USDA Natural Resources Conservation Service

Ecological site R065XY022NE
Wet Land

Last updated: 2/04/2025
Accessed: 05/12/2025

General information

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

Figure 1. Mapped extent

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

MLRA notes

Major Land Resource Area (MLRA): 065X–Nebraska Sand Hills

The Nebraska Sand Hills (MLRA 65) is located in Nebraska (98 percent) and South Dakota (2 percent) and encompasses approximately 13.2 million acres (534,201 hectares) or 20,625 square miles (53,420 square kilometers). The largest town in the MLRA is North Platte, Nebraska and numerous small towns and villages are located within the MLRA, including the county seats of Arthur, Bartlett, Bassett, Brewster, Greeley, Hyannis, Mullen, Thedford, and Tryon, Nebraska. The Niobrara River is near the northern boundary while the North Platte River flows along the southwest boundary of the area. The North Loup, Middle Loup, Calamus, Snake, and Dismal Rivers and Long Pine Creek occur in the central and eastern portion of the area.

Fort Niobrara, Crescent Lake, and Valentine National Wildlife Refuges and portions of the Nebraska National Forest, including the Bessey Ranger District and Samuel R. McKelvie National Forest, are located within this MLRA. The Bessey Ranger District includes the largest human-planted forest in the United States and is home to the Bessey Tree Nursery which is listed on the National Register of Historic Places.

This MLRA is defined by an 8,000 year-old landscape of sand hills dominated by rolling to steep sand dunes with narrow, elongated, nearly level to steeply sloping valleys between the dunes. Dune heights range from 10 to 400 feet (3 to 130 meters) and slopes may exceed twenty-five percent. Dune complexes often extend for several miles in a northwest to southeast direction. These Quaternary sand dunes are derived from the underlying Tertiary

Ogallala and Arikaree Groups, which formed when rivers deposited sediments from erosional detritus after the uplift of the Rocky Mountains to the west. The Nebraska Sand Hills are the largest sand dune area in the Western Hemisphere and one of the largest grass-stabilized dune regions in the world. The soils of the MLRA are principally derived from deep eolian sand.

The Ogallala aquifer underlies the MLRA and is the most extensive and heavily used aquifer of the high plains between the Rocky Mountains and Mississippi River. The aquifer is at its thickest in the Sand Hills which are a primary recharge are for the aquifer. Numerous small permanent and intermittent lakes and wetlands occur in the MLRA. While the dominant source of water for these lakes is precipitation, groundwater discharge is important to maintaining these lakes especially in drier years. A number of these lakes, especially in the western portion of the MLRA are alkaline.

Considered to be a western extension of the tallgrass prairie, the matrix vegetation is a unique mix of species that is sometimes identified as Sandhills Prairie. Sand bluestem, prairie sandreed, Indiangrass, switchgrass, sand lovegrass, little bluestem, and needle and thread are the primary grasses. Porcupinegrass is a significant cool-season grass in the eastern portion of the MLRA while blue grama and hairy grama are important warm-season grasses in the western portion due to differences in precipitation. Soils which have a high water table support a tallgrass prairie dominated by big bluestem, switchgrass, Indiangrass, prairie cordgrass, and a variety of grass-likes. The endangered plant blowout penstemon (Penstemon haydenii) is found in this MLRA.

More than ninety percent of the land in MLRA 65 is native grassland utilized by grazing livestock. Areas along streams and in subirrigated valleys are utilized for prairie hay. Wetlands, legume hay, and irrigated cropland make up the balance of the land area with corn being the principal irrigated crop.

Wildlife flourishes in this native grassland environment. Historically large bison herds occupied the landscape. White-tailed deer, mule deer, pronghorn, black tailed jackrabbit, and coyote are now the major mammalian species. Upland sandpiper, lark bunting, grasshopper sparrow, western meadowlark, long-billed curlew, sharp-tailed grouse, and greater prairie chicken are common avian species. The mosaic of grassland and wetlands provide excellent habitat for wading and shorebird species as well.

This landscape serves as a backdrop for a disturbance-driven ecosystem, which developed under the influences of herbivory, fire, and periodic long-term drought. Historically, these processes created a heterogeneous mosaic of plant communities and vegetative structure across the region. Any given site in this landscape experienced fire every six to ten years. Fires were caused by lightning strikes and also were set by Native Americans, who used fire for warfare, signaling, and to refresh the native grasses. Indigenous peoples understood the value of fire as a tool and that the highly palatable growth following a fire provided excellent forage for their horses and attracted grazing animals such as bison, elk, and pronghorn.

