USDA Natural Resources Conservation Service

# Ecological site R065XY029NE
# Sandy Lowland

Accessed: 05/07/2024

## 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.

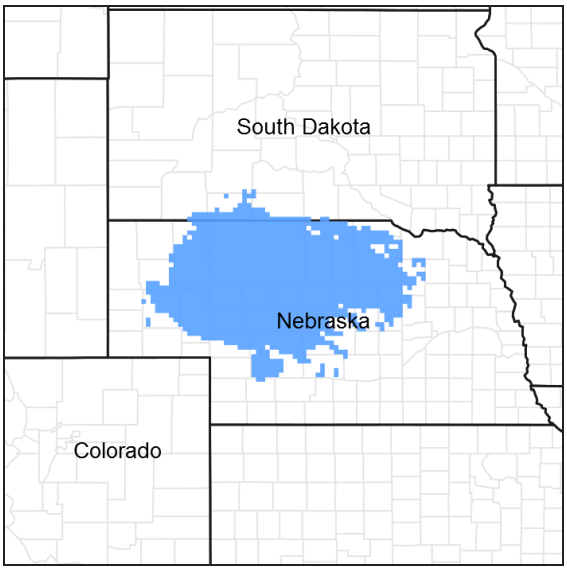



**Figure 1. Mapped extent**

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): 065X–Nebraska Sand Hills

Provisional Site Author: Doug Whisenhunt
Provisional Site Approval:

Revision Notes:
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.

## Classification relationships

Major Land Resource Area (MLRA): Major Land Resource Area (MLRA) and Land Resource Unit (LRU) (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

Landform/landscape position: The Sandy Lowland site is generally positioned on non-ponding interdunes and non-flooding stream terraces with less than 3 percent slopes (Calamus soils, however, are on floodplains and may flood rarely or occasionally, in the channeled phase). This site has a seasonal high water table at a depth of 36 to 60 inches.

Edaphic: These soils are fine sandy loam to fine sand surface soils above water tables that remain below the surface for the duration of the growing season.

Vegetation Dynamics: This primary plant community for this site is the warm season mid-grass community with a native shrub component. A shift towards a cool-season and shorter warm season grasses will occur with excessive long-term grazing pressure. Eastern red cedars spreading from introduced windbreaks will increase and potentially dominate the grasslands in the absence of fire or other brush control practices.

## Associated sites

| | |
|---|---|
| R065XY011NE | **Sandy Low P.Z .14-17**<br>Sandy 14-17" Precipitation Zone |
| R065XY024NE | **Subirrigated**<br>Subirrigated |
| R065XY032NE | **Sandy Medium P.Z. 17-22**<br>Sandy 17-22" Precipitation Zone |

## Similar sites

| | |
|---|---|
| R065XY024NE | **Subirrigated**<br>Subirrigated. This site has cordgrass present, and higher vegetative production. |
| R065XY011NE | **Sandy Low P.Z .14-17**<br>Sandy 14-17" Precipitation Zone. This site has less switchgrass and less vegetative production. |
| R065XY032NE | **Sandy Medium P.Z. 17-22**<br>Sandy 17-22" Precipitation Zone. This site has less switchgrass and less vegetative production. |

**Table 1. Dominant plant species**

| | |
|---|---|
| Tree | Not specified |
| Shrub | Not specified |
| Herbaceous | (1) *Andropogon hallii*<br>(2) *Calamovilfa longifolia* |

## Physiographic features

This site occurs on nearly level to gently sloping interdunes, stream terraces and high flood plains adjacent to streams, springs and ponds.

This area consists of Quaternary sand dunes. The sands are derived from the underlying Tertiary Ogallala and Arikaree Groups. These units formed when rivers deposited sediments that originated as erosional detritus following the uplift of the Rocky Mountains to the west. The Ogallala aquifer underlies this are. It is the most extensive and heavily used aquifer on the high plains between the Rocky Mountains and the Mississippi River. The major recharge area for this aquifer is the Sand Hills.

