USDA Natural Resources Conservation Service

Ecological site R106XY031NE
Shallow Savannah

Last updated: 9/16/2019
Accessed: 05/13/2025

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.

MLRA notes

Major Land Resource Area (MLRA): 106X–Nebraska and Kansas Loess-Drift Hills

Named the “Nebraska and Kansas Loess-Drift Hills,” Major Land Resource Area (MLRA) 106 is divided almost evenly between southeastern Nebraska (52%), and northeastern Kansas, (48%). The northern border is located on the north end of Saunders County, Nebraska, and the MLRA stretches into Douglas County, Kansas in the south. The Nebraska cities of Beatrice and Lincoln are the major population centers in the north, while Topeka and Lawrence in Kansas are the primary cities in the south. The approximately seven million-acre landscape covers all or parts of 30 counties between the two states. This dissected glacial drift plain primarily consists of broad, smooth ridgetops, and slopes ranging from nearly level to steep. The elevation in MLRA 106 decreases from west to east, and ranges from nearly 1,650 feet to less than 790 feet above sea level. Stream valleys in this landscape are narrow and bordered by steep hills, with 10 to 20 feet of local relief. The river valleys are broader, and may drop up to over 160 feet below the adjacent hilltops. The Platte, Little Nemaha, and the North Fork of the Big Nemaha Rivers flow through the Nebraska side of the MLRA, while the Black Vermillion, the Soldier, and the Delaware Rivers are the major waterways on the Kansas side. The Big Blue River runs through both states, while The Salt Creek hydrologic system located near Lincoln, Nebraska provides habitat for the only known population of the Federally-listed endangered Tiger Salt Beetle.
The uplands are primarily comprised of glacial drift underlying a mantle of loess, while alluvial deposits are found in the stream and river valleys. Limestone and shale quarries are also located in MLRA 106. The predominant soil orders in this MLRA are mesic, udic, Mollisols, Alfisols, and Entisols. Loams and clays are the primary soil textures

in this landscape.
Sixty-two percent of the land in this MLRA has been broken out of native prairie and farmed, while only 23 percent of the grasslands remain intact. Livestock grazing, primarily by cattle, is the main industry on these remnants. Corn, wheat, soybeans, and grain sorghum are the primary commodity crops, but a significant number of acres are also planted to alfalfa for harvest as hay.
With annual precipitation averaging from 40 inches in the southeast, to 28 inches in the northwest, irrigation for crop production is not a critical factor in most years.
The historical matrix vegetation type is Tallgrass Prairie, and big and little bluestem, switchgrass, Indiangrass, sideoats, and blue grama make up the bulk of the warm-season species; western wheatgrass is the dominant cool-season grass in the north, tall fescue is in the south. Large- and small-patch vegetative communities are found primarily along the riparian zones, and on both upland and lowland saline sites. Woodlands make up about six percent of MLRA 106, consisting primarily of green ash, oak, hackberry, boxelder, and maple trees.
Wildlife flourishes in this combination of crop and grassland environments. In a landscape historically occupied by bison herds, white-tailed deer are now the most abundant wild ungulates. A variety of smaller species, including coyote, raccoon, opossum, porcupines, muskrat, beaver, squirrel, and mink thrive in the region, as do several upland bird species. Native grassland bird populations are somewhat limited by the lack of contiguous native prairie and the fragmented habitat created by the farmland.
The rivers, streams, and lakes harbor excellent fisheries, and migrating and local waterfowl use the wetland complexes. These complexes provide ideal habitat for a number of wading and shore bird species as well.
This landscape serves as a backdrop for a disturbance-driven ecosystem, evolving under the influences of herbivory, fire, and variable climate. Historically, these processes created a heterogeneous mosaic of plant communities and structure heights across the region. Any given site in this landscape experienced fire every three to four years. The fires were caused by lightning strikes and also were set by Native Americans, who used fire for warfare, signaling, and to refresh the native grasses. The indigenous inhabitants understood the value of fire as a tool, and that the highly palatable growth following a fire provided excellent forage for their horses, and attracted grazing game animals such as bison and elk.
Land use patterns by post-European settlement have greatly altered the historical fire regime, allowing the expansion of the woody component. Introduction of eastern redcedar (ERC) as a windbreak species further facilitates invasion by this species.
While eastern redcedar is native to the landscape, the historic population in MLRA 106 was limited to isolated pockets in rugged river drainageways that were subsequently insulated from fire. Widespread plantings of windbreaks with eastern redcedar as a primary component have 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 redcedar is very susceptible to fire when under six feet tall. Management with prescribed fire is exceedingly effective if applied before this stage. Larger redcedars can also be controlled with fire, but successful application requires the use of specifically-designed ignition and holding techniques.
Fragmentation of the native grasslands by conversion to cropland, transportation corridors, and other developments have 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 reseeded grasslands.