The natural fire regime has been disrupted by aggressive fire suppression policies which have facilitated woody species encroachment by both native and introduced shrubs and trees into the native prairie. The most common encroacher is eastern redcedar. While eastern redcedar is native to the landscape, it was present only in trace amounts due to the periodic fires. Widespread plantings of windbreaks with eastern redcedar as a primary component have provided a seed source for this aggressive woody plant causing encroachment into native grasslands, especially in the eastern and central Sand Hills. This encroachment causes significant forage loss for domestic livestock and degrades the native wildlife habit. Since it is not a root-sprouter, eastern redcedar is very susceptible to fire when under six feet tall making management with prescribed fire very effective when applied before trees reach this stage.

Classification relationships

►USDA-NRCS (2022)◄
Land Resource Region – G, Central Feed Grains and Livestock Region
Major Land Resource Area (MLRA) –65, Nebraska Sand Hills

►Fenneman (1916) Physiographic Regions ◄
Division – Interior Plains
Province – Great Plains
Section – High Plains

►USDA-USFS (2007) Ecoregions◄
Domain – Dry
Division – Temperate Steppe
Province – Great Plains Steppe (332)
Section – Mixed Grass Steppe

►EPA Ecoregions (Omernik 1997)◄
I – Great Plains (9)
II – West-Central Semi-Arid Prairies (9.3)
III – Nebraska Sandhills (44)
IV – Sandhills (44a), Alkaline Lakes Area (44b), Wet Meadow and Marsh Plain (44c), Lakes Area (44d)

Ecological site concept

The Wet Land ecological site is a run-on site found primarily on interdunes and on stream valleys with slopes of 1 percent or less. The site is generally saturated or ponded for a long duration at or near the surface during the growing season to a depth of up to 6 inches.

The historic vegetation of the Wet Land ecological site is tallgrass prairie. Vegetation in the Reference Community (1.1) is a mixture of cool-season grasses and warm-season tallgrasses. Dominant grasses include prairie cordgrass, bluejoint, northern reedgrass, and stiffstem reedgrass. The plant community includes a diversity population of forbs. Typical shrubs include dwarf false indigo and willows.

Associated sites

R065XY023NE	**Wet Subirrigated** The Wet Subirrigated ecological site is typically found interspersed with Wet Land ecological sites in interdunes and stream valleys.
R065XY024NE	**Subirrigated** The Subirrigated ecological site is typically found interspersed with Wet Land ecological sites in interdunes and stream valleys, but Subirrigated sites are found on a slightly higher landscape position.

Similar sites

R065XY026NE	**Deep Wetland** Wet Land and Deep Wetland ecological sites are very similar. The primary difference between the two sites is the length and depth of ponding. Ponding is deeper (up to 24 inches) and of very long duration on Deep Wetland sites.

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Spartina pectinata* (2) *Calamagrostis stricta ssp. inexpansa*

Physiographic features

The Wet Land ecological site occurs on flood plains of nearly level valley floors or in the sandhills on interdunes, interdune swales, or fens. Water is at or near the surface during most of the year.

Table 2. Representative physiographic features

Landforms	(1) Valley > Flood plain (2) Sandhills > Interdune (3) Sandhills > Swale (4) Sandhills > Fen

Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Long (7 to 30 days) to very long (more than 30 days)
Elevation	1,970–3,940 ft
Slope	0–1%
Ponding depth	0–6 in
Water table depth	0–12 in
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 34 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 ºF during the summer. The winters are characterized with frequent northerly winds, producing severe cold with temperatures dropping to as low as -30 ºF.

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 (characteristic range)	109-126 days
Freeze-free period (characteristic range)	131-143 days
Precipitation total (characteristic range)	19-26 in
Frost-free period (actual range)	103-129 days
Freeze-free period (actual range)	129-146 days
Precipitation total (actual range)	18-27 in
Frost-free period (average)	118 days
Freeze-free period (average)	137 days
Precipitation total (average)	22 in

Climate stations used

- (1) ALLIANCE MUNI AP [USW00024044], Alliance, NE
- (2) ARTHUR [USC00250365], Arthur, NE
- (3) ATKINSON 3SW [USC00250420], Atkinson, NE
- (4) BARTLETT 1S [USC00250525], Bartlett, NE
- (5) BREWSTER [USC00251130], Brewster, NE
- (6) CHAMBERS [USC00251590], Chambers, NE

