00257515], Saint Paul, NE
- (11) ANSELMO 2 SE [USC00250245], Anselmo, NE

- (12) COMSTOCK [USC00251835], Comstock, NE
- (13) MASON CITY [USC00255250], Mason City, NE
- (14) BROKEN BOW 2 W [USC00251200], Broken Bow, NE
- (15) BURWELL [USC00251345], Burwell, NE
- (16) OCONTO [USC00256167], Oconto, NE
- (17) OVERTON 3 W [USC00256439], Overton, NE
- (18) STAPLETON 5W [USC00258133], Stapleton, NE
- (19) TAYLOR [USC00258455], Taylor, NE

Influencing water features

This site occurs on nearly level areas that receive additional water from overflow of intermittent or perennial streams, or runoff from adjacent slopes.

Soil features

These very deep soils are subject to inundation by floodwaters and subsequent sedimentation. Most soils are stratified. Textures are dominantly loamy and silty, but sandy textures may occur in the lower part of the root zone. Free water is usually very deep but may be present in the lower part of some profiles during part of the growing season. Organic matter is generally low to moderate in the surface layer.

Major soil series correlated to this ecological site include: Hobbs.

The Reference Plant Community should exhibit slight to no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are broken, irregular in appearance or discontinuous with numerous debris dams or vegetative barriers. The soil surface is stable and intact. Sub-surface soil layers are non-restrictive to water movement and root penetration. These soils are susceptible to wind and water erosion where vegetative cover is inadequate. Channel cutting, deposition, and removals may occur adjacent to streams.

Table 4. Representative soil features

Surface texture	(1) Sandy loam
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderately slow to moderate
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	17.78–27.94 cm
Calcium carbonate equivalent (0-101.6cm)	0–3%
Soil reaction (1:1 water) (0-101.6cm)	5.8–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

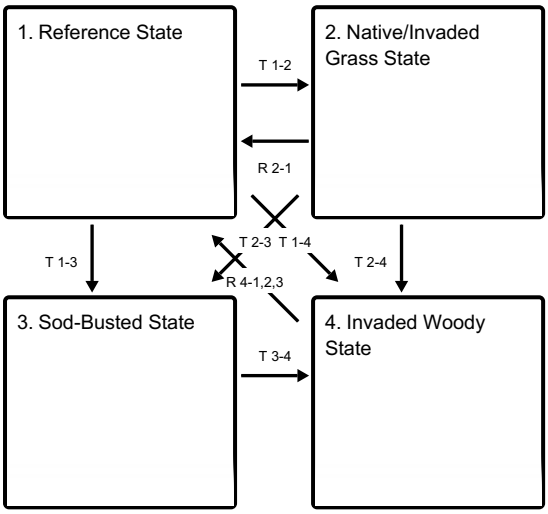
Loamy Overflow sites developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused wildfire, and other biotic and abiotic factors that typically influence soil/site development. This is a disturbance driven site, with the disturbances being herbivory, fire, and

variable climate. The landscape position and association with streams make this site somewhat less susceptible to fire, which allowed woody species to become more abundant than less sheltered sites in the MLRA.