**Table 2. Representative physiographic features**

| | |
|---|---|
| Landforms | (1) Interdune<br>(2) Stream terrace<br>(3) Flood plain |
| Flooding duration | Brief (2 to 7 days) |
| Flooding frequency | None to rare |
| Ponding frequency | None |
| Elevation | 610–1,219 m |
| Slope | 0–3% |
| Water table depth | 91–183 cm |
| Aspect | Aspect is not a significant factor |

## Climatic features

The mean average annual precipitation varies from 14 to 25 inches, but has varied from 12 to 29 inches in the driest to wettest seasons. Approximately 65 percent of the annual precipitation occurs during the growing season of mid-April to late September. The average annual snowfall varies from about 30 inches to about 55 inches. The wind velocity is high throughout the year, averaging 10 to 12 miles per hour. Maximum wind velocities generally occur in the spring.

The average length of the growing season is 138 days, but the growing season has varied from 114 to 168 days. The average date of first frost in the fall is September 25, and the last frost in the spring is about May 10. July is the hottest month and January is the coldest. It is not uncommon for the temperature to reach 100 degrees Fahrenheit during the summer. Summer humidity is low and evaporation is high. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to as low as negative 30 degrees Fahrenheit.

Growth of native cool season plants begins mid to late March and continues to late June. Native warm season plants begin growth in early May and continue to late August. Green up of cool season plants may occur in September and October when adequate soil moisture is present.

**Table 3. Representative climatic features**

| | |
|---|---|
| Frost-free period (average) | 127 days |
| Freeze-free period (average) | 148 days |
| Precipitation total (average) | 610 mm |

## Climate stations used

- (1) BREWSTER [USC00251130], Brewster, NE
- (2) CHAMBERS [USC00251590], Chambers, NE
- (3) ROSE 10 WNW [USC00257318], Long Pine, NE
- (4) ARTHUR [USC00250365], Arthur, NE
- (5) ELLSWORTH 15 NNE [USC00252647], Ellsworth, NE
- (6) ATKINSON 3SW [USC00250420], Atkinson, NE
- (7) CRESCENT LAKE NWR [USC00252000], Oshkosh, NE
- (8) ELSMERE 9 ENE [USC00252680], Johnstown, NE
- (9) ERICSON 8 WNW [USC00252770], Burwell, NE
- (10) GREELEY [USC00253425], Greeley, NE
- (11) MULLEN [USC00255700], Mullen, NE
- (12) MULLEN 21 NW [USC00255702], Whitman, NE
- (13) NEWPORT [USC00255925], Newport, NE
- (14) PURDUM [USC00256970], Purdum, NE

- (15) BARTLETT 1S [USC00250525], Bartlett, NE
- (16) HYANNIS [USC00254100], Hyannis, NE
- (17) KINGSLEY DAM [USC00254455], Keystone, NE
- (18) MERRIMAN [USC00255470], Merriman, NE
- (19) VALENTINE NWR [USC00258755], Valentine, NE
- (20) NORTH PLATTE RGNL AP [USW00024023], Maxwell, NE

## Influencing water features

No riparian areas or wetland features are directly associated with this site.

## Soil features

The features common to soils in this site are the fine sandy loam to fine sand textured surface soils and slopes of 0 to 3 percent. These soils have water tables below the surface for all of the growing season. The water table is non-saline and non-alkaline. The soils in this site are moderately well drained and formed in eolian sand or sandy alluvium. The surface layer is 4 to 8 inches thick. The texture of the subsurface layers ranges from loam to sand. This site should show no evidence of rills, wind scoured areas or pedestalled plants. Water flow paths are typically indistinguishable. The soil surface is stable and intact. Sub-surface soil layers are not restrictive to water movement and root penetration.
Calamus is the only series that experiences any flooding, which is rare and of brief duration.

Major soil series correlated to this ecological site include: Ipage, Libory, Ipage Terrace, Doughboy and Nenzel.

Other soil series that have been correlated to this site include: Ipage Calcareous, Nenzel Calcareous, Natick, Calamus and Thedford.

More information can be found in the various soil survey reports for each county within the MLRA. Contact the local USDA Service Center for soil survey reports that include more detail specific to your location.