Classification relationships

Major Land Resource Area (MLRA): 106 Major Land Resource Area (MLRA) (USDA-Natural Resources Conservation Service, 2006)

General information for MLRA 106:

Fenneman (1916) Physiographic Regions Division – Interior Plains
Province – Central Lowland
Section – Dissected Till Plains

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

Section – Central Dissected Till Plains (251C)

EPA Ecoregions (Omernik 1997)
I – Great Plains (9)
II – Temperate Prairies (9.2)
III – Western Corn Belt Plains (9.2.3)
IV – Loess and Glacial Drift Hills (47i)

Associated Counties
Nebraska: Butler, Cass, Gage, Jefferson, Johnson, Lancaster, Nemaha, Otoe, Pawnee, Richardson, Saline, Saunders, Seward

Kansas: Atchison, Brown, Doniphan, Douglas, Franklin, Jackson, Jefferson, Johnson, Leavenworth, Marshall, Nemaha, Osage, Pottawatomie, Shawnee, Wabaunsee, Washington, Wyandotte

Ecological site concept

The Shallow Savannah site is an upland site occupying ridges and slopes. Tall- and Mid-grasses, and deciduous trees are the dominant reference community vegetation. The soils are shallow, and formed over sandstone or sandy shale. Vegetative production is less than that of the associated deeper soils.

Associated sites

R106XY068NE	**Loamy Floodplain** The Loamy Floodplain is a run-on site often positioned down slope of the Shallow Savannah site.
R106XY075NE	**Loamy Upland** Loamy Upland is often located adjacent to the Shallow Savannah site. Loamy Upland has a deeper soil, a higher percentage of tallgrass species, and higher vegetative production.
R106XY077NE	**Shallow Limy** The Shallow Limy site is often adjacent to the Shallow Savannah site. Shallow Limy is effervescent at or near the surface.

Similar sites

R106XY077NE	**Shallow Limy** The Shallow Limy site is often adjacent to the Shallow Savannah site. Shallow Limy is effervescent at or near the surface. Shallow Savannah has a greater percentage of woody species in the reference community.

Table 1. Dominant plant species

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

Physiographic features

The Shallow Savannah site is a run-off site on erosional uplands, often adjacent to a local drainageway. The Plane and convex slopes range from nearly level to steeply sloping.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Flooding frequency	None

Ponding frequency	None
Elevation	228–516 m
Slope	3–35%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

Like most Great Plains landscapes, the climate in this MLRA is under the sway of the continental effect. This creates a regime of extremes, with summer highs often in the triple digits, and winter lows plunging well below zero. Blizzards can occur anytime between early fall and late spring, often dropping the temperature more than 50 degrees in just a few hours. These events can pile up several feet of snow, often driven by winds in excess of 50 miles an hour. The resulting huge snow drifts can cause serious hardship for livestock, wildlife, and humans. Winters can be open, with bare ground for most of the season, or closed, with up to several feet of snow persisting until March. Most winters have a number of warm days, interspersed with dropping temperatures, usually associated with approaching cold fronts. Spring brings violent thunderstorms, hail, and high winds. Tornadoes occur frequently.

About three-fourths of the precipitation falls as high-intensity, convective thunderstorms from late in spring through early in autumn.

The average annual precipitation gradient trends higher from northwest (28”) to southeast (40”), and the average annual temperature gradient trends higher from north (50°F) to south (55°F).

