

## Ecological site R065XY022NE Wet Land

Accessed: 05/10/2024

### 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.

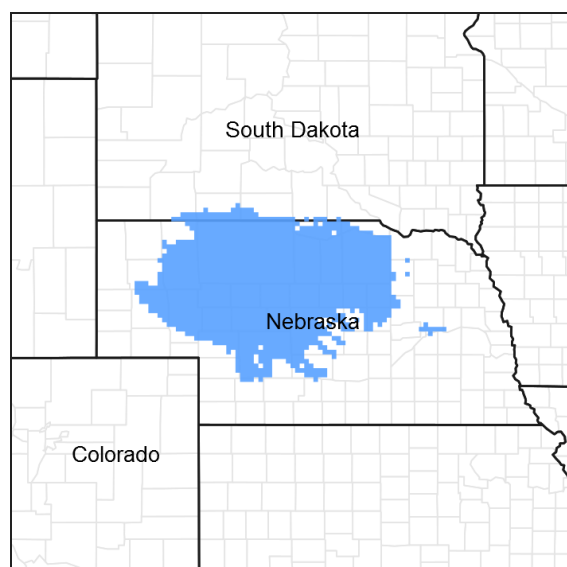


Figure 1. Mapped extent

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

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

The wetland site is found on interdunes and stream valleys. The slope is 0 to 1%.

The site is generally saturated or ponded for a long duration to or near the surface during the growing season to a depth of up to 6 inches.

## Associated sites

|             |   |
|-------------|---|
| R065XY023NE | <b>Wet Subirrigated</b><br>Wet Subirrigated |
| R065XY024NE | <b>Subirrigated</b><br>Subirrigated         |

## Similar sites

|             |   |
|-------------|---|
| R065XY023NE | <b>Wet Subirrigated</b><br>Wet Subirrigated (big bluestem/prairie cordgrass co-dominant; more switchgrass; less productive) |
|-------------|---|

Table 1. Dominant plant species

|            |  |
|------------|--|
| Tree       | Not specified  |
| Shrub      | Not specified  |
| Herbaceous | (1) <i>Phalaris arundinacea</i><br>(2) <i>Spartina pectinata</i> |

## Physiographic features

This site occurs on nearly level valley floors, and water is at or near the surface for most of the year.

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 area. 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) Swale<br>(2) Flood plain<br>(3) Fen |
| Flooding duration  | Brief (2 to 7 days)                     |
| Flooding frequency | None to frequent                        |
| Ponding duration   | Long (7 to 30 days)                     |
| Elevation          | 610–1,189 m                             |
| Slope              | 0–1%                                    |
| Ponding depth      | 0–15 cm                                 |
| Water table depth  | 15–30 cm                                |
| Aspect             | Aspect is not a significant factor      |

## Climatic features

The mean average annual precipitation varies from 14 - 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 °F 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 -30 °F.

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) ARTHUR [USC00250365], Arthur, NE
- (2) ELSMERE 9 ENE [USC00252680], Johnstown, NE
- (3) GREELEY [USC00253425], Greeley, NE
- (4) MULLEN 21 NW [USC00255702], Whitman, NE
- (5) BARTLETT 1S [USC00250525], Bartlett, NE
- (6) CHAMBERS [USC00251590], Chambers, NE
- (7) ROSE 10 WNW [USC00257318], Long Pine, NE
- (8) ATKINSON 3SW [USC00250420], Atkinson, NE
- (9) BREWSTER [USC00251130], Brewster, NE
- (10) HYANNIS [USC00254100], Hyannis, NE
- (11) KINGSLEY DAM [USC00254455], Keystone, NE
- (12) VALENTINE NWR [USC00258755], Valentine, NE
- (13) NORTH PLATTE RGNL AP [USW00024023], Maxwell, NE
- (14) CRESCENT LAKE NWR [USC00252000], Oshkosh, NE
- (15) ELLSWORTH 15 NNE [USC00252647], Ellsworth, NE
- (16) ERICSON 8 WNW [USC00252770], Burwell, NE
- (17) MERRIMAN [USC00255470], Merriman, NE
- (18) MULLEN [USC00255700], Mullen, NE
- (19) NEWPORT [USC00255925], Newport, NE
- (20) PURDUM [USC00256970], Purdum, NE

## Influencing water features

This ecological site has a combination of physical and hydrological features that: 1) normally has partial growing-season groundwater near to or above the soil surface (-0.5 ft. to +0.5 ft.), 2) allowing limited free movement of water and air (anaerobic conditions) throughout much of the root zone, and 3) is ponded or flooded during brief to long periods of the growing-season in most years