**Table 4. Representative soil features**

| | |
|---|---|
| Surface texture | (1) Fine sandy loam<br>(2) Loamy fine sand<br>(3) Fine sand |
| Family particle size | (1) Sandy |
| Drainage class | Moderately well drained |
| Permeability class | Moderately rapid to very rapid |
| Soil depth | 203 cm |
| Surface fragment cover <=3" | 0% |
| Surface fragment cover >3" | 0% |
| Available water capacity (0-101.6cm) | 7.62–15.24 cm |
| Calcium carbonate equivalent (0-101.6cm) | 0–10% |
| Electrical conductivity (0-101.6cm) | 0–4 mmhos/cm |
| Sodium adsorption ratio (0-101.6cm) | 0–6 |
| Soil reaction (1:1 water) (0-101.6cm) | 5.1–8.4 |
| Subsurface fragment volume <=3" (Depth not specified) | 0–6% |

| | |
|---|---|
| Subsurface fragment volume >3" (Depth not specified) | 0% |

## Ecological dynamics

This site 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. Changes will occur in the plant communities due to short-term weather variations, impacts of native and/or exotic plant and animal species, and management actions.

Even as post European settlement's alteration of the fire regime allows the expansion of the woody component of the sandhills, introduction of eastern red cedar as a windbreak species has compounded the issue.

While eastern red cedar is native to Nebraska, the historic population in the Sandhills 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.

While the following plant community descriptions describe more typical transitions between communities that will occur, severe disturbances, such as periods of well-below average precipitation, can cause significant shifts in plant communities and/or species composition.

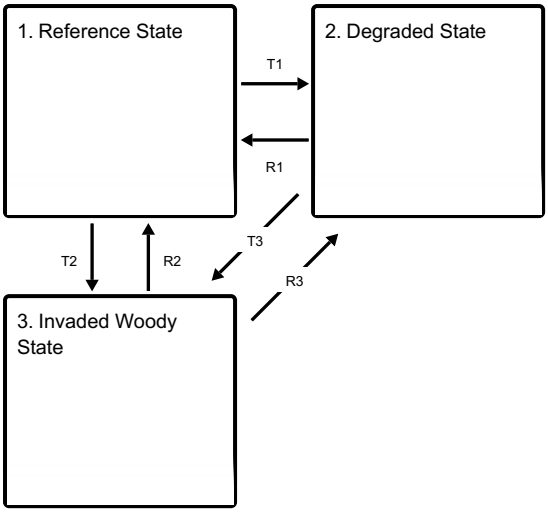
This site includes depressional areas, which allow for deep-rooted native warm season grasses to utilize subsurface moisture. The site is often a transitional area between Sandy and Subirrigated sites, although transitions can occur abruptly to a Sands site. If management common to Subirrigated sites extends onto Sandy Lowland sites, such as haying practices, the dominant species in the reference state can quickly shift to a more grazing tolerant community due to the limited availability of subsoil moisture. Under favorable vegetative management treatments the trend can be reversed.

Little bluestem occurs mainly in the central and eastern portions of the MLRA, and decreases as you move west. As this site deteriorates, species such as prairie sandreed, sand dropseed and blue grama will increase initially. Species such as sand bluestem and switchgrass will decrease in frequency and production. With continued improper management, prairie sandreed will decrease with a significant increase in cool season grasses and forbs. Interpretations are primarily based on the Warm Season Tallgrass Plant Community. These have been determined by the study of rangeland relic areas, areas protected from disturbance of a transitional magnitude, and areas under long-term rotational grazing regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

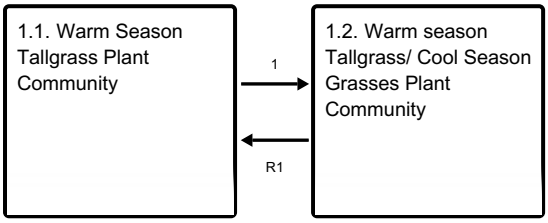
The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