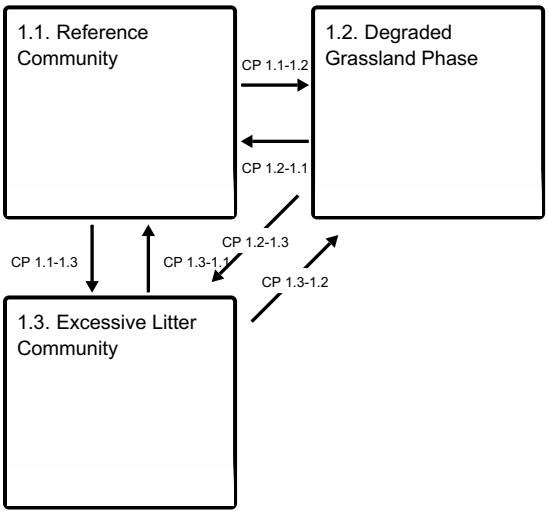
The State and Transition Model (STM) is depicted below, and is made up of a Reference State, a Native/Invaded State, an Invaded Grass State and an Invaded Woody State. Each state represents the crossing of a major ecological threshold due to alteration of the functional dynamic properties of the ecosystem. The main properties observed to determine this change are the soil and vegetative communities, and the hydrological cycle.
Each state may have one or more vegetative communities that fluctuate in species composition and abundance within the normal parameters of the state. Within each state, communities may degrade or recover in response to natural and man caused disturbances such as variation in the degree and timing of herbivory, presence or absence of fire, and climatic and local fluctuations in the precipitation regime. Periodic flooding and deposition events can cause a wide variability in plant communities and production on this site. The states and communities are described individually in the following pages.

State and transition model

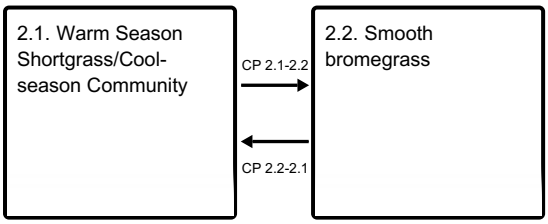
Ecosystem states



State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1. Re-Seeded Community	3.2. Naturally Revegetated Community

State 4 submodel, plant communities

4.1. Invasive Woody Community

State 1
Reference State

This state contains three community phases historically maintained by frequent fire and herbivory (grazing) with adequate recovery periods. High perennial grass cover and production allows for increased soil moisture retention, vegetative production and overall soil quality.

Community 1.1
Reference Community

The Reference Plant Community is primarily tall, warm season grasses with scattered pockets of deciduous trees. Potential vegetation averages 85 percent grasses and grass-like plants, 7 percent forbs, and 8 percent shrubs or trees. The major grasses include big bluestem, little bluestem, and Indiangrass. Other grasses and grass-likes include switchgrass and sedges. Forbs are diverse and include sunflowers, goldenrods, and native legume species. Woody species included in the plant community are coralberry and rose. Some pockets of native trees such as Green ash and Cottonwood occured on this site. The potential for tree encroachment is very high. This plant community is productive and diverse. The diversity in plant species allows for high drought tolerance and moderate flooding tolerance. This is a sustainable plant community in regard to site/soil stability, watershed function, and biologic integrity. The total annual production ranges from 3500 to 4500 pounds of air dry vegetation per acre per year and will average 4000 pounds during an average year but can be affected by flooding events on some sites.

Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3839	4214	4584
Shrub/Vine	–	112	230
Forb	84	157	230
Total	**3923**	**4483**	**5044**

Figure 7. Plant community growth curve (percent production by month). NE7507, Central Loess Plains, native - receiving water flow site. Warm-season dominant on sites receiving runoff water.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	4	9	27	29	15	8	5	2	1	0

Community 1.2
Degraded Grassland Phase

The major grasses include big bluestem and little bluestem. This is considered an At-risk Community Phase which

shows a significant loss of yield in the production due to continuous season long grazing with inadequate recovery periods. Indiangrass has been significantly reduced in the plant community composition. Short, warm season grasses including blue grama, increase in the plant composition. The forb composition remains diverse. The potential is high for tree encroachment or regeneration. This plant community is less productive and the diversity of grasses is lower than the representative plant community and can be impacted by flooding on some sites. Pockets of trees occurred naturally on this site and it is very susceptable to woody encroachment. This site remains a sustainable plant community in regards to site/soil stability, watershed function, and biologic integrity. The total annual production ranges from 3000 to 4000 pounds of air dry vegetation per acre per year and will average 3500 pounds during an average year.

Community 1.3
Excessive Litter Community

The Excessive Litter Community Phase describes the response of the community to the removal of the natural disturbances of herbivory and fire. As the duff layer deepens, infiltration of the precipitation is interrupted and evaporation increases significantly, simulating drouth-like conditions.

