Ecological site R071XY044NE
Wet Land

Accessed: 05/18/2024

General information

Provisional. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.

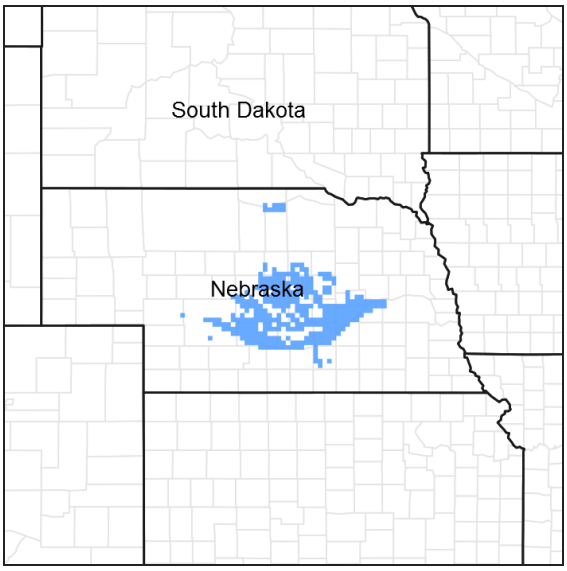


Figure 1. Mapped extent

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

MLRA notes

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

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

MLRA 71 is named “The Central Nebraska Loess Hills”, and is located exclusively in Nebraska. The approximately 5.3 million acre landscape covers all or parts of 21 counties, primarily Custer, Dawson, Buffalo, Sherman, Howard, Valley, Greeley and Hall. The physical appearance of the landscape is dominated by loess hills dissected by the North, Middle and South Loup Rivers and their tributaries. The Platte River defines the southern border.
The elevation in MLRA 71 ranges from over 3,000 to less than 1,700 feet above sea level, with average local relief stretching from 20 to 200 feet. The predominate soil orders are mesic, udic Mollisols and Entisols, commonly represented by the Coly, Uly, Cozad, Hord, Hall and Holdredge soil series.
Loess overlays the surface of almost all of the uplands in this MLRA. Alluvial clay, silt, sand, and gravel are deposited in the stream and river valleys, and can be extensive in the major drainages. Terraces are common in the valleys along the river systems.
Average annual precipitation ranges from 21 to 26 inches, with the number of freeze-free days averaging around 150.

The matrix vegetation type is mixed-grass prairie, with big and little bluestem, switchgrass, Indiangrass, and sideoats and blue grama making up the bulk of the warm-season species, while western wheatgrass in the dominant cool season species.
The primary large-patch vegetative component of the landscape is dominated by Needle-and-thread, prairie sandreed, sand and little bluestem, and blue grama grass.
The majority of the small-patch communities are associated with upland playas and the wetter sites found along the floodplains.
Forty four percent of the land in this MLRA has been broken out of native prairie and farmed; primarily, corn, alfalfa and some soybeans, while 48 percent of the grasslands remain intact. Livestock grazing, primarily cattle, is a major industry here.
Wildlife flourishes in this combination of crop and grassland environment, with both mule and white-tailed deer being the most abundant wild ungulate. A variety of smaller species, including coyote, raccoon, opossum, porcupines, muskrat, beaver, squirrel and mink thrive in the region, as well as a suite of grassland and upland birds. The rivers, streams and lakes harbor excellent fisheries.
This landscape developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores and repeated natural or man-caused wildfire. Other biotic and abiotic factors also typically influence soil/site development. This is a disturbance driven ecosystem, evolving under the influences of herbivory, fire, and variable climate. Historically, these processes created a heterogenous mosaic of plant communities and structure heights across the region. Any given site in this landscape experienced fire every 7 to 9 years. The fires were caused both by lightning strikes, and were set by native Americans, who used fire for warfare, signaling, and to refresh the native grasses. These people understood the value of fire as a tool, and that the highly palatable growth following a fire provided both excellent forage for their horses, and attracted grazing game animals such as bison and elk.
Even as post European settlement's alteration of the fire regime allows the expansion of the woody component of the native prairie, introduction of eastern red cedar as a windbreak species further facilitates invasion by this species.
While eastern red cedar is native to Nebraska, the historic population in MLRA 71 was limited to isolated pockets in rugged river drainages that were subsequently insulated from fire, or non-existent. Widespread plantings of windbreaks with eastern red cedar as a primary component has provided a seed source for the aggressive woody plant. The ensuing encroachment into the native grasslands degrades the native wildlife habit and causes significant forage loss for domestic livestock. However, since it is not a root sprouter, eastern red cedar is very susceptible to fire when under six feet tall. Management with prescribed fire is exceedingly effective if applied before this stage. Larger cedars can also be controlled with fire, but requires the use of specially designed ignition and suppression techniques.
Fragmentation of the native grasslands by conversion to cropland, transportation corridors and other development by European man has effectively disrupted the natural fire regime of this ecosystem. This has allowed encroachment by native and introduced shrubs and trees into the remnants of the native prairie throughout the MLRA. Aggressive fire suppression policies have exacerbated this process to the point that shrub and tree encroachment is a major ecological issue in the majority of both native and re-seeded grasslands.