## State and transition model

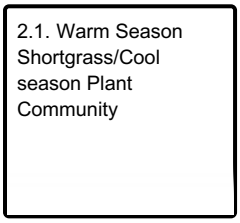
**Ecosystem states**



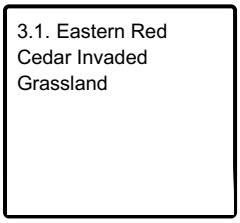

**State 1 submodel, plant communities**




**State 2 submodel, plant communities**




**State 3 submodel, plant communities**




## State 1
## Reference State

The information for this site was derived from the Nebraska Field Office Technical Guide, low intensity field transects, and the observations and technical opinions of experienced range professionals and soil scientists. The historic reference state of the Sandy Lowland Ecological site is typified by the Warm Season Tallgrass plant community as described in the community descriptions of this document. The ecological processes of native ungulate grazing and periodic wildfires maintained this community in a dynamic equilibrium, with fluctuations in response to natural climate variations and other natural events. In many areas, season long grazing as introduced by European settlers has changed the ecological dynamic enough to shift this community to a community with fewer dominant Tallgrass Warm season species and allowed a stronger expression of Cool season grasses. This community is further described in the community phase section. Long-term continuous grazing or annual haying followed by fall grazing will alter this phase of the reference State enough to cross the threshold to the Degraded State. Eastern red cedar encroachment can degrade either phase of this state to the Invaded Woody State.

## Community 1.1

## Warm Season Tallgrass Plant Community

**Figure 6. Plant Community 1.1**

This plant community is found on areas that are properly managed with grazing and or prescribed burning. Harvesting hay biennially at a different time during the growing season will allow this plant community to persist. The potential vegetation is about 90 percent grasses, 5 percent forbs and 5 percent woody plants. Tall, warm-season grasses predominate. The major grasses include sand bluestem, prairie sandreed, switchgrass and little bluestem. Other grasses occurring in this plant community include needleandthread, Indiangrass, hairy and blue grama, and grass-likes including sedges. This plant community is extremely resilient and well adapted to the Northern Great Plains climatic conditions. The diversity in plant species allows for high drought tolerance. Plant litter is properly distributed with very little movement off-site and natural plant mortality is very low.

**Table 5. Annual production by plant type**

| Plant Type | Low (Kg/Hectare) | Representative Value (Kg/Hectare) | High (Kg/Hectare) |
|---|---|---|---|
| Grass/Grasslike | 2533 | 2925 | 3278 |
| Forb | 157 | 244 | 364 |
| Shrub/Vine | – | 82 | 168 |
| **Total** | **2690** | **3251** | **3810** |

**Figure 8. Plant community growth curve (percent production by month). NE6534, NE/SD Sandhills, Native Grasslands. Warm-season dominant, cool-season subdominant, mid- and tallgrasses.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 5 | 15 | 25 | 30 | 10 | 7 | 3 | | |

## Community 1.2
## Warm season Tallgrass/ Cool Season Grasses Plant Community

Plants resistant to continuous grazing are maintaining themselves in this plant community which developed under grazing by domestic livestock. Most of the palatable plants from the Warm Season Tallgrass Plant Community are present but occur in lesser amounts. The potential vegetation is about 85 percent grasses or grass-like plants, 10 percent forbs and 5 percent shrubs. The dominant grass is prairie sandreed. Little Bluestem declines in composition. Grasses of secondary importance include blue or hairy grama, needleandthread, sand dropseed and western wheatgrass. Forbs commonly found in this plant community include white sagebrush, white heath aster, goldenrod, verbena, and Cuman ragweed. Indiangrass is completely suppressed, and sand bluestem and perennial forbs are present in lesser amounts. This plant community has a higher percentage of cool season grasses and forbs than the Warm Season Tallgrass Plant Community. Lesser amounts of desirable tall warm season grasses reduces production and the community's ability to increase production in favorable years. The soil surface has remained intact. This plant community is considered stable, but is at risk if a major shift in climate or overgrazing occurs; especially in combination. The resiliency of this plant community is moderate depending on the intensity and duration of disturbance. Infiltration and runoff are not greatly affected due to the nature of the soil. The close

proximity of this site to the Subirrigated ecological site often leads to identical management scenarios on both areas. The lack of subsoil moisture reduces the ability of the Sandy Lowland site grasses to adequately recover from annual mowing to maintain plant vigor and health. One option is to hay this site biennially, and graze the site every fall in conjunction with the Subirrigated site. Fencing along ecological site boundaries provides additional management scenarios on both Subirrigated and Sandy Lowland sites. This option should be considered if adequate water facilities exist.