Pathway CP 1.1-1.2
Community 1.1 to 1.2

A shift from the Reference Community to the Degraded Grasslands Phase occurs with continuous season long grazing and inadequate recovery periods during the growing season. Repeated grazing of the growing point of tall warm season grasses and grazing below recommended heights are other common reasons for a reduction in tall warm season grasses.

Pathway CP 1.1-1.3
Community 1.1 to 1.3

Interruption of the natural disturbances of herbivory and fire will result in conversion of this community to the Excessive Litter Community.

Pathway CP 1.2-1.1
Community 1.2 to 1.1

A shift from this community phase back to the Reference Community is achieved with prescribed grazing early and late in the growing season to reduce undesirable cool season grasses. Targeting high intensity grazing events during the peak growth period of cool season grasses followed by a 60 day deferment will allow for tall native warm season grasses to increase. Grazing should not remove more than 50 percent of annual growth.

Conservation practices

Access Control
Prescribed Grazing

Pathway CP 1.2-1.3
Community 1.2 to 1.3

Interruption of the natural disturbances of herbivory and fire will result in conversion of this community to the Excessive Litter Community.

Pathway CP 1.3-1.1
Community 1.3 to 1.1

Re-introduction of the natural processes of herbivory and fire will allow the vegetation to return to the previous community.

Pathway CP 1.3-1.2
Community 1.3 to 1.2

Re-introduction of the natural processes of herbivory and fire will allow the vegetation to return to the previous community.

State 2
Native/Invaded Grass State

This state has very little native tall warm season grasses remaining, such as big bluestem and indiangrass. Significant amounts of mid and short native grasses persist with encroachment by introduced grasses and less desireable forbs such as ironweed and western ragweed. Other undesireable forbs will be present that indicate degraded forage productivity, reduced plant vigor and poor soil quailty.

Community 2.1
Warm Season Shortgrass/Cool-season Community

This plant community represents a shift from the Reference State across a plant community threshold. With continued grazing pressure, blue grama, Kentucky bluegrass and other cool season grasses will become the dominant plant species, with only trace remnants of the tall and mid warm season grasses such as big and little bluestem. Continuous and heavy grazing pressure will maintain this plant community in a sod-bound condition. Forb richness and diversity will decrease. Grazing management practices that allow for adequate periods of recovery between grazing events will add in restoration of mid and tall warm season plants. Total annual production ranges from 2200 to 2800 pounds of air dry vegetation per acre per year and will average 2500 pounds.

Figure 8. Plant community growth curve (percent production by month). NE7503, Central Loess Plains, warm season/cool season co-dominant. Native warm-season plant community encroached with cool-season grasses, MLRA 75.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	3	9	27	25	12	10	10	3	1	0

Community 2.2
Smooth bromegrass

This plant community contains predominately smooth bromegrass but also contains native warm season grass remnants. Production on smooth bromegrass dominated plant communities are highly variable depending on the percent composition present and outside inputs such as fertilizer and weed control. Production can range from 2500 lbs/acre to 3000 pounds/acre with an average of 2750 lbs/acre in normal years on rangelands with a smooth bromegrass component of 50 percent or more. Clipping or ocular estimates of production should be conducted to verify current annual production. Prescribed grazing, prescribed burning, or the use of herbicide treatments at critical time periods can reduce the smooth bromegrass component in the plant community.

Figure 9. Plant community growth curve (percent production by month). NE7506, Central Loess Plains, cool season dominant, warm season remnants - receiving water flow site. Cool-season, smooth brome with native warm season remnants, sites receiving water runoff, MLRA 75.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	2	13	27	17	9	12	13	6	1	0

Pathway CP 2.1-2.2
Community 2.1 to 2.2

Transition to the Smooth Bromegrass Community includes the following environmental factors - Triggers: Introduced grass seeding, excessive summer grazing, inadequate rest during the summer, multi season haying and nitrogen fertilizing in spring and/or fall that promote cool season grasses such as smooth bromegrass and reduce the amount of native grasses. Threshold: Smooth bromegrass and/or other non-native native plants are

predominant and there is limited plant species diversity.