Daily winds range from an average of 14 miles per hour during the spring to 11 miles per hour during the late summer. Occasional strong storms may bring brief periods of high winds with gusts to more than 80 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 (characteristic range)	150-181 days
Freeze-free period (characteristic range)	188-202 days
Precipitation total (characteristic range)	991-1,041 mm
Frost-free period (actual range)	145-183 days
Freeze-free period (actual range)	186-206 days
Precipitation total (actual range)	965-1,067 mm
Frost-free period (average)	161 days
Freeze-free period (average)	194 days
Precipitation total (average)	1,016 mm

Climate stations used

- (1) LAWRENCE [USC00144559], Lawrence, KS
- (2) LEAVENWORTH [USC00144588], Fort Leavenworth, KS
- (3) OSKALOOSA 4 NE [USC00146100], Mc Louth, KS
- (4) BONNER SPRINGS [USC00140957], Bonner Springs, KS
- (5) PERRY LAKE [USC00146333], Perry, KS
- (6) CLINTON LAKE [USC00141612], Lawrence, KS
- (7) KANSAS CITY DOWNTOWN AP [USW00013988], Kansas City, MO

Influencing water features

The vegetative communities on this site are not affected by the water table. Erosion can be a concern with a heavy

precipitation event.

Soil features

The soils associated with the Shallow Savannah site are shallow, well drained soils with high saturated hydraulic conductivity. These soils formed in residuum weathered from non-calcareous sandstone. The depth to lithic contact ranges from 10 to 20 inches.
Basehor is the primary series associated with this ecological site.

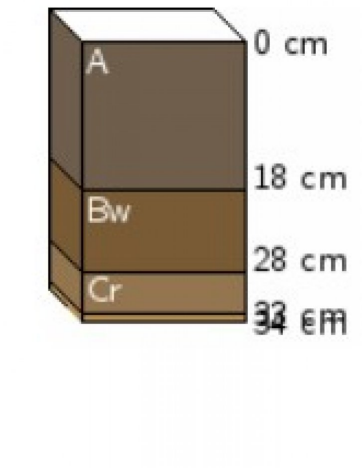


Figure 8. Basehor series profile

Table 4. Representative soil features

Parent material	(1) Residuum–sandstone and shale
Surface texture	(1) Loam
Drainage class	Well drained
Soil depth	0–51 cm
Available water capacity (0-101.6cm)	3.05–9.65 cm
Soil reaction (1:1 water) (0-101.6cm)	5.9–6

Ecological dynamics

Shallow Savannah ecological sites developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or human-caused wildfires, and other biotic and abiotic factors which typically influence soil/site development. This continues to be a disturbance-driven site, by herbivory, fire, and variable climate. Changes occur in the plant communities due to weather variations, impacts of native and/or exotic plant and animal species, and management actions.

One of the primary impacts to this site introduced by European settlers is season-long continuous grazing by domestic livestock. This management practice causes the repeated removal of the growing point and excessive defoliation of the leaf area of individual warm-season tallgrasses. The resulting reduction of the ability of the plants to harvest sunlight depletes the root reserves, subsequently decreasing the root mass. This negatively impacts the ability of the plants to compete for life-sustaining nutrients, resulting in declining vigor and eventual mortality. The space created in the vegetative community is then occupied by a species that evades the negative grazing impacts by a growing season adaptation (such as a cool season), a shorter structure, or a reduced palatability mechanism.

The State-and-Transition Model (STM) is depicted following this section, and is made up of a Reference State, and a Native/Invaded 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 hydrologic cycle.

Each state may have one or more vegetative communities which 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 human-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.

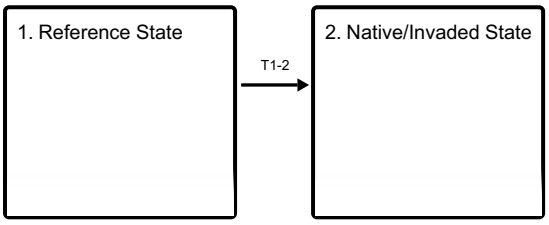
Interpretations are primarily based on the Reference State, and have been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing regimes. Trends in plant community dynamics have been interpreted from heavily to lightly grazed areas, seasonal-use pastures, and historical accounts. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

Growth of native cool-season plants begins about April 1, and continues to about June 15. Native warm-season plants begin growth about May 15, and continue to about August 15. Green-up of cool-season plants may occur in September and October if adequate moisture is available.