## Soil features

The features common to all soils in this site are the loamy fine sand and fine sandy loam textured surface soils and slopes of 0 to 1 percent. A number of soils have surfaces of mucky peat and/or slightly decomposed plant material. The soils in this site are very poorly drained and formed in eolian sands and sandy alluvium. Minor soils in this site occur along streams flowing through and out of the Sand Hills, and formed in sandy to loamy alluvium. Fen soils (Cutcomb series), included in this site, are very poorly drained and formed in thick deposits of organic material. The surface layer is 2 to 19 inches thick. The texture of the subsurface ranges from sand to fine sandy loam in the major soils of this site. The minor soils have textures ranging from sand to clay loam. Cutcomb soils (fens) have subsurface textures ranging from muck to mucky peat interspersed with thin layers of sand. Runoff as evidenced by patterns of rill, gully or other water flow is negligible due to the low slope gradient and high intake rate of these soils. Cryptobiotic crusts are present, but their function is not well understood. Pedestalling of plants does not typically occur on this site.

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

Major soil series correlated to this ecological site include: Tryon, Loup and Gannett.

Other soil series that have been correlated to this site include: Almeria, Crowther, Cullison, Cutcomb, Gus, and Hoffland.

**Table 4. Representative soil features**

|  |  |
|--|--|
| Surface texture  | (1) Loamy fine sand<br>(2) Fine sandy loam |
| Family particle size                                     | (1) Sandy                                  |
| Drainage class   | Poorly drained                             |
| Permeability class                                       | Moderate to rapid                          |
| Soil depth   | 203 cm                                     |
| Surface fragment cover <=3"                              | 0%   |
| Surface fragment cover >3"                               | 0%   |
| Available water capacity<br>(0-101.6cm)                  | 7.62–40.61 cm                              |
| Calcium carbonate equivalent<br>(0-101.6cm)              | 0–40%                                      |
| Electrical conductivity<br>(0-101.6cm)                   | 0–4 mmhos/cm                               |
| Sodium adsorption ratio<br>(0-101.6cm)                   | 0–5  |
| Soil reaction (1:1 water)<br>(0-101.6cm)                 | 5.6–8.4                                    |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 0–5%                                       |
| Subsurface fragment volume >3"<br>(Depth not specified)  | 0%   |

## Ecological dynamics

Typically, this site is extremely stable. Plant species composition and production does not fluctuate greatly under most management scenarios. Ditching is an exception, but this practice usually results in a shift to another ecological site, such as the Wet Subirrigated or the Subirrigated ecological site.

Interpretations are based on the Prairie Cordgrass/Reedgrass Plant Community. It has been determined by study of rangeland relic areas, areas protected from excessive disturbance, and areas under long-term rotational grazing

regimes. Trends in plant community dynamics ranging from heavily grazed to lightly grazed areas, seasonal use pastures, and historical accounts also have been used. Subclimax 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**