Classification relationships

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

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

Ecological site concept

The wetland site is found primarily in river and stream valleys. The slope is 0 to 1 percent.

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

R071XY024NE	**Subirrigated** Subirrigated- This site is generally positioned above and often adjacent to the Wetland site.

Similar sites

R071XY024NE	**Subirrigated** Subirrigated- The water table is located 12 to 42 inches below the soil surface on the subirrigated site, while it is generally saturated or ponded for a long duration to or near the surface on the Wetland site.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Phalaris arundinacea* (2) *Spartina pectinata*

Physiographic features

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

Table 2. Representative physiographic features

Landforms	(1) Swale (2) Flood plain
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days)
Elevation	497–937 m
Slope	0–1%
Ponding depth	0–15 cm
Water table depth	15–30 cm
Aspect	Aspect is not a significant factor

Climatic features

Hourly winds are estimated to average about 14 miles per hour annually. Occasional strong storms may bring brief periods of high winds with gusts to more than 60 miles per hour.

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

Table 3. Representative climatic features

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

Climate stations used

- (1) BURWELL [USC00251345], Burwell, NE
- (2) CANADAY STEAM PLT [USC00251450], Lexington, NE
- (3) KEARNEY 4 NE [USC00254335], Kearney, NE
- (4) NORTH LOUP [USC00256040], North Loup, NE
- (5) RAVENNA [USC00257040], Ravenna, NE
- (6) STAPLETON 5W [USC00258133], Stapleton, NE
- (7) BROKEN BOW 2 W [USC00251200], Broken Bow, NE
- (8) OCONTO [USC00256167], Oconto, NE
- (9) TAYLOR [USC00258455], Taylor, NE
- (10) ANSELMO 2 SE [USC00250245], Anselmo, NE
- (11) ARNOLD [USC00250355], Arnold, NE
- (12) LOUP CITY [USC00254985], Loup City, NE
- (13) SAINT PAUL [USC00257515], Saint Paul, NE
- (14) GRAND ISLAND AP [USW00014935], Grand Island, NE
- (15) CENTRAL CITY [USC00251560], Central City, NE
- (16) COMSTOCK [USC00251835], Comstock, NE
- (17) GOTHENBURG [USC00253365], Gothenburg, NE
- (18) MASON CITY [USC00255250], Mason City, NE
- (19) OVERTON 3 W [USC00256439], Overton, NE

Influencing water features

This site has a combination of the following physical and hydrological features:
1;groundwater near or above the surface during at least part of the growing season, 2; allows 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.

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 and poorly drained and formed in eolian sands and sandy to loamy alluvium along streams and rivers. 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.
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. 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, Almeria and Barney.