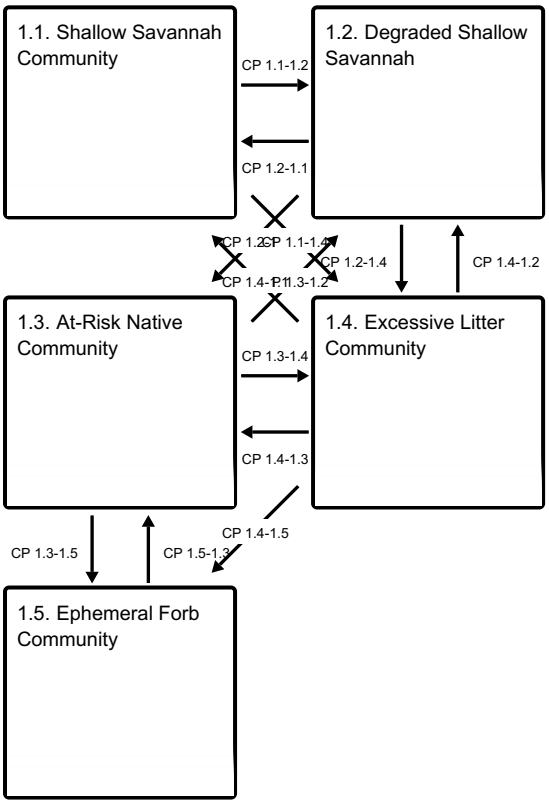
The following is a diagram illustrating the common plant communities that can occur on the site, and the transition pathways between communities.

State and transition model

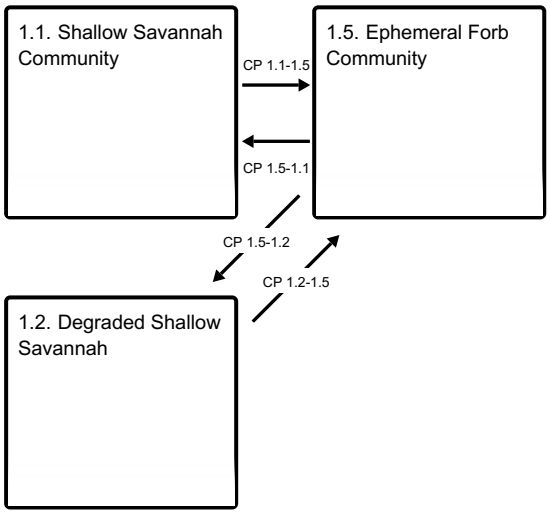
Ecosystem states



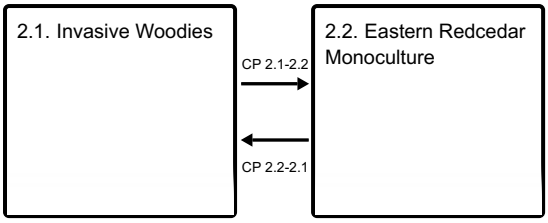
State 1 submodel, plant communities



Communities 1, 5 and 2 (additional pathways)



State 2 submodel, plant communities



State 1
Reference State

This state describes the range of vegetative community phases that occur on the Shallow Savannah site where the natural processes are mostly intact. The Reference Community is a representation of the native plant community phase that occupies a site that has been minimally altered by management. The Degraded Savannah, the At-Risk, and the Excessive Litter Communities are the phases that result from management decisions that are unfavorable for a healthy Reference Community. The Ephemeral Forb Community is the result of a high intensity disturbance event. High perennial grass cover and production allows for increased soil moisture retention, vegetative production, and overall soil quality.