**Prairie Cordgrass/  
Reedgrass Plant  
Community**

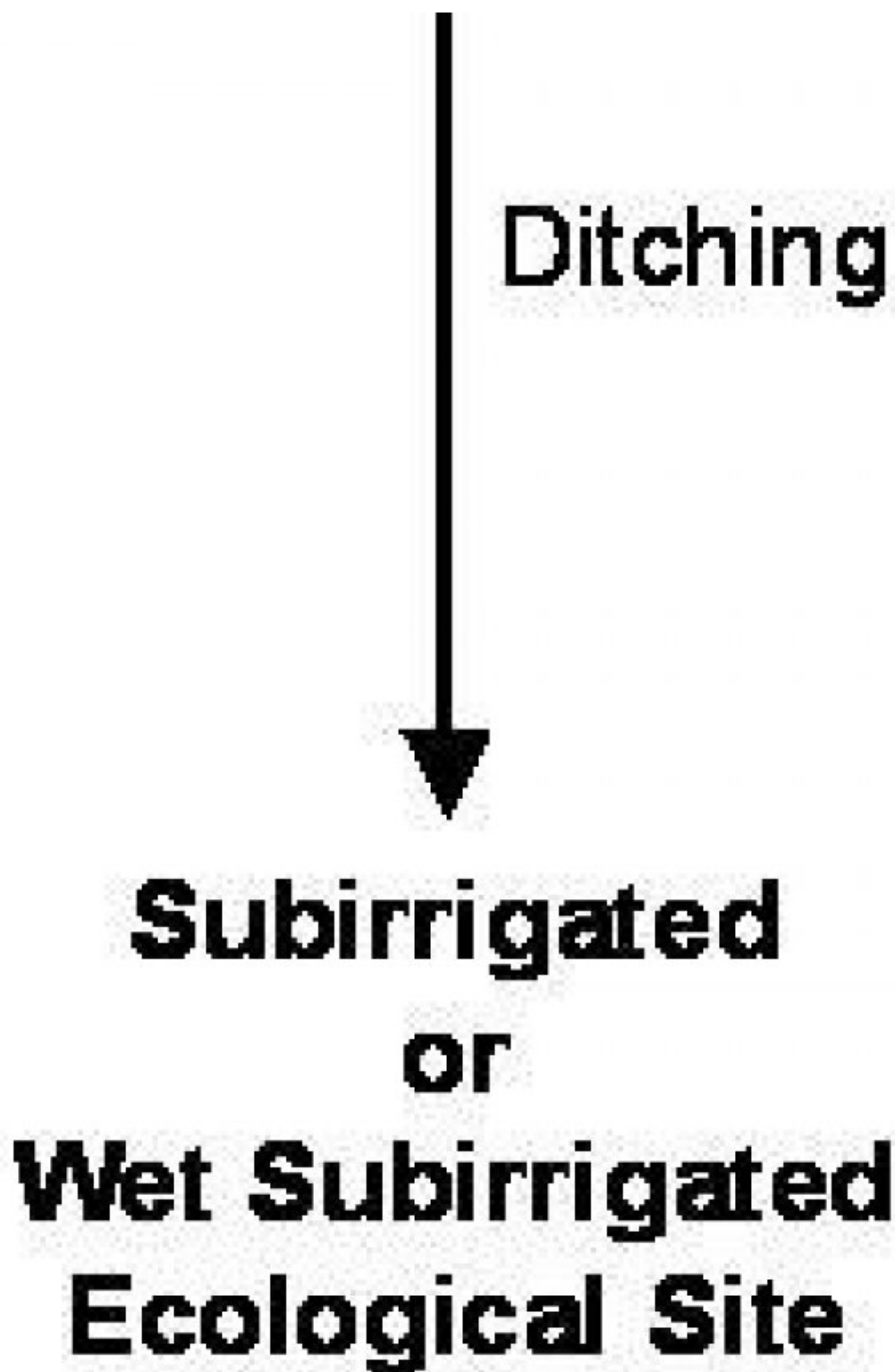


Figure 6. Locator Map

**State 1**  
**Reference State**

**Community 1.1**  
**Prairie Cordgrass/Reedgrass Plant Community**

Interpretations are primarily based on the Prairie Cordgrass/Reedgrass Plant Community (this is also considered reference). This plant community is very resistant to any change that does not affect the associated water table. With a seasonably high water table that ranges from above the ground surface in wet years to within one foot of the surface in dry years, traditional hayland management usually leaves these areas idle. Primary use is by wildlife species. The potential vegetation is about 55 percent grasses, 30 percent grass-like plants, 10 percent forbs, and 5 percent shrubs. The dominant grass is prairie cordgrass. A wide variety of grass-like plants exist, and may comprise

up to 30 percent of the plant community. Forbs include Pennsylvania and swamp smartweed, wild strawberry, and cinquefoil. Dominant shrubs are false indigo and willow. Ditching has been a traditional management tool for this site. Draining a wetland effectively changes the hydrology of the site and allows it to more closely resemble a Subirrigated ecological site. Once ditched, significant inputs are required to restore and maintain the high water table. The following growth curve shows the estimated monthly percentages of total annual growth of the dominant species expected during a normal year: Growth curve number: NE6543 Growth curve name: Nebraska/South Dakota Sandhills, Native Grasslands, Wet Growth curve description: Warm-season dominant, cool-season subdominant, mid & tall grasses.

Table 5. Annual production by plant type

| Plant Type      | Low<br>(Kg/Hectare) | Representative Value<br>(Kg/Hectare) | High<br>(Kg/Hectare) |
|-----------------|---------------------|--------------------------------------|----------------------|
| Grass/Grasslike | 5139                | 4827                                 | 5969                 |
| Forb            | 129                 | 390                                  | 729                  |
| Shrub/Vine      | —                   | 163                                  | 364                  |
| <b>Total</b>    | <b>5268</b>         | <b>5380</b>                          | <b>7062</b>          |

Figure 8. Plant community growth curve (percent production by month). NE6543, NE/SD Sandhills, Native Grass, Wet. Warm-season dominant, cool-season subdominant, mid & tall grasses.