- (7) CRESCENT LAKE NWR [USC00252000], Oshkosh, NE
- (8) ELLSWORTH 15 NNE [USC00252647], Ellsworth, NE
- (9) ELSMERE 9 ENE [USC00252680], Johnstown, NE
- (10) ERICSON 8 WNW [USC00252770], Burwell, NE
- (11) GREELEY [USC00253425], Greeley, NE
- (12) HYANNIS [USC00254100], Hyannis, NE
- (13) KILGORE 1NE [USC00254432], Kilgore, NE
- (14) KINGSLEY DAM [USC00254455], Keystone, NE
- (15) MERRIMAN [USC00255470], Merriman, NE
- (16) MULLEN [USC00255700], Mullen, NE
- (17) MULLEN 21 NW [USC00255702], Whitman, NE
- (18) NEWPORT [USC00255925], Newport, NE
- (19) NORTH PLATTE RGNL AP [USW00024023], Maxwell, NE
- (20) PURDUM [USC00256970], Purdum, NE
- (21) ROSE 10 WNW [USC00257318], Long Pine, NE
- (22) SWAN LAKE [USC00258360], Amelia, NE
- (23) VALENTINE NWR [USC00258755], Valentine, NE
- (24) WHITMAN 5 ENE [USW00094079], Whitman, NE

Influencing water features

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

Soil features

The soils associated with the Wet Land ecological site are deep and very poorly drained. Slopes range from 0 to 1 percent. Soils associated with this site were typically formed in either loamy and sandy alluvium or sandy eolian deposits. The surface layer texture ranges from loamy fine sand to fine sandy loam. Subsurface textures are typically sand to fine sandy loam but range from sand to clay loam. The surface layer is 5 to 19 inches thick. Several soils associated with the Wet Land site have surfaces of mucky peat and/or slightly decomposed plant material. Soil structure is typically medium to fine angular blocky in the A-horizon.

The Cutcomb soil series is include in the Wet Land ecological site and is associated with fens. These soils are very poorly drained and formed in thick deposits of organic material. These soils 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. Pedestalling of plants does not typically occur on this site.

The major soil series correlated to this ecological site include Tryon, Loup, and Almeria. Other soil series that have been correlated to this site include Barney, Crowther, Cullison, Cutcomb, Gannett, Gus, and Hoffland. Additional information can be found in the various soil survey reports. Contact the local USDA Service Center for soil survey reports that include more details specific to your location or visit Web Soil Survey (https://websoilsurvey.sc.egov.usda.gov).

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Eolian deposits (3) Herbaceous organic material
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	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3.2–17.7 in
Calcium carbonate equivalent (0-40in)	0–23%
Electrical conductivity (0-40in)	0–4 mmhos/cm
Sodium adsorption ratio (0-40in)	0–5
Soil reaction (1:1 water) (0-40in)	5.1–8.4
Subsurface fragment volume <=3" (0-40in)	0–9%
Subsurface fragment volume >3" (0-40in)	0%

Ecological dynamics

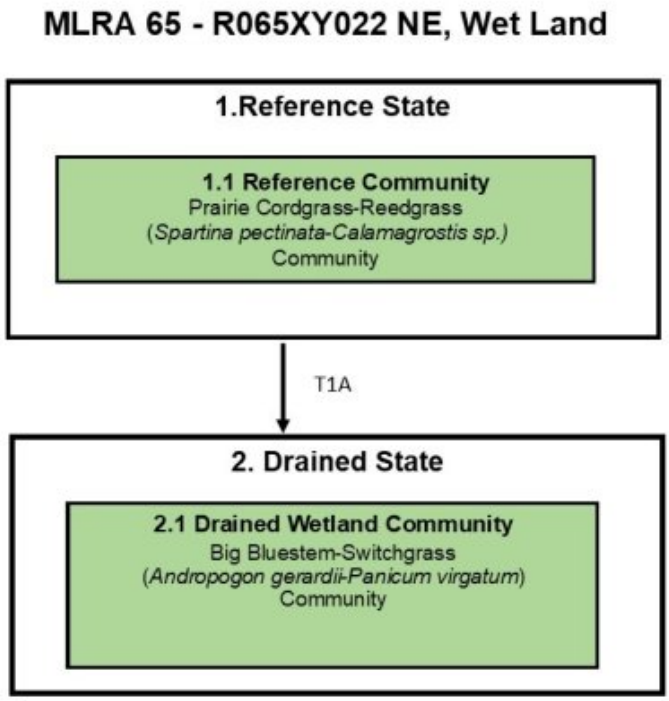
Wet Land ecological sites developed under Northern Great Plains climatic conditions, light to severe grazing by bison and other large herbivores, sporadic natural or man-caused fire, and other biotic and abiotic factors that typically influence soil and site development. This continues to be a disturbance-driven site with herbivory, fire, and variable climate being the primary disturbances. Changes occur in the plant communities due to short-term weather variations, impacts of native and exotic plant and animal species, and management actions.

