USDA Natural Resources Conservation Service

Ecological site R113XY914IL
Wet Lacustrine Terrace Prairie

Last updated: 5/17/2024
Accessed: 08/17/2024

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.

MLRA notes

Major Land Resource Area (MLRA): 113X–Central Claypan Areas

The eastern Illinois portion of the Central Claypan Areas MLRA is in the Till Plains Section of the Central Lowland Province of the Interior Plains (USDA-NRCS, 2006) and includes the Southern Till Plain Natural Division of the natural divisions of Illinois (Schwegman, 1973; 1997; IDNR, 2018) in south-central Illinois. South-central Illinois is a dissected Illinoisan till plain south of the terminal Wisconsin moraine. This region consists of nearly level to gently sloping, old till plains. Stream valleys are shallow and generally are narrow. Elevation is about 660 feet (200 meters), increasing gradually from south to north. Local relief is generally low on the broad, flat till plains and flood plains and high on the dissected hills bordering rivers or drainage systems. The Kaskaskia, Little Muddy, Little Wabash, Embarras, and Skillet Fork rivers are part of this area. This region is covered with loess, which overlies old glacial drift (Illinoisan till) that has a high content of clay. Fragipans are also present. Pennsylvanian limestone and shale bedrock underlay the glacial till. The dominant soil orders in this region are Alfisol and Mollisol. The soils in the area predominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or smectitic mineralogy. They generally are very deep, well drained to poorly drained, and loamy or clayey. (USDA-NRCS, 2006).

Classification relationships

Major Land Resource Area (MLRA) (USDA-NRCS, 2006):
113 – Central Claypan Areas, Eastern Part
U.S. Forest Service Ecoregions (Cleland et al. 2007):
Domain: Humid Temperate Domain
Division: Hot Continental Division
Province: Eastern Broadleaf Forest (Continental)
Province Code: 222
Section: Central Till Plains, Oak-Hickory Section
Section Code: 222G

Ecological site concept

This wet prairie community type is found in southeast-central Illinois of the Central Claypan Areas MLRA. Wet Lacustrine Terrace Prairies occur on lacustrine terraces and lake plains with slopes of 0 to 2 percent in soils that seasonally perch water. The soils are poorly drained and very deep. Standing surface water may be present for varying periods in the winter and spring or after heavy rains. A water table is near or at the surface.

The historic reference plant community was a wet grassland with a tree and shrub canopy of less than 10 percent. A dense layer of graminoids dominates this community. Forbs and shrubs are also common. The vegetation is typically 1 to 2 meters tall. Bluejoint (Calamagrostis canadensis (Michx.) P. Beauv.*) and (Spartina pectinata Bosc ex Link) are the two most abundant species. Several common sedge species (Carex spp.) found in this community include hairy sedge (Carex lacustris Willd.), ravenfoot sedge (Carex crus-corvi Shuttlw. ex Kunze), awlfruit sedge

(Carex stipata Muhl. ex Willd.), and woolly sedge (Carex pellita Muhl. ex Willd.). Other species associated with this community include (Andropogon gerardii Vitman), New England aster (Symphyotrichum novae-angliae (L.) G.L. Nesom), sawtooth sunflower (Helianthus grosseserratus M. Martens), harlequin blueflag (Iris versicolor L.), prairie blazing star (Liatris pycnostachya Michx.), winged lythrum (Lythrum alatum Pursh), switchgrass (Panicum virgatum L.), Virginia mountainmint (Pycnanthemum virginianum (L.) T. Dur. & B.D. Jacks. ex B.L. Rob. & Fernald), giant goldenrod (Solidago gigantea Aiton), purple meadow-rue (Thalictrum dasycarpum Fisch. & Avé-Lall.), and Culver's root (Veronicastrum virginicum (L.) Farw.). In some instances composition may show more of a meadow character, with swamp milkweed (Asclepias incarnata L.), rice cutgrass (Leersia oryzoides (L.) Sw.), hemlock waterparsnip (Sium suave Walter), and marsh hedgenettle (Stachys palustris L.) listed as characteristic plants. (Mohlenbrock and Ladd, 1978; Mohlenbrock, 2003; NatureServe 2018; Nelson 2010; White and Madany 1978) Periodic prolonged ponding and fire were natural disturbances that prevented woody vegetation from dominating this community (NatureServe 2018).

* All plant common and scientific names in this document were obtained from the U.S. Department of Agriculture – Natural Resources Conservation Service National PLANTS Database (USDA NRCS, 2018).

Associated sites

F113XY905IL	**Wet Upland Woodland** Wet Upland Woodlands typically occur adjacent to Wet Lacustrine Terrace Prairies and have similar slopes and drainages but are wooded.
F113XY920IL	**Silty Floodplain Forest** Wet Silty Floodplain Forests occupy the areas adjacent to but lower on the landscape and are wooded.

Similar sites

R113XY903IL	**Wet Upland Prairie** Wet Upland Prairies have similar drainage and species composition but occur higher on the landscape.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Cephalanthus occidentalis*
Herbaceous	(1) *Spartina pectinata* (2) *Lythrum alatum*

Physiographic features

This site is on very deep, poorly drained, slowly permeable soils formed in loess and lacustrine sediments on lacustrine terraces and lake plains. Slope ranges from 0 to 2 percent. The site generates negligible runoff to downslope ecological sites. Depth to an intermittent perched high water table is 0.5 foot above the surface to 1.0 foot below from December to April in most years. This site occasionally floods.

Table 2. Representative physiographic features

Landforms	(1) Lake plain > Terrace
Runoff class	Negligible
Ponding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Ponding frequency	None to occasional
Elevation	110–137 m
Slope	0–2%
Water table depth	0–15 cm
Aspect	Aspect is not a significant factor

Climatic features

The soil temperature regime of MLRA 113 is classified as mesic, where the mean annual soil temperature is between 47 and 59°F. Temperature and precipitation occur along a north-south gradient, where temperature and precipitation increase the further south you travel (USDA-NRCS 2006). The majority of the precipitation occurs as rainfall in the form of convective thunderstorms during the growing season.

Table 3. Representative climatic features

Frost-free period (characteristic range)	159-162 days
Freeze-free period (characteristic range)	185-186 days
Precipitation total (characteristic range)	1,143-1,194 mm
Frost-free period (actual range)	158-163 days
Freeze-free period (actual range)	185-186 days
Precipitation total (actual range)	1,118-1,194 mm
Frost-free period (average)	161 days
Freeze-free period (average)	186 days
Precipitation total (average)	1,168 mm

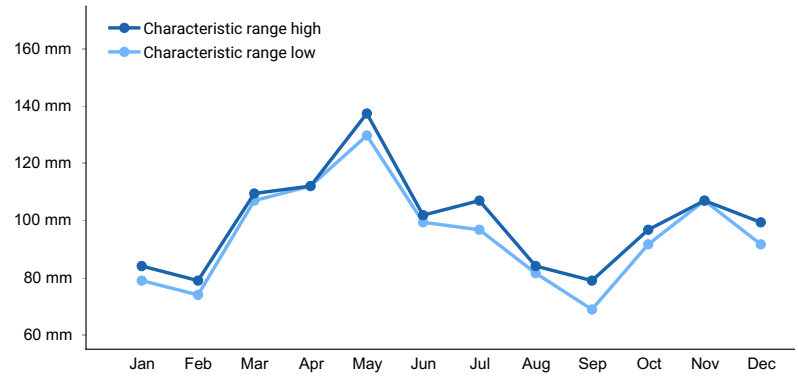


Figure 1. Monthly precipitation range

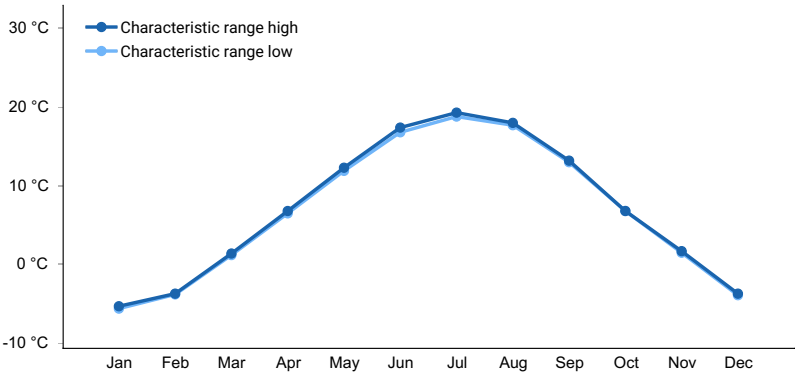


Figure 2. Monthly minimum temperature range

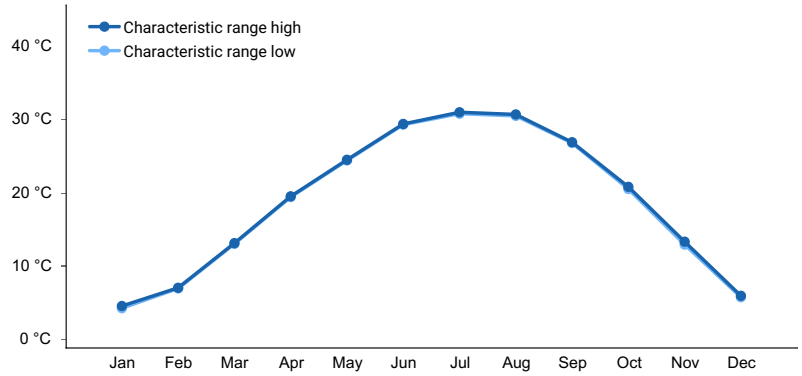


Figure 3. Monthly maximum temperature range

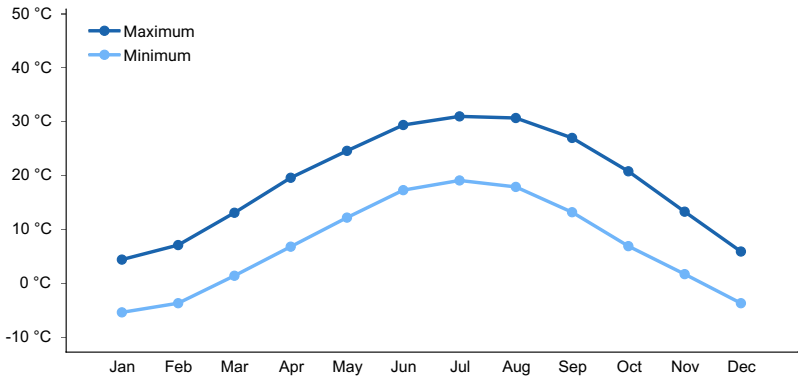


Figure 4. Monthly average minimum and maximum temperature