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

## Additional community tables

Table 6. Community 1.1 plant community composition



| Group                  | Common Name                 | Symbol | Scientific Name                                     | Annual Production (Kg/Hectare) | Foliar Cover (%) |
|------------------------|-----------------------------|--------|---|--------------------------------|------------------|
| <b>Grass/Grasslike</b> |                             |        |   |                                |                  |
| 1                      | <b>Grasses</b>              |        |   | 1625–4551                      |                  |
|                        | prairie cordgrass           | SPPE   | <i>Spartina pectinata</i>                           | 1625–4551                      | –                |
| 2                      | <b>Reedgrasses</b>          |        |   | 325–2275                       |                  |
|                        | bluejoint                   | CACA4  | <i>Calamagrostis canadensis</i>                     | 0–1300                         | –                |
|                        | northern reedgrass          | CASTI3 | <i>Calamagrostis stricta</i> ssp. <i>inexpansa</i>  | 325–1300                       | –                |
|                        | slimstem reedgrass          | CASTS5 | <i>Calamagrostis stricta</i> ssp. <i>stricta</i>    | 0–975                          | –                |
| 3                      | <b>Other Native Grasses</b> |        |   | 325–975                        |                  |
|                        | slender wheatgrass          | ELTRT  | <i>Elymus trachycaulus</i> ssp. <i>trachycaulus</i> | 0–650                          | –                |
|                        | plains bluegrass            | POAR3  | <i>Poa arida</i>                                    | 325–650                        | –                |
|                        | Grass, perennial            | 2GP    | <i>Grass, perennial</i>                             | 0–130                          | –                |
| 4                      | <b>Grass-Likes</b>          |        |   | 975–1950                       |                  |
|                        | sedge                       | CAREX  | <i>Carex</i>  | 975–1950                       | –                |
|                        | rush                        | JUNCU  | <i>Juncus</i>                                       | 0–650                          | –                |
|                        | bulrush                     | SCIRP  | <i>Scirpus</i>                                      | 0–325                          | –                |
|                        | spikerush                   | ELEOC  | <i>Eleocharis</i>                                   | 0–325                          | –                |
| <b>Forb</b>            |                             |        |   |                                |                  |
| 5                      | <b>Forbs</b>                |        |   | 130–650                        |                  |
|                        | Forb, perennial             | 2FP    | <i>Forb, perennial</i>                              | 0–130                          | –                |
|                        | Virginia strawberry         | FRVI   | <i>Fragaria virginiana</i>                          | 0–130                          | –                |
|                        | American licorice           | GLLE3  | <i>Glycyrrhiza lepidota</i>                         | 0–130                          | –                |
|                        | wild mint                   | MEAR4  | <i>Mentha arvensis</i>                              | 0–130                          | –                |
|                        | swamp smartweed             | POHY2  | <i>Polygonum hydropiperoides</i>                    | 0–130                          | –                |
|                        | Pennsylvania smartweed      | POPE2  | <i>Polygonum pensylvanicum</i>                      | 0–130                          | –                |
|                        | cinquefoil                  | POTEN  | <i>Potentilla</i>                                   | 0–130                          | –                |
| <b>Shrub/Vine</b>      |                             |        |   |                                |                  |
| 6                      | <b>Shrubs</b>               |        |   | 0–325                          |                  |
|                        | dwarf false indigo          | AMNA   | <i>Amorpha nana</i>                                 | 0–195                          | –                |
|                        | Missouri River willow       | SAER   | <i>Salix eriocephala</i>                            | 0–195                          | –                |
|                        | narrowleaf willow           | SAEX   | <i>Salix exigua</i>                                 | 0–195                          | –                |
|                        | meadow willow               | SAPE5  | <i>Salix petiolaris</i>                             | 0–195                          | –                |
|                        | Shrub (>.5m)                | 2SHRUB | <i>Shrub (&gt;.5m)</i>                              | 0–130                          | –                |

## Animal community

"Wetlands provide migration, breeding, nesting, and feeding habitat for millions of waterfowl, shorebirds, songbirds, and other wildlife. Wetlands are home to thousands of different plant and animal species including many that are threatened or endangered. Nine of Nebraska's 12 federal endangered and threatened species use wetland areas, as do 19 of Nebraska's 27 state listed endangered and threatened species.

Many wetlands provide important feeding and rearing habitat for fish. All the state's amphibians, as well as many reptiles and invertebrates, use wetlands.

Wetlands also provide important winter cover for pheasants, deer and other resident wildlife.