Table 4. Representative soil features

Surface texture	(1) Loamy fine sand (2) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Poorly drained to very poorly drained
Permeability class	Moderate to rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%

Available water capacity (0-101.6cm)	7.62–40.61 cm
Calcium carbonate equivalent (0-101.6cm)	0–40%
Electrical conductivity (0-101.6cm)	0–4 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0–5
Soil reaction (1:1 water) (0-101.6cm)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

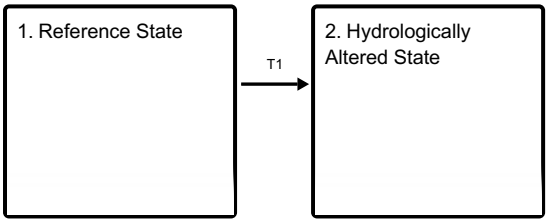
Typically, this site is extremely stable under normal management practices.
Ditching and draining practices usually results in a shift to another ecological site, such as the Subirrigated ecological site.

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.

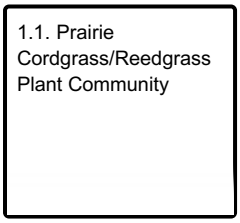
The following is a diagram that illustrates the common plant communities that can occur on the site and the transition pathways between communities. The ecological processes will be discussed in more detail in the plant community descriptions following the diagram.

State and transition model

Ecosystem states



State 1 submodel, plant communities



State 1
Reference State

The Prairie Cordgrass/Reedgrass Plant Community is the only recognized plant community in the Reference State. This state is very resistant to any change that does not affect the associated water table. Ditching has been a traditional management tool on this ecological 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.

Community 1.1
Prairie Cordgrass/Reedgrass Plant Community

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. 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 (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	5139	4827	5969
Forb	129	390	729
Shrub/Vine	–	163	364
Total	**5268**	**5380**	**7062**

Figure 7. 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

State 2
Hydrologically Altered State

This state is a result of ditching or other draining mechanisms that alter the hydrology of the site to the point that a major reclamation effort is required to return to the reference state.

Transition T1
State 1 to 2

Significant ditching or draining the reference state shifts this site to the dryer subirrigated ecological site.

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

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. 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.
Bird watchers enjoy the variety of shorebirds and other avian fauna that inhabit the wetlands site.

Wood products

No appreciable amount of wood products are generated on this 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 were also used.

One R-417 recorded data collected on 10 points
in Custer County in 1982.

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.

Contributors

Doug Whisenhunt

Acknowledgments

Site Development and Testing Plan:
Future work is needed to validate the information in this Provisional Ecological Site Description. Additional data collection and evaluation may also be needed to develop this ESD to the Approved, then Correlated level. This

could include field activities to collect low, medium and high intensity sampling, soil correlations, and analysis of that data. Field reviews of the project plan should be done by soil scientists and vegetation specialists. A final field review, peer review, quality control, and quality assurance reviews of the ESD will be needed to produce the final document.
The State and Transitional Model and corresponding pathways and associated vegetative communities will need to be reviewed and upgraded to adhere to the new guidelines.
Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team. The project plan is: ES R071XY044NE- MLRA 71 -

Rangeland health reference sheet

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

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

Indicators

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

   _____

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

   _____

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

   _____

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

   _____

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

   _____

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

   _____

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

   _____

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

values):

---

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

---

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

---

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

---

12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

---

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

---

14. **Average percent litter cover (%) and depth (in):**

---

15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

---

16. **Potential invasive (including noxious) species (native and non-native). List species which BOTH characterize degraded states and have the potential to become a dominant or co-dominant species on the ecological site if their future establishment and growth is not actively controlled by management interventions. Species that become dominant for only one to several years (e.g., short-term response to drought or wildfire) are not invasive plants. Note that unlike other indicators, we are describing what is NOT expected in the reference state for the ecological site:**

---

17. **Perennial plant reproductive capability:**
