USDA Natural Resources Conservation Service

Ecological site R066XY044NE
Wet Land

Accessed: 04/18/2024

General information

Approved. An approved ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model, enough information to identify the ecological site, and full documentation for all ecosystem states contained in the state and transition model.

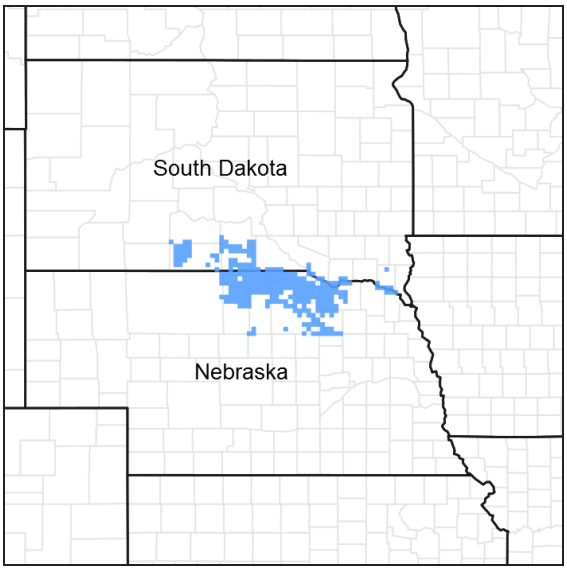

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

Classification relationships

Level IV Ecoregions of the Conterminous United States: 43i - Keya Paha Tablelands.

Associated sites

R066XY045NE	**Wet Subirrigated (obsolete, absorbed by sub/wetland)** Wet Subirrigated
R066XY046NE	**Subirrigated** Subirrigated

Similar sites

R066XY045NE	**Wet Subirrigated (obsolete, absorbed by sub/wetland)** Wet Subirrigated (big bluestem/prairie cordgrass co-dominant; more switchgrass; less productive)

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified

Herbaceous	Not specified

Physiographic features

This site occurs on nearly level wet swales of interdunes on uplands and on floodplains of valleys.

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Flood plain
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Frequent
Ponding duration	Long (7 to 30 days)
Ponding frequency	Occasional
Elevation	1,900–3,000 ft
Slope	0–1%
Ponding depth	0–6 in
Water table depth	0–12 in
Aspect	Aspect is not a significant factor

Climatic features

MLRA 66 is considered to have a continental climate – cold winters and hot summers, low humidity, light rainfall, and much sunshine. Extremes in temperature may also abound. The climate is the result of this MLRA's location near the geographic center of North America. There are few natural barriers on the northern Great Plains and the winds move freely across the plains and account for rapid changes in temperature.

Annual precipitation ranges from 18 to 25 inches per year. The normal average annual temperature is about 48° F. January is the coldest month with average temperatures ranging from about 19° F (Bonesteel, SD) to about 23° F (Ainsworth, NE). July is the warmest month with temperatures averaging from about 73° F (Harrington, SD) to about 75° F (Gregory, SD). The range of normal average monthly temperatures between the coldest and warmest months is about 54° F. This large annual range attests to the continental nature of this area's climate. Hourly winds average about 10 miles per hour annually, ranging from about 11 miles per hour during the spring to about 9 miles per hour during the summer. Daytime winds are generally stronger than nighttime and occasional strong storms may bring brief periods of high winds with gusts to more than 50 miles per hour.

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)	154 days
Freeze-free period (average)	173 days
Precipitation total (average)	25 in

Influencing water features

Soil features

The features common to all soils in this site are the loamy sand to loam textured surface layers 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 on upland swales and sandy alluvium on floodplains. The texture of the control section ranges from loamy sand to gravelly coarse sand and has thin strata of loamy material. 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.

Table 4. Representative soil features

Surface texture	(1) Fine sandy loam (2) Fine sand (3) Silt loam
Family particle size	(1) Sandy
Drainage class	Poorly drained
Permeability class	Rapid
Soil depth	80 in
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–15.99 in
Calcium carbonate equivalent (0-40in)	0–40%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (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

Ditching

Subirrigated

or

Wet Subirrigated Ecological Site

State 1
Prairie Cordgrass/Reedgrass Plant Community

Community 1.1
Prairie Cordgrass/Reedgrass Plant Community

Interpretations are primarily based on the Prairie Cordgrass/Reedgrass Plant Community (this is also considered climax). 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% grasses, 30% grass-like plants, 10% forbs, and 5% shrubs. The dominant grass is prairie cordgrass. A wide variety of grass-like plants exist, and may comprise up to 30% 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. Draining a wetland effectively changes the hydrology of the site and allows it to more closely resemble a Subirrigated or Wet 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 (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	3735	4002	4225
Forb	115	348	650
Shrub/Vine	0	145	325
Total	**3850**	**4495**	**5200**