Community 1.1
Shallow Savannah Community

Figure 9. Shallow Savannah Reference community, eastern Kansas

The Shallow Savannah Community is comprised of mid and tallgrass native prairie species under a scattered canopy of deciduous trees, primarily oak, hickory, and elm . This community serves as a description of the native plant community that naturally occurs on the site when the natural disturbance regimes are intact, or closely mimicked by management practices. This phase is dynamic, with fluid relative abundance and spatial boundaries between the dominant structural vegetative groups. These fluctuations are primarily driven by different responses of the species to changes in precipitation timing and abundance, and fire and grazing events. The potential vegetation consists of approximately 70 percent grasses and grass-like plants, 10 percent forbs, and 20 percent trees and shrubs. Big and little bluestem are the primary grass species in this community. Secondary species include switchgrass, indiangrass, and sideoats grama. The site has a moderately diverse forb population, including catclaw sensitive briar, sunflowers, and lespedezas. This plant community is less productive than similar upland sites, and species diversity is somewhat limited as well. It is a resilient community, and resistant to short term stresses such as drought and short periods of heavy stocking. The well-developed root systems support this resiliency when allowed adequate recovery periods between grazing events. When exposed to long-term or frequent over-grazing events without adequate rest, this plant community will degrade. The annual forage production of this community averages about 1,800 lbs per acre.

Figure 10. Plant community growth curve (percent production by month). NE1061, Mid and Tall Warm Season Grasses. This plant community is dominated by warm-season, tall and midgrasses in MLRA 106.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	0	0	5	25	35	20	10	5	0	0	0

Community 1.2
Degraded Shallow Savannah

Figure 11. Shallow Savannah Degraded community, eastern Kansas

Big bluestem, little bluestem, and sideoats grama lose productive capacity through loss of vigor and reproductive potential. Switchgrass, and Indiangrass are reduced to remnants. As growing season defoliation continues, the more grazing evasive species such as hairy grama, Kentucky bluegrass, muhly, and tall dropseed increase. The woody component becomes more prominent, causing additional shade over the understory. This community phase signals a significant loss of production. The change is due to continuous season-long grazing with inadequate recovery periods. The composition of the forb component favors less palatable species, and lespedeza and ragweed increase. Fewer high bio-mass producing deep rooted species result in a reduced fire-friendly fuel load. While this plant community is less productive and less diverse than the representative plant community, it remains sustainable in regards to site/soil stability, watershed function, and biologic integrity.

Community 1.3
At-Risk Native Community

Figure 12. At-Risk Shallow Savannah community, eastern Kansas

In this plant community, the more palatable tall warm-season grasses have been reduced to remnant populations by continued defoliation during their critical growth periods. Grazing-evasive warm-season and cool-season grasses increase significantly. Tall dropseed, warm season shortgrasses, and Kentucky bluegrass become dominant. Shade tolerant annuals increase. Blackberry, broomsedge and buckbrush populations expand, and the palatable forb component is only a trace. Soil health is affected by reduced efficiency in the nutrient, mineral, and hydrologic cycles as a result of decreases in plant litter and rooting depths. This may result in formation of a compacted layer in the pockets of deeper soil, and total annual vegetative production declines significantly. Without

a management change, this community is at-risk to degrade to the Native/Invaded State.

Figure 13. Plant community growth curve (percent production by month). NE1069, MLRA 106 Warm/cool-season mix.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
0	1	4	10	23	26	17	8	6	4	1	0

Community 1.4
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 undisturbed duff layer deepens, infiltration of the precipitation is interrupted and evaporation increases significantly, simulating drought-like conditions.

Community 1.5
Ephemeral Forb Community

This community describes the flush of forbs that occurs in response to a major disturbance, or combination of disturbances. Growing season wildfire followed by hail, extreme prolonged drought, or extreme defoliation by herbivores are all examples of these disturbances. The native warm-season grasses re-establish dominance with-in a few years of the event.

Pathway CP 1.1-1.2
Community 1.1 to 1.2

Shallow Savannah Community **Degraded Shallow Savannah**

A shift from the Reference community to the Degraded Savannah community occurs with continuous season long grazing and inadequate recovery periods during the growing season.