Pathway CP 2.2-2.1
Community 2.2 to 2.1

Restoration can be achieved by herbicide treatment and reseeding. If native remnants are present, appropriately timed prescribed fire and a follow up prescribed grazing program may achieve the desired results.

State 3
Sod-Busted State

This threshold is crossed as a result of mechanical disturbance to facilitate production agriculture. If farming operations are suspended, the site can: be abandoned, which will result in the Naturally Revegetated Community, or; be re-seeded to a desired perennial forage mixture, which is described as the Re-seeded Community. Permanent alterations of the soil community and the hydrological cycle make restoration to the original native Reference Community extremely difficult, if not impossible.

Community 3.1
Re-Seeded Community

This plant community does not contain native remnants, and will vary considerably depending on what type of grasses/legumes were planted, how eroded the soil is, how long ago the stand was planted, nitrogen fertilizer use, and past grazing management. Prescribed grazing with adequate recovery periods will be needed to maintain productivity and desirable species. There are several factors that make seeded pasture a different grazing resource than native rangeland. Factors such as species selected, stand density, improved varieties and harvest efficiency all impact the production level and palatability. Species diversity on seeded pasture is often limited to a few species. When seeded pasture and native rangelands are in the same grazing unit, uneven forage utilization will occur. Improve forage utilization by managing this community separately from native rangelands. Total annual production during an average year varies significantly depending on the level of management and grass species seeded. Improved varieties of warm season or cool season grasses are recommended for forage purposes. Single species stands of Big bluestem, Indiangrass or Switchgrass or well managed cool season grasses/legume plantings with improved varieties will yield 4000-5000 lbs/acre/year with an average of 4500 lbs/acre/year.

Community 3.2
Naturally Revegetated Community

This plant community consists of annual and perenial weeds and less desirable grasses. These sites have been farmed (all previous plant communities were destroyed) and abandoned without being reseeded. These sites experience degraded soil quality, increased runoff and reduced water infiltration. This plant community is not stable during the early successional stages. Total annual production during an average year varies significantly depending on the succession stage of the plant community and any management applied to the system.

State 4
Invaded Woody State

This State is a result of the disruption of the natural fire regime, and lack of management in response to an increase in woody species. The native component of woody species increases, as do invading introduced exotic species. Once the canopy cover reaches 15 percent with an average tree height exceeding 5 feet, the threshold is crossed to the Invaded Woody State.

Community 4.1
Invasive Woody Community

Shrubs and trees will establish readily on this site, and some sites could have been Savannahs that contained pockets of trees and shrubs but have increased over time. Typical native trees include Eastern Cottonwood, Green ash, Hackberry, Eastern redcedar, and Honey locust and various native shrubs. Siberian Elm and Eastern redcedar are invasive on these sites. When the Tree Over-story community establishes, this forest or woodland community

should be considered a non-commercial forest. Wood products derived from this community do not necessarily have commercial value. Wood products will be described at a later date as cubic feet per acre.

Figure 10. Plant community growth curve (percent production by month). NE7505, Central Loess Plains, woody encroachment. Woody plant encroachment with warm- and cool-season grasses MLRA 75.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	3	8	12	20	25	14	5	8	4	1	0

Transition T 1-2
State 1 to 2

Transition from the Reference State to the Native/Invaded State includes the following environmental factors - Triggers: Heavy grazing during the summer, inadequate rest during the summer, repeated grazing of growing point, and grazing below recommended heights which allows for encroachment of non-native species and species more tolerant to heavy summer grazing. Threshold: A predominance of introduced cool season grasses and/or lower succession species such as dropseeds, blue grama and/or Kentucky bluegrass.