They also provide a watering source for both domestic livestock and wildlife." (LaGrange, 2004).

## **Hydrological functions**

Excessive water is the principal factor limiting forage production on this site. Soils on this site are in Hydrologic Soil Group D due to high water tables. Although soils are permeable, high water tables limit infiltration. Surrounding upland areas tend to have very permeable soils that cause surface inflow peaks to these sites to be muted. Outflows generally occur only as a result of very intense storms or seepage inflows during very wet years. Many areas are frequently to continuously flooded.

For the interpretive plant community, rills and gullies are not typically present. Water flow patterns should be barely distinguishable if at all present. Pedestals are not typically present. Litter falls in place, and signs of movement are not common. Litter often accumulates to create muck peat like conditions. Chemical and physical crusts are rare. Cryptogamic crusts are present but are not expected to significantly affect hydrologic considerations. Overall this site has the appearance of being stable and productive.

## **Recreational uses**

This site provides hunting opportunities for upland game and waterfowl species. The wide variety of plants which bloom from spring until fall have an esthetic value that appeals to visitors.

## **Wood products**

No appreciable wood products are present on the site.

## **Other products**

None noted

## **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 was also used. Those involved in developing this site include: Dave Cook, Rangeland Management Specialist, NRCS; Dwight Hale, Engineer, NRCS; Sheila Luoma, Resource Conservationist, NRCS; Marla Shelbourn, Rangeland Management Specialist, NRCS; Dave Steffen, Rangeland Management Specialist, NRCS.

There are 6 SCS-RANGE-417 records available from Garden, Garfield, Lincoln, Loup, Morrill, and Wheeler counties. The sample period was from 1968 to 1999.

## **Other references**

LaGrange, T. 2004. Guide to Nebraska's Wetlands. Nebraska Game and Parks Commission. pp 3-4.  
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 R065XY022NE- MLRA 65 -

## Contributors

Dana Larsen

## 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)                    | Stan Boltz  |
| Contact for lead author                     | Stan Boltz, stanley.boltz@sd.usda.gov, 605-352-1236 |
| Date  | 10/31/2001  |
| Approved by                                 | Stan Boltz  |
| Approval date                               |   |
| Composition (Indicators 10 and 12) based on | Annual Production                                   |

## Indicators

1. **Number and extent of rills:** None.

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2. **Presence of water flow patterns:** None.

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3. **Number and height of erosional pedestals or terracettes:** None.

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground is typically less than 5 percent. During periods of above average precipitation and run-on, this site may be ponded for longer than normal durations, and typical vegetation may be temporarily reduced, creating areas of bare ground for relatively short periods of time.

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5. **Number of gullies and erosion associated with gullies:** None.

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6. **Extent of wind scoured, blowouts and/or depositional areas:** None.

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7. **Amount of litter movement (describe size and distance expected to travel):** Litter falls in place.
- 
8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil aggregate stability ratings should typically be 5 to 6, normally 6. This site typically has an O-horizon (roots and partly decomposed stems and leaves of plants) that is 0-3 inches thick. Surface organic matter adheres to the soil surface. Soil surface fragments will typically retain structure indefinitely when dipped in distilled water.
- 
9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 12 to 24 inches thick with dark gray or gray colors when moist. Structure typically is medium to fine angular blocky in the A-horizon.
- 
10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** Deep rooted species (tall rhizomatous cool- and warm-season grasses and grass-likes) with fine and coarse roots positively influences infiltration. Infiltration is somewhat limited naturally due to poor drainage and relatively low permeability.
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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None.
- 
12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**
- Dominant: Tall, warm-season rhizomatous grasses >> grass-likes species >
- Sub-dominant: Mid and tall, cool-season rhizomatous grasses > grass-like species >
- Other: Cool-season bunchgrasses = forbs > shrubs
- Additional:
- 
13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Little evidence of decadence or mortality.
- 
14. **Average percent litter cover (%) and depth ( in):** Litter cover is typically 80 to 90 percent, and depth of litter ranges from 0.5 to 1.5 inches.
- 
15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** Total annual production ranges from 4,700 to 6,300 pounds/acre, with the reference values being 5,800 pounds/acre (air-dry basis).
- 
16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize**

degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site: State and local noxious weeds; Kentucky bluegrass may be prevalent during dry cycles, but will typically not dominate the site. Reed canarygrass can become prevalent. Most invasive species will occupy the perimeter of this site.

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17. **Perennial plant reproductive capability:** Perennial grasses and grass-likes should have vigorous rhizomes or tillers.
-