Figure 5. 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 (Lb/Acre)	Foliar Cover (%)
Grass/Grasslike					
1	**Prairie Cordgrass**			1450–4060	
	prairie cordgrass	SPPE	*Spartina pectinata*	1450–4060	–
2	**Reedgrasses**			290–2030	
	bluejoint	CACA4	*Calamagrostis canadensis*	0–1160	–
	northern reedgrass	CASTI3	*Calamagrostis stricta ssp. inexpansa*	290–1160	–
	slimstem reedgrass	CASTS5	*Calamagrostis stricta ssp. stricta*	0–870	–
3	**Other Native Grasses**			290–870	
	slender wheatgrass	ELTRT	*Elymus trachycaulus ssp. trachycaulus*	0–580	–
	plains bluegrass	POAR3	*Poa arida*	290–580	–
	foxtail barley	HOJU	*Hordeum jubatum*	0–290	–
	marsh muhly	MURA	*Muhlenbergia racemosa*	0–290	–
	Grass, perennial	2GP	*Grass, perennial*	0–116	–
4	**Grass-Likes**			870–1740	
	sedge	CAREX	*Carex*	870–1740	–
	rush	JUNCU	*Juncus*	0–580	–
	bulrush	SCHOE6	*Schoenoplectus*	0–290	–
	spikerush	ELEOC	*Eleocharis*	0–290	–
	Grass-like (not a true grass)	2GL	*Grass-like (not a true grass)*	0–290	–
Forb					
5	**Forbs**			116–580	
	aster	ASTER	*Aster*	0–290	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	0–290	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–290	–
	cinquefoil	POTEN	*Potentilla*	0–116	–
	Virginia strawberry	FRVI	*Fragaria virginiana*	0–116	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–116	–
	wild mint	MEAR4	*Mentha arvensis*	0–116	–
	Forb, annual	2FA	*Forb, annual*	0–116	–
	Forb, perennial	2FP	*Forb, perennial*	0–116	–
Shrub/Vine					
6	**Shrubs**			0–290	
	false indigo bush	AMFR	*Amorpha fruticosa*	0–174	–
	Missouri River willow	SAER	*Salix eriocephala*	0–174	–
	narrowleaf willow	SAEX	*Salix exigua*	0–174	–
	meadow willow	SAPE5	*Salix petiolaris*	0–174	–
	Shrub (>.5m)	2SHRUB	*Shrub (>.5m)*	0–116	–

Animal community

Grazing by domestic livestock is one of the major income-producing industries in the area. Rangeland in this area

may provide year-long forage. During the dormant period, the forage for livestock will likely be lacking protein to meet livestock requirements, and added protein will allow ruminants to better utilize the energy stored in grazed plant materials. A forage quality test (either directly or through fecal sampling) should be used to determine the level of supplementation needed.

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.

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: Wayne Bachman, Soil Scientist, NRCS; Stan Boltz, Range Management Specialist, NRCS; Anna Ferguson, Soil Conservationist, NRCS; Roger Hammer, Soil Scientist, NRCS; Dana Larsen, Range Management Specialist, NRCS; Dave Schmidt, Rangeland Management Specialist, NRCS; Kim Stine, Rangeland Management Specialist, NRCS.

Other references

High Plains Regional Climate Center, University of Nebraska, 830728 Chase Hall, Lincoln, NE 68583-0728. (http://hpccsun.unl.edu)

USDA, NRCS. National Water and Climate Center, 101 SW Main, Suite 1600, Portland, OR 97204-3224. (http://wcc.nrcs.usda.gov)

USDA, NRCS. National Range and Pasture Handbook, September 1997

USDA, NRCS. National Soil Information System, Information Technology Center, 2150 Centre Avenue, Building A, Fort Collins, CO 80526. (http://nasis.nrcs.usda.gov)

USDA, NRCS, 2002. National Soil Survey Handbook, title 430-VI. (http://soils.usda.gov/procedures/handbook/main.htm)

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	08/01/2006
Approved by	Stan Boltz
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

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

---

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

---

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

---

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

---

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

---

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

---

7. **Amount of litter movement (describe size and distance expected to travel):** 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. Surface organic matter adheres to the soil surface.

---

9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):** A-horizon should be 3 to 6 inches thick with dark gray or gray colors when moist. Structure typically is platy and firm 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.

---

11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):** None, however surface horizons are naturally platy and should not be confused with a compaction layer.

---

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 >>

    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 6,800 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.

---

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