Pathway CP 1.1-1.4
Community 1.1 to 1.4

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

Pathway CP 1.1-1.5
Community 1.1 to 1.5

A high-impact disturbance event or combination of events causing excessive defoliation of the vegetation, i.e. a growing season wildfire followed by a significant hailstorm, or a prolonged intensive grazing event or long-term drought, etc.

Pathway CP 1.2-1.1
Community 1.2 to 1.1

Degraded Shallow Savannah **Shallow Savannah Community**

A shift from the Degraded Savannah community toward the Reference community can be achieved through prescribed grazing. Applying grazing pressure during the growth period of the undesirable cool season grasses, and allowing rest during the warm season growing season favors our desired species. This grazing regime will enable the more deeply rooted tall warm season grasses to out compete the shallow rooted grazing evasive warm season and the cool season grasses. Appropriately timed prescribed fire will accelerate this process.

Conservation practices

Prescribed Burning
Access Control
Prescribed Grazing

Pathway CP 1.2-1.3
Community 1.2 to 1.3

Degraded Shallow Savannah **At-Risk Native Community**

Maintaining continuous season long grazing or haying with inadequate recovery periods during the growing season further degrades the site to the At-Risk Community.

Pathway CP 1.2-1.4
Community 1.2 to 1.4

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

Pathway CP 1.2-1.5
Community 1.2 to 1.5

A high-impact disturbance event, or combination of events causing excessive defoliation of the vegetation, i.e. a growing season wildfire followed by a significant hailstorm, or a prolonged intensive grazing event, or long-term drought, etc.

Pathway CP 1.3-1.2
Community 1.3 to 1.2

At-Risk Native Community **Degraded Shallow Savannah**

Reversing the downward trend to the previous community can be achieved with prescribed grazing early and late in the growing season to reduce undesirable cool season grasses. Targeting the peak growth period of cool season grasses with high intensity grazing events followed by rest will allow the tall native warm season grasses to rejuvenate. Appropriately timed prescribed fire will accelerate this process.

Conservation practices

Access Control
Prescribed Grazing

Pathway CP 1.3-1.4
Community 1.3 to 1.4

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

Pathway CP 1.3-1.5
Community 1.3 to 1.5

A high-impact disturbance event, or combination of events causing excessive defoliation of the vegetation, i.e. a growing season wildfire followed by a significant hailstorm, or a prolonged intensive grazing event, or long-term drought, etc.

Pathway CP 1.4-1.1
Community 1.4 to 1.1

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

Conservation practices

Prescribed Burning
Prescribed Grazing

Pathway CP 1.4-1.2
Community 1.4 to 1.2

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

Pathway CP 1.4-1.3
Community 1.4 to 1.3

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

Pathway CP 1.4-1.5
Community 1.4 to 1.5

A high-impact disturbance event, or combination of events causing excessive defoliation of the vegetation, i.e. a growing season wildfire followed by a significant hailstorm, or a prolonged intensive grazing event, or long-term drought, etc.

Pathway CP 1.5-1.1
Community 1.5 to 1.1

Restoration occurs naturally once the disturbance event has subsided. Allowing growing season rest will accelerate the recovery.

Conservation practices

Access Control

Pathway CP 1.5-1.2
Community 1.5 to 1.2

Restoration occurs naturally once the disturbance event has subsided. Allowing growing season rest will accelerate the recovery.

Conservation practices

Access Control

Pathway CP 1.5-1.3
Community 1.5 to 1.3

Restoration occurs naturally once the disturbance event has subsided. Allowing growing season rest will accelerate the recovery.

Conservation practices

Access Control

State 2
Native/Invaded State

This state has been degraded from the Reference State and much of the native warm-season grass community has been replaced by less desirable plants. The loss of tall and mid- warm-season grasses has negatively impacted energy flow and nutrient cycling. The woody component has expanded significantly, and shading due to the overstory has increased. Water infiltration is reduced due to the shallow root system and rapid runoff characteristics of the grazing-evasive plant communities. Alteration of the soil, and the hydrological processes make return to reference state unlikely. The Invasive Woodies and the Eastern Redcedar are the communities in this state.