Transition T 1-3
State 1 to 3

The Reference State is significantly altered by mechanical tillage to allow the site to be placed into production agriculture. The disruption to the plant community, the soil and the hydrology of the system make restoration to a true reference state unlikely.

Transition T 1-4
State 1 to 4

Disruption of the natural fire regime, and the introduction of exotic species such as Russian olive trees causes a major shift in the vegetative community. The resulting impacts to the system cross the threshold into the Invaded Woody State.

Restoration pathway R 2-1
State 2 to 1

Restoration from the Native/Invaded Grass State to the Reference State is achieved by initially deferring grazing during the summer. Planned grazing events in the early spring and late fall will reduce cool season grasses in order to provide native remnants an opportunity to increase. Prescribed fire timed to improve native warm season grasses once fuel loads are increased and grasses have an adequate root system. Use of burn down herbicides in the early spring and late fall when native warm season grasses are dormant can also be beneficial. Once warm season grasses have adequately recovered, ongoing prescribed grazing with adequate rest and recovery during the summer months is important.

Conservation practices

Prescribed Burning
Access Control
Integrated Pest Management (IPM)
Prescribed Grazing

Transition T 2-3
State 2 to 3

The State is significantly altered by mechanical tillage to allow the site to be placed into production agriculture. The disruption to the plant community, the soil and the hydrology of the system make restoration unlikely.

Transition T 2-4
State 2 to 4

Disruption of the natural fire regime and the introduction of exotic species can cause this state to shift to the Invaded Woody State.

Transition T 3-4
State 3 to 4

Disruption of the natural fire regime, and the introduction of exotic species such as Russian olive trees causes a major shift in the vegetative community. The resulting impacts to the system cross the threshold into the Invaded Woody State.

Restoration pathway R 4-1,2,3
State 4 to 1

Restoration from the Invaded Woody State can be achieved with brush management for woody plant control. If re-sprouting brush such as honey locust or elm is present, stumps must be treated after mechanical removal. Ongoing brush management such as hand cutting, chemical spot treatments or periodic prescribed burning is required. If the site has a healthy warm season grass component, this community could quickly return to the previous state with the addition of prescribed grazing with adequate recovery periods.

Conservation practices

Brush Management
Prescribed Burning
Prescribed Grazing

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 Grasses**			1625–2242	
	big bluestem	ANGE	*Andropogon gerardii*	1121–1793	–
	Indiangrass	SONU2	*Sorghastrum nutans*	224–673	–
	switchgrass	PAVI2	*Panicum virgatum*	224–448	–
2	**Mid Warm Season Grasses**			1177–1569	
	little bluestem	SCSC	*Schizachyrium scoparium*	897–1345	–
	sideoats grama	BOCU	*Bouteloua curtipendula*	224–448	–
	composite dropseed	SPCOC2	*Sporobolus compositus var. compositus*	0–224	–
3	**Native Cool Season Grasses**			140–448	
	western wheatgrass	PASM	*Pascopyrum smithii*	90–448	–
	needle and thread	HECOC8	*Hesperostipa comata ssp. comata*	45–224	–
	porcupinegrass	HESP11	*Hesperostipa spartea*	0–224	–
	Scribner's rosette grass	DIOLS	*Dichanthelium oligosanthes var. scribnerianum*	0–135	–
	Canada wildrye	ELCA4	*Elymus canadensis*	0–90	–
	prairie Junegrass	KOMA	*Koeleria macrantha*	0–90	–
4	**Short Warm Season Grasses**			140–448	