**Figure 9. Plant community growth curve (percent production by month). NE6534, NE/SD Sandhills, Native Grasslands. Warm-season dominant, cool-season subdominant, mid- and tallgrasses.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | 5 | 5 | 15 | 25 | 30 | 10 | 7 | 3 | | |

### Pathway 1
### Community 1.1 to 1.2

Continuous season-long grazing will convert this plant community to the Warm Season Tall/Cool Season Grasses Plant Community. Continuous heavy grazing tends to accelerate this movement.

### Pathway R1
### Community 1.2 to 1.1

Prescribed grazing with adequate recovery periods will return this community to the Warm Season Tallgrass Plant Community.

## State 2
## Degraded State

The information for this site was derived from the Nebraska Field Office Technical Guide, low intensity field transects, and the observations and opinions of experienced range professionals and soil scientists. The Degraded State reflects the consequences of management decisions that have resulted in altering the Reference State Communities to the point that grazing and haying strategies alone won't be adequate to restore them to the original ecological balance. Lack of surface litter has negatively impacted the hydrological cycle, and not enough remnants of the Warm Season Tallgrasses remain to allow recovery without reseeding. Eastern red cedar encroachment can degrade this state to the Invaded Woody State.

### Community 2.1
### Warm Season Shortgrass/Cool season Plant Community

This plant community develops with heavy livestock grazing, usually season-long, or with annual haying followed by fall grazing. Plant diversity is diminished as the bluestems, prairie sandreed and switchgrass are removed from the plant community. Small isolated plants may exist in a prostrate form to avoid defoliation. The potential vegetation is about 80 percent grass or grass-like plants, 10 percent forbs and 10 percent shrubs. Dominate grasses include needleandthread, blue or hairy grama, and sand dropseed. Other grasses or grass-likes include annual brome, Kentucky bluegrass, prairie junegrass, Scribner panicum, western wheatgrass and sedges. Dominant forbs include Cuman ragweed, verbena, white sagebrush, thistle and white heath aster. Plant diversity is low. Sand sagebrush shows significant increase in the western portion of the MLRA, with cactus and rose showing the most increase in the central and eastern portions of the MLRA. Annual haying delays the increase of sand sagebrush and rose, but increases the cactus component in this community. This plant community is fairly resistant to change. Low species diversity makes it vulnerable to events like drought or hailstorms. Soil erosion is low. The water cycle is reduced because of the lack of surface litter. Infiltration is moderate due to soil texture, which also reduces runoff. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during an average year:

**Figure 10. Plant community growth curve (percent production by month). NE6540, NE/SD Sandhills, Native Grass, Grama/Wheatgrass. Warm-season and cool-season co-dominant, short and mid grasses.**

| Jan | Feb | Mar | Apr | May | Jun | Jul | Aug | Sep | Oct | Nov | Dec |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 0 | 0 | 5 | 10 | 20 | 25 | 20 | 15 | 5 | 0 | 0 | 0 |

### State 3
### Invaded Woody State

This state occurs when eastern red cedar encroachment reaches 15 percent canopy cover with an average tree height of at least 5 feet. The plant community has been degraded to the point that grazing and haying management will not restore the reference communities. A combination of prescribed fire and/or mechanical treatment will be required to remove the encroaching woody plants. To maintain the grassland state, maintenance burns will need to be conducted every 3 to five years to mimic the historical fire frequency of the grasslands in the great plains.

### Community 3.1
### Eastern Red Cedar Invaded Grassland

Eastern red cedar canopy cover has reached 15 percent or above with average tree height exceeding 5 feet. Forage production and wildlife diversity have been negatively impacted to a large degree. Due to needlecast, soil quality has been reduced. Encroachment increases rapidly at this point. Without management intervention, the eastern red cedar component of this community will continue to increase until it becomes a monoculture. Under the resulting closed canopy, virtually all livestock forage value will be lost, and ecological diversity will decline significantly.