Community 2.1
Invasive Woodies

Figure 14. Invaded Woody site, Douglas County, Kansas

This plant community represents a shift from the Reference State across a plant community threshold. With continued grazing pressure, annual bromes, hairy grama, Kentucky bluegrass, sedges, and dropseed will become the dominant grass and grasslike species, with only trace remnants of the more palatable warm-season grasses such as little bluestem and sideoats grama. Continuous and heavy grazing pressure will maintain this plant community in a sod-bound condition. Forb richness and diversity has decreased. The woody component has expanded significantly. The increased light interception from the overstory creates a more shade tolerant environment. In the areas with deeper soils, with the decline and loss of deeper penetrating root systems, a compacted layer may form in the soil profile below the more shallow replacement root systems. Grazing management practices that allow for adequate periods of recovery between grazing events and appropriately timed prescribed fire will favor mid and tall warm-season grasses.

Community 2.2
Eastern Redcedar Monoculture

Figure 15. Invading cedars, Eastern Kansas

If eastern redcedar is present on the site, it will often completely dominate and replace the existing woody community, creating a monoculture that eliminates most of the understory as well as the overstory.

Pathway CP 2.1-2.2
Community 2.1 to 2.2

Invasive Woodies **Eastern Redcedar Monoculture**

Interruption of the natural fire regime can allow eastern redcedar to dominate to the point of becoming a monoculture.

Pathway CP 2.2-2.1
Community 2.2 to 2.1

Eastern Redcedar Monoculture **Invasive Woodies**

Implementation of an aggressive prescribed burning program will eliminate the encroaching eastern redcedar. Mechanical removal will also aid in reversing the invasion.

Conservation practices

Brush Management
Prescribed Burning

Transition T1-2
State 1 to 2

Heavy grazing or haying without adequate recovery periods will cause this state to lose a significant proportion of tall and mid- warm-season grass species and cross a threshold to the Native/Invaded State. Water infiltration and other hydrologic functions will be reduced due to the root matting presence of sod-forming grasses. With the decline

and loss of deeper penetrating root systems, soil structure and biological integrity are catastrophically degraded to the point that recovery is unlikely. Once this occurs, it is highly unlikely that grazing management alone will return the community to the Reference State. Additionally, increasing woody encroachment also results from overgrazing and lack of fire. The expansion of the overstory blocks more of the sunlight, creating a more competitive environment for a shade tolerant understory. Mechanical removal with follow-up stump treatment of the root-sprouting species and implementation of a prescribed burning regime will alleviate the invasion of woodies..

Additional community tables

Animal community

When maintained in good to excellent condition, this site provides habitat for numerous wildlife species. The combination of tallgrasses, forbs, shrubs, and trees provides food, nesting, and loafing cover for deer, quail, numerous songbirds, and small mammals. It may also be suitable habitat for limited populations of wild turkey. Several species of lizards and snakes inhabit this site. Maintaining adequate woody vegetation for travel lanes and escapecover is necessary for maximum wildlife populations. When practicing
brush management, the maintenance of a well planned brush pattern can enhance the site for most animals and songbirds. This usually requires that 25 to 35 percent of the area be maintained in woody vegetation.

Hydrological functions

The primary soil series associated with this site is Basehor. It is classified as a hydrologic group D soil. The major hazard on this site is its susceptibility to rill
and small gully erosion, especially on the steeper slopes. Please refer to the NRCS National Engineering Handbook Section 4 (NEH-4) for runoff quantities and hydrologic curves when making hydrology determinations.

Recreational uses

The Shallow Savannah site provides for a variety of outdoor activities including camping, hunting, bird watching, hiking, and outdoor/wildlife photography. There are a variety of flowering plants in bloom throughout the growing season that provide much aesthetic appeal to the landscape. Recreation can be a valued use, but there are site considerations such as somewhat steep, rocky, rough terrain.

Wood products

A mature overstory can provide a limited amount of timber, and firewood, though due to access issues and the limited supply, harvest may not be economically feasible.

Other products

No appreciable other products.

Other information

Other Information

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.

Inventory data references

Historical accounts and data are supplemented by expert opinions from resource professionals.

Other references

Other References

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Approval

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Rangeland health reference sheet

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

Author(s)/participant(s)	
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:**

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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:**