This site is extremely stable. Plant species composition and production do not fluctuate greatly under most grazing management scenarios. A significant amount of drainage has occurred on Wet Land sites across the MLRA. Ditching to remove water at or near the surface to allow haying is common on these sites. This practice usually results in a shift to another ecological site, usually either the Wet Subirrigated or the Subirrigated ecological site.

The State and Transition Model (STM) is depicted below and includes a Reference State (1) and a Drained State (2). Each state represents the crossing of a major ecological threshold due to the alteration of the functional dynamic properties of the ecosystem. The primary properties observed to determine this change are soil stability, vegetative communities, and the hydrologic cycle. Each state may have one or more plant communities that fluctuate in species composition and abundance within the normal parameters of the state. Within each state, communities may degrade or recover in response to natural and man caused disturbances such as variation in the degree and timing of herbivory, presence or absence of fire, and local climatic fluctuations especially in the precipitation regime. The processes that cause the movement between the states and communities are discussed in more detail in the state and community description following the diagram.

Interpretations are primarily based on the Reference Community (1.1), which 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 have been used as well. Plant communities, states, transitional pathways, and thresholds have been determined through similar studies and experience.

State and transition model



Transitions:
T1A: Drainage, typically through ditching.

Figure 8. State and Transition Diagram, Wet Land ecological site, MLRA 65.

State 1
Reference State

The Reference State (1) describes the range of vegetative communities that occur on the Wet Land ecological site where the range of natural variability under historic conditions and disturbance regimes is mostly intact. The Reference State developed under the combined influences of climatic conditions, periodic fire activity, grazing by large herbivores, and impacts from small mammals and insects. High perennial grass cover and production allows for increased soil moisture retention, vegetative production and overall soil quality. The Reference State is a very stable state that is very resistant to any change that does not affect the associated water table. The Reference State includes one community phase which is the Reference Community (1.1). The Reference Community serves as a description of the native plant community that naturally occurs on the site when the hydrology of the site is intact.

Dominant plant species

- prairie cordgrass (*Spartina pectinata*), grass
- northern reedgrass (*Calamagrostis stricta ssp. inexpansa*), grass
- slimstem reedgrass (*Calamagrostis stricta ssp. stricta*), grass

Community 1.1
Reference Community

Interpretations are primarily based on the Reference or Prairie Cordgrass-Reedgrass (*Spartina pectinata*-Calamagrostis) Community (1.1). This plant community serves as a description of the native plant community that occurs on the site when the historic disturbance regimes are intact or are closely mimicked by management practices. Fluctuations in plant community are primarily driven by different responses of the species to fluctuations in precipitation timing and abundance and changes in the water table. This plant community consists chiefly of warm-season, tallgrasses, cool-season grasses, and grass-likes. Prairie cordgrass, bluejoint, northern reedgrass, and sedges are the dominant species. Grasses of secondary importance include slimstem reedgrass, slender wheatgrass, and plains bluegrass. Forbs typically include Virginia strawberry, American licorice, wild mint, swamp smartweed, and Pennsylvania smartweed. Dwarf false indigo, and willows are common shrubs. This plant community is about 55 to 75 percent grasses, 20 to 30 percent grass-likes, 5 to 10 percent forbs, and 1 to 5 percent shrubs by weight. Natural fire played a less significant role in the succession of this site than on other ecological sites in the MLRA. Due to the wetness of the site, woody encroachment is limited to willows which are usually controlled by grazing and haying. This plant community can be found on areas that have been grazed or hayed in dry years when the water table drops enough to allow mechanical harvest.

Dominant plant species

- prairie cordgrass (*Spartina pectinata*), grass
- northern reedgrass (*Calamagrostis stricta ssp. inexpansa*), grass
- slimstem reedgrass (*Calamagrostis stricta ssp. stricta*), grass
- sedge (*Carex*), other herbaceous

Table 5. Annual production by plant type

Plant Type	Low (Lb/Acre)	Representative Value (Lb/Acre)	High (Lb/Acre)
Grass/Grasslike	4500	5075	5410
Forb	100	580	600
Shrub/Vine	0	145	290
Total	**4600**	**5800**	**6300**

Figure 10. 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

Drained State

The Drained State (2) occurs when the hydrology of the site has been altered through drainage, usually by ditching, to lower the water table to facilitate haying. Once drainage occurs the site will, depending upon the extent of the drainage activity, more closely resemble either a Subirrigated or Wet Subirrigated ecological site than the Wet Land site. Land in this state is often interseeded with introduced grasses, introduced legumes, or a combination to increase hay quality. The Drained State consists of the Drained Community (2.2).