	blue grama	BOGR2	*Bouteloua gracilis*	0–224	–
5	**Other Native Grasses and Grass-Likes**			0–90	
	Grass, perennial	2GP	*Grass, perennial*	0–90	–
	sedge	CAREX	*Carex*	45–90	–
Forb					
6	**Forbs**			67–448	
	Forb, perennial	2FP	*Forb, perennial*	45–90	–
	Cuman ragweed	AMPS	*Ambrosia psilostachya*	0–90	–
	white heath aster	SYER	*Symphyotrichum ericoides*	0–90	–
	spiderwort	TRADE	*Tradescantia*	0–90	–
	purple prairie clover	DAPUA	*Dalea purpurea var. arenicola*	0–90	–
	scarlet beeblossom	GACO5	*Gaura coccinea*	0–90	–
	hairy false goldenaster	HEVI4	*Heterotheca villosa*	0–90	–
	dotted blazing star	LIPU	*Liatris punctata*	0–90	–
	Nuttall's sensitive-briar	MINU6	*Mimosa nuttallii*	0–90	–
	evening primrose	OENOT	*Oenothera*	0–90	–
	silverleaf Indian breadroot	PEAR6	*Pediomelum argophyllum*	0–90	–
	beardtongue	PENST	*Penstemon*	0–90	–
	slimflower scurfpea	PSTE5	*Psoralidium tenuiflorum*	0–90	–
	upright prairie coneflower	RACO3	*Ratibida columnifera*	0–90	–
	ragwort	SENEC	*Senecio*	0–45	–
	goldenrod	SOLID	*Solidago*	0–45	–
	white sagebrush	ARLU	*Artemisia ludoviciana*	0–45	–
Shrub/Vine					
7	**Shrubs**			0–224	
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–135	–
	leadplant	AMCA6	*Amorpha canescens*	0–135	–
	prairie rose	ROAR3	*Rosa arkansana*	0–90	–
	western snowberry	SYOC	*Symphoricarpos occidentalis*	0–45	–
	smooth sumac	RHGL	*Rhus glabra*	0–45	–

Animal community

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:

- Reference Community; 4000 lbs/acre production and 1.10 AUM/acre carrying capacity*

- Degraded Grassland Phase; 3500 lbs/acre production and 0.88 AUM/acre carrying capacity*

- Warm-season Shortgrass/Cool-season Community; 2500 lbs/acre production and 0.68 AUM/acre carrying capacity*

- Smooth bromegrass (dryland, unfertilized, > 50 percent plant composistion); 2750 lbs/acre and 0.75 AUM/acre carrying capacity*

* Continuous season-long grazing by cattle under average growing conditions, 25 percent harvest efficiency. Air dry forage requirements based on 3 percent of animal body weight, or 912 lbs/acre (air-dry weight) per Animal Unit Month (AUM). If 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. 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.

WILDLIFE INTERPRETATIONS:
Major Land Resource Area (MLRA) 71 lies primarily within the loess mixed-grass prairie ecosystem mixed with tallgrass prairie in lower elevations. 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, prairie dogs and herds of roaming bison, elk, and pronghorn were among the historic inhabitants. Small mammal and plentiful insect species provided for prey in the lower part of the food chain benefitting large predators such as wolves, and mountain lions, 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 habitat.

Historically, the loess 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 and prairie dogs were historically keystone species but bison and nearly all prairie dogs have been extirpated from the site. 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 such as greater prairie chicken.

Within MLRA 71, most Loamy Overflow ecological site provide grassland or tree cover with an associated forb and limited shrub component. Some of these sites have increased in tree cover if they are not cropped including varius deciduous trees and Eastern redcedar. This site was part of an expansive grassland landscape that included combinations of Loamy Upland, Clayey Overflow (wetland depressions), Loamy Lowland, and Loamy Overflow sites. This site provided habitat for species requiring unfragmented grassland. Important habitat features and components found commonly or exclusively on this site may include upland nesting habitat for grassland birds and game birds, nesting and escape cover for waterfowl; forbs and insects for brood habitat; and a forage source for small and large herbivores. Many grassland nesting bird populations are declining such as dickcissel and Henslow's sparrow. Extirpated species include free-ranging American bison, pronghorn, wolves and swift fox.