### Transition T1
### State 1 to 2

Continuous season-long grazing or annual haying followed by fall grazing will convert this state to the Degraded State. This shift crosses the threshold and requires reseeding to return to a productive, stable plant community within a forage suitability group.

### Transition T2
### State 1 to 3

Absence of fire allows the encroachment of woody species, particularly eastern red cedars introduced from windbreak plantings. When the canopy cover reaches 15 percent with an average tree height of over 5 feet, normal management practices such as altering haying and grazing practices are not adequate to return the system to a grassland state.

### Restoration pathway R1
### State 2 to 1

Due to the lack of native tall warm season grass remnants and large amounts of blue grama, annual brome and Kentucky bluegrass, improved grazing management techniques have little effect on shifting the plant community. To improve plant diversity and forage production, suppression of the existing plant community followed by re-seeding may be necessary. See Forage Suitability Groups for additional information.

### Transition T3
### State 2 to 3

Absence of fire and/or brush management allows the encroachment of woody species, particularly eastern red cedars introduced from windbreak plantings. When the canopy cover reaches 15 percent with an average tree height of greater than 5 feet, normal management practices such as altering haying and grazing practices are not adequate to return the system to a grassland state.

### Restoration pathway R2
### State 3 to 1

Restoration to a grassland state requires treatment by mechanical removal or a reclamation level prescribed burn. A combination of both practices is usually the most cost effective control method. Periodic maintenance burning will be required to maintain the grassland once renovation is achieved.

### Restoration pathway R3
### State 3 to 2

Restoration to a grassland state requires treatment by mechanical removal or a reclamation level prescribed burn. A combination of both practices is usually the most cost effective control method. Periodic maintenance burning will be required to maintain the grassland once renovation is achieved.

## 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 | **Warm-season grasses** | | | 1300–2600 | |
| | sand bluestem | ANHA | *Andropogon hallii* | 650–1300 | 20–40 |
| | prairie sandreed | CALO | *Calamovilfa longifolia* | 488–975 | 15–30 |
| | little bluestem | SCSC | *Schizachyrium scoparium* | 488–975 | 15–30 |
| | switchgrass | PAVI2 | *Panicum virgatum* | 325–650 | 10–20 |
| 2 | **Other Native Grasses** | | | 488–1300 | |
| | needle and thread | HECOC8 | *Hesperostipa comata ssp. comata* | 163–488 | 5–15 |
| | blue grama | BOGR2 | *Bouteloua gracilis* | 0–325 | 0–10 |
| | hairy grama | BOHI2 | *Bouteloua hirsuta* | 0–163 | 0–5 |
| | sedge | CAREX | *Carex* | 33–163 | 1–5 |
| | Grass, perennial | 2GP | *Grass, perennial* | 0–163 | 0–5 |
| | purple lovegrass | ERSP | *Eragrostis spectabilis* | 0–163 | 0–5 |
| | sand lovegrass | ERTR3 | *Eragrostis trichodes* | 0–163 | 0–5 |
| | western wheatgrass | PASM | *Pascopyrum smithii* | 0–163 | 0–5 |
| | Indiangrass | SONU2 | *Sorghastrum nutans* | 0–163 | 0–5 |
| | sand dropseed | SPCR | *Sporobolus cryptandrus* | 0–163 | 0–5 |
| | prairie Junegrass | KOMA | *Koeleria macrantha* | 0–65 | 0–2 |
| | thin paspalum | PASE5 | *Paspalum setaceum* | 0–65 | 0–2 |
| | Scribner's rosette grass | DIOLS | *Dichanthelium oligosanthes var. scribnerianum* | 0–65 | 0–2 |
| **Forb** | | | | | |
| 4 | | | | 163–325 | |
| | goldenrod | SOLID | *Solidago* | 0–65 | 0–2 |
| | white heath aster | SYER | *Symphyotrichum ericoides* | 0–65 | 0–2 |
| | dotted blazing star | LIPU | *Liatris punctata* | 0–65 | 0–2 |
| | beardtongue | PENST | *Penstemon* | 0–65 | 0–2 |
| | Forb, perennial | 2FP | *Forb, perennial* | 0–65 | 0–2 |
| | purple prairie clover | DAPU5 | *Dalea purpurea* | 0–65 | 0–2 |
| | stiff sunflower | HEPA19 | *Helianthus pauciflorus* | 0–33 | 0–2 |
| | Forb, annual | 2FA | *Forb, annual* | 0–33 | 0–1 |
| | Carolina larkspur | DECAV2 | *Delphinium carolinianum ssp. virescens* | 0–33 | 0–1 |