Dominant plant species

- prairie cordgrass (*Spartina pectinata*), grass
- big bluestem (*Andropogon gerardii*), grass
- switchgrass (*Panicum virgatum*), grass
- reed canarygrass (*Phalaris arundinacea*), grass
- creeping meadow foxtail (*Alopecurus arundinaceus*), grass

Community 2.1
Drained Community

The Drained Community (2.1) occurs when the water table has been lowered due to drainage activities. Depending upon the extent of the drainage, the community resembles either a community of the Wet Subirrigated ecological site or the Subirrigated ecological site. Ditching has been a traditional management tool for this site to facilitate hay production. Once ditched, significant inputs are required to restore and maintain the high water table. Once the hydrology is restored, restoration to a true Reference Community is unlikely due to the changes to soils and biotic integrity.

Dominant plant species

- sand bluestem (*Andropogon hallii*), grass
- switchgrass (*Panicum virgatum*), grass
- prairie cordgrass (*Spartina pectinata*), grass
- creeping meadow foxtail (*Alopecurus arundinaceus*), grass
- reed canarygrass (*Phalaris arundinacea*), grass

Transition T1A
State 1 to 2

Drainage through ditching to facilitate haying has been a traditional management tool for this site. Draining 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 the and maintain the high water table but due to the impact of the drainage on the soils and biotic integrity of the site a true return to a Reference State is unlikely.

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	**Warm-Season Tallgrass**			1450–2900	
	prairie cordgrass	SPPE	*Spartina pectinata*	1450–2900	–
	Grass, perennial	2GP	*Grass, perennial*	0–290	–
2	**Cool-Season Tall- and Mldgrass**			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	–
	slender wheatgrass	ELTRT	*Elymus trachycaulus ssp. trachycaulus*	0–580	–
	Grass, perennial	2GP	*Grass, perennial*	0–116	–
3	**Cool-Season Shortgrass**			290–580	
	plains bluegrass	POAR3	*Poa arida*	290–580	–
	Grass, perennial	2GP	*Grass, perennial*	0–116	–
4	**Grass-Likes**			1160–1740	
	sedge	CAREX	*Carex*	870–1740	–
	rush	JUNCU	*Juncus*	0–580	–
	bulrush	SCIRP	*Scirpus*	0–290	–
	spikerush	ELEOC	*Eleocharis*	0–290	–
Forb					
5	**Forbs**			290–580	
	Forb, perennial	2FP	*Forb, perennial*	0–116	–
	Virginia strawberry	FRVI	*Fragaria virginiana*	0–116	–
	American licorice	GLLE3	*Glycyrrhiza lepidota*	0–116	–
	wild mint	MEAR4	*Mentha arvensis*	0–116	–
	swamp smartweed	POHY2	*Polygonum hydropiperoides*	0–116	–
	Pennsylvania smartweed	POPE2	*Polygonum pensylvanicum*	0–116	–
	cinquefoil	POTEN	*Potentilla*	0–116	–
Shrub/Vine					
6	**Shrubs**			58–290	
	dwarf false indigo	AMNA	*Amorpha nana*	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

"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 the Wet Land ecological 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 after very intense storms or from 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 through the Quality Control and Quality Assurance processes 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.

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. Annual reviews of the Project Plan are to be conducted by the Ecological Site Technical Team. The project plan is ES-R065XY013NE - MLRA 65.

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

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USDA, NRCS, various published Soil Surveys

Contributors

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Approval

Suzanne Mayne-Kinney, 2/04/2025

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.

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Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:** None. Rills are not expected on this site.

2. **Presence of water flow patterns:** None. Water flow patterns are not expected on this site.

3. **Number and height of erosional pedestals or terracettes:** None. Erosional pedestals or terracettes are not expected.

4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):** Bare ground typically less than 5 percent with patches less than 2 inches (5 cm) wide. During periods of above average precipitation and run-on, this site may be ponded for longer than normal durations and the typical vegetation will be temporarily reduced. This situation will create areas of bare ground for relatively short periods of time after which early successional forbs, grasses, and grass-likes will occupy the site.