Many Loamy Overflow ecological sites have been converted to cropland unless they are subject to frequent flooding. Remaining prairies provide increasingly important habitat for grassland nesting birds, small rodents, small mammals, and a variety of reptiles, amphibians, and insects. Introduced species such as smooth bromegrass, reeds canarygrass (wet areas), Kentucky bluegrass, muskthistle, and Canada thistle have impacted biological integrity of many sites and habitat for some grassland birds such as Baird’s sparrow.

Invasive birds are present such as European starling and house sparrows severely compete with native birds for nests and brown-headed cowbirds parasitize nests.

Tree encroachment on this site has habitat favoring generalist species such as American robin and morning dove.

1. REFERENCE STATE: The predominance of tall and mid statured grasses plus high diversity of forbs and shrubs in this state favors grazers and mixed-feeders, such as deer. Insects such as pollinators play a large role in maintaining the forb community and provide habitat for grassland birds and other grassland dependent species.

Sound management of this plant community maintains proper ecological processes preventing impacts to off-site aquatic habitats. This plant community provides habitat for frog, toad and snake species. The complex plant structural diversity provides habitat for a wide array of migratory and resident birds. Henslow's sparrow, Western meadowlark, Northern bobwhite, ringneck pheasants are examples of common birds that benefit from the structure and composition this plant community provides. Diverse prey populations are available for grassland raptors such as Swainson’s hawk, burrowing owl, short-eared owl and great horned owl. Some bird species over-winter in this habitat, such as Western meadowlark, and American crow.

The diversity of grasses, forbs and shrubs provide high nutrition levels for small and large herbivores including moles, mice, ground squirrels, white-tailed jackrabbit, and whitetail deer. The moderate stature of this plant community provides suitable thermal, protective and escape cover for small herbivores and grassland birds. Many wide-ranging predators utilize this plant community including coyote, badger, red fox and weasel (least and long-tailed).

As the plant community degrades to more mid-grasses and less tall grasses, less winter and escape cover are provided. It also provides less cover for predators. As the plant community shifts from tall warm season grasses to mid-height grasses will favor grassland birds that prefer shorter vegetation. This provides for more vision and better habitat for species such as greater prairie chicken, lark bunting, and lark sparrows. Habitat in plant community 1.2 is much the same as 1.1 but provides less winter protection because of the reduced plant height and cover.

2. NATIVE/INVADED GRASS STATE: Although the amount of Kentucky bluegrass in this plant community varies, the lower structural diversity favor grassland birds that prefer lower plant heights and more vision such as greater prairie chickens, lark bunting, and lark sparrows. Increased dominance by Kentucky bluegrass with a lower diversity provides less habitat for ringneck pheasant, Northern bob-white and mixed-feeders, such as whitetail deer and small mammals. Insect populations are somewhat reduced but still play a large role in maintaining the forb community and provide a forage base for grassland birds and other species.

The diversity of grasses,forbs and shrubs provide high nutrition levels for small and large herbivores including voles, mice, ground squirrels, blacktailed jackrabbit (better suited to this plant community than white-tailed jackrabbit), and white-tailed deer. The increase in litter accumulation benefits small mammals such as voles and mice. The moderate stature of this plant community provides suitable thermal, protective and escape cover for small herbivores and grassland birds. Many wide-ranging predators utilize this plant community including coyote, badger, red fox, racoon, and weasel (least and long-tailed).

3. SOD-BUSTED STATE: As the vegetation recovers from previous farming activities, management practices heavily influence the process. Typically resulting from continued heavy continuous season-long grazing without adequate recovery periods between grazing events or from continued non-use and no fire for extended periods of time, Kentucky bluegrass will dominate. Smooth bromegrass may also become prevalent in the non-use situation. The forb component exhibits lower diversity than the reference state and shifts towards increaser/ introduced forbs including sweetclover, yarrow, Cuman ragweed, Missouri goldenrod, Hoary verbena and Ironweed. Pollinator insects will still be prevalent, but a shift to generalists.

The earlier greenup associated with Kentucky bluegrass and smooth bromegrass and lower structural diversity provide habitat for those species that tolerate litter buildup, and shorter stature and increased woody cover typically occurs with this plant community).