| | | | | | |
|---|---|---|---|---|---|
| | Carolina larkspur | DECAV2 | *Delphinium carolinianum ssp. virescens* | 0–33 | 0–1 |
| | Cuman ragweed | AMPS | *Ambrosia psilostachya* | 0–33 | 0–1 |
| | white sagebrush | ARLU | *Artemisia ludoviciana* | 0–33 | 0–1 |
| | false boneset | BREU | *Brickellia eupatorioides* | 0–33 | 0–1 |
| | yellow sundrops | CASE12 | *Calylophus serrulatus* | 0–33 | 0–1 |
| | upright prairie coneflower | RACO3 | *Ratibida columnifera* | 0–33 | 0–1 |
| | lacy tansyaster | MAPI | *Machaeranthera pinnatifida* | 0–33 | 0–1 |
| | vervain | VERBE | *Verbena* | 0–33 | 0–1 |
| **Shrub/Vine** | | | | | |
| 5 | | | | 0–163 | |
| | Shrub (>.5m) | 2SHRUB | *Shrub (>.5m)* | 0–98 | 0–3 |
| | leadplant | AMCA6 | *Amorpha canescens* | 0–65 | 0–2 |
| | rose | ROSA5 | *Rosa* | 0–65 | 0–2 |

## Animal community

Livestock - Grazing Interpretations:
Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area may provide yearlong 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.

Wildlife Habitat Interpretations:
When the plant community structure of this tallgrass prairie site is maintained, this site provides excellent nesting areas for quail, pheasant, and prairie chickens, especially when it is associated with adjacent booming grounds. The variety of forbs, grasses, and insects on this site makes it a preferred feeding area for deer and birds. Numerous songbirds utilize this site for nesting and other activities.

Changes to the structure and species composition of the plant community in ways that reduce the availability of the food and cover that attracts these species to this site. However, some animal species favor alternative community phases/states. For additional habitat components beyond the scope of this ESD, refer to species specific habitat appraisal guides.

In the absence of fire and grazing, excess litter buildup can occur on this site hindering the movement of young birds, especially quail and prairie chickens. Additionally, decreased forb abundance/diversity will result in an accompanying decrease in insects, a critical food source for young birds.

Numerous rodents and small animals utilize this site by taking advantage of the taller growing plants to visually shield them from predators.

## Hydrological functions

Moisture conditions are ideal for forage production on this site. Soils on this site are in Hydrologic Soil Groups A and B. Although most of these soils are very permeable, water tables provide subirrigation of grasses and other vegetation. Surrounding upland areas tend to also have permeable soils and surface inflow peaks on these sites are often muted. These sites are not subject to flooding or rarelyflooded. Refer to Section 4, NRCS National Engineering Handbook for runoff quantities and hydrologic curves.

## Recreational uses

This site provides hunting, hiking, photography, bird watching and other opportunities. The wide varieties of plants that bloom from spring until fall have an esthetic value that appeals to visitors.

## Wood products

Wood products are not generally in abundance enough to provide harvest opportunity.

## Other products

Native seed collection and lease hunting are potential revenue creating industries for this site.

## 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

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. Those involved in developing this site include: Dana Larsen, State Rangeland Management Specialist, NRCS, Nebraska, Chuck Markley, Soil Scientist, NRCS Nebraska; Stan Boltz, State Rangeland Management Specialist, NRCS, South Dakota;
Data Source Number of Records Sample Period State County
SCS-RANGE-417 4 NE Cherry

## Other references

Other sources used as references include: USDA NRCS Water & Climate Center, USDA NRCS National Range and Pasture Handbook, USDA NRCS Soil Surveys from various counties, Atlas of the Sandhills.

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- R065XY029NE - MLRA 65 -

## Contributors

Doug Whisenhunt

## 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:**

---