   Bare ground is exposed mineral soil that is not covered by vegetation (basal and/or foliar canopy), standing dead vegetation, gravel/rock, and visible biological crust (e.g., lichen, mosses, algae).

5. **Number of gullies and erosion associated with gullies:** None. Gullies are not expected on this site.

6. **Extent of wind scoured, blowouts and/or depositional areas:** None. Wind-scoured areas and depositional areas are not expected on this site.

7. **Amount of litter movement (describe size and distance expected to travel):** Litter should fall in place. Slight amount of movement of fine litter from water is possible, but not normal. Litter movement from wind is not expected.

8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):** Soil stability ratings will be 6. This site typically has an O-horizon consisting of roots and partially decomposed vegetation that is up to 3 inches (7.5 cm) 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):** The A-horizon is 2 to 19 inches (5-48.25 cm) thick. The soil color is typically dark gray (values of 3-5) when dry and black (values of 2 to 4) when moist. Soil structure is medium to fine angular blocky in the A-horizon.

   Tryon, Loup, and Almeria are the major soil series correlated to this ecological site. Other soil series that have been correlated to this site include Barney, Crowther, Cullison, Cutcomb, Gannett, Guss, and Hoffland.

10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:** The functional/structural groups provide a combination of rooting depths and structure which positively influences infiltration. Combination of shallow and deep rooted species (rhizomatous, warm-season tall- and midgrasses and tufted perennial cool season grasses) with fine and coarse roots positively influences infiltration.

The expected composition of the plant community is 55 to 75 percent perennial grasses, 20 to 30% grass-likes, 5 to 10 percent forbs, and 1 to 5 percent shrubs. The perennial grass component is made up of warm-season tallgrass (25-50%), cool-season grasses (10-25%), and warm-season shortgrass (5-10%).

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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. Compaction layers should not be present.

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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: Phase 1.1
    1. Native, perennial, warm-season, tallgrass, 1450-2900 #/ac, 25-50%, 1 species minimum: prairie cordgrass.
    2. Grass-like, 1160-1740 #/ac, 20-30%, 1 species minimum: sedge, rush, bulrush, spikerush.
    3. Native, perennial, cool-season, tall- and midgrass, 290-2030 #/ac, 5-35%, 1 species minimum: bluejoint, northern reedgrass, slimstem reedgrass, slender wheatgrass.

    Sub-dominant: Phase 1.1
    N/A

    Other: Minor - Phase 1.1
    1. Native, perennial, cool-season shortgrass, 290-580, 5-10%: plains bluegrass.

    2. Native forb, 290-580, 5-10%: forbs present vary from location to location.

    3. Shrub, 58-290, 1-5%: dwarf false indigo, Missouri River willow, narrowleaf willow, meadow willow.

    Additional: The Reference Community (1.1) includes six functional/structural groups which are in order of relative abundance native, perennial, warm-season tallgrass; grass-like; native, perennial, cool-season tall- and midgrass; native, perennial, cool-season shortgrass; native forbs; native shrubs.

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):** Very little evidence of decadence or mortality. Bunch grasses have strong, healthy centers and shrubs have few dead stems.

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14. **Average percent litter cover (%) and depth (in):** Plant litter cover is evenly distributed throughout the site and is expected to be 80 to 90 percent and at a depth of 0.50 to 1.5 inch (1.3-4 cm).

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):** The representative value (RV) for annual production is 5,800 pounds per acer on an air dry weight basis. Low and high production years should yield 4,700 and 6,300 pounds per acre respectively.

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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: Canada thistle, reed canarygrass, creeping foxtail, common watercress, leafy spurge, quackgrass, redtop, and purple loosestrife are known invasives that have the potential to be dominant or co-dominant on the site. Consult the state noxious weed and state watch lists for potential invasive species on each ecological site.

NOTE: Invasive plants (for the purposes of the IIRH protocol) are plant species that are typically not found on the ecological site or should only be in trace or minor categories under the natural disturbance regime and have the potential to become a dominant or codominant species on the site if their establishment and growth are not actively controlled by natural disturbances or management interventions. Species listed characterize degraded states AND have the potential to become a dominant or co-dominant species.

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17. **Perennial plant reproductive capability:** All perennial species exhibit high vigor relative to recent weather conditions. Perennial grasses should have vigorous rhizomes or tillers; vegetative and reproductive structures are not stunted. All perennial species should be capable of reproducing annually.