Savannah sparrow, American robin, Western meadowlark are common birds that can benefit from the structure and composition of this plant community. The shorter stature of this plant community provides habitat for killdeer, horned lark, black-tailed jackrabbit (better suited to this plant community than white-tailed jackrabbit), and thirteen-lined ground squirrel. Prey populations are reduced and are more vulnerable to predation by raptors and mammalian predators. Burrowing owls may be associated with Richardson’s ground squirrel or other mammal burrows. The short stature of this plant community does not provide suitable thermal/protective cover and escape cover.

4. INVADED WOODY STATE
This state provides habitat for white-tailed deer, racoon, raptors, and birds that favor woody cover. Several raptors or birds of prey, such as the Cooper’s hawk, and sharp-shinned hawk use coniferous forests and woodlands for nesting, nesting materials, and for perching.

Birds that are habitat generalists, such as the Bell's Vireo, common yellowthroat, Eastern kingbird, morning dove, American goldfinch, Northern bobwhite, field sparrow, solitary vireo, and pigmy nuthatch use woody cover for nesting, food, and breeding habitats.

The woody cover in this plant community state provide habitat for wild turkey and white-tailed deer as long as canopy cover is 25 percent or less or significant open areas exist where grassland or other open habitats are nearby. Raptors or birds of prey, such as the Cooper's hawk, and sharp-shinned hawk use woody cover for nesting, nesting materials, and for perching. Oppossum, woodland vole, bobcat, racoons are provided excellent habitat as well.

Hydrological functions

Water is the principal factor limiting forage production on this site. This site is dominated by soils in hydrologic group B, with localized areas in hydrologic group C. Infiltration rate is moderate to moderately slow. Runoff potential for this site varies from very low to moderate depending on soil hydrologic group, slope and ground cover. In many cases, areas with greater than 75 percent ground cover have the greatest potential for high infiltration and lower runoff. An example of an exception would be where rhizomatous grasses form a strong sod and dominate the site. Areas where ground cover is less than 50 percent 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 for upland game species along with hiking, photography, bird watching and other opportunities. The wide varieties of plants which bloom from spring until fall have an aesthetic value that appeals to visitors.

Wood products

Local or individual fire wood can be utilized from this site. Red cedar pulpwood can be utilized for veneer and/or cedar furniture. Cottonwood can be harvested for pallets.

Other products

None of appreciable value.

Other information

Revision Notes: "This PROVISIONAL ecological site concept has been QC'd and QA'd to ensure that the site meets the NESH standards for a provisional ecological site that provides basic compiled information in one location. This site should not be considered an Approved ESD until further data entry and editing is completed.

Inventory data references

Information presented here has been derived from NRCS clipping data and other inventory data. Field observations from range-trained personnel were also used.

Other references

Other sources used as references include USDA NRCS Water and Climate Center, USDA NRCS National Range and Pasture Handbook, and USDA NRCS Soil Surveys from various counties.

Contributors

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Acknowledgments

Site Development and Testing Plan:
Future work is needed to validate the information in this Provisional Ecological Site Description. Additional data collection and evaluation may also be needed to develop this ESD to the Approved, then Correlated level. This could include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Field reviews of the project plan should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.
The State and Transitional Model and corresponding pathways and associated vegetative communities will need to be reviewed and upgraded to adhere to the new guidelines.
Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team. The project plan is: ES R071XY029NE MLRA 71

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)	
Contact for lead author	
Date	
Approved by	
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

2. **Presence of water flow patterns:**

3. **Number and height of erosional pedestals or terracettes:**

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

5. **Number of gullies and erosion associated with gullies:**

6. **Extent of wind scoured, blowouts and/or depositional areas:**

7. **Amount of litter movement (describe size and distance expected to travel):**

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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:

    Sub-dominant:

    Other:

    Additional:

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

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):**

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:**

17. **Perennial plant reproductive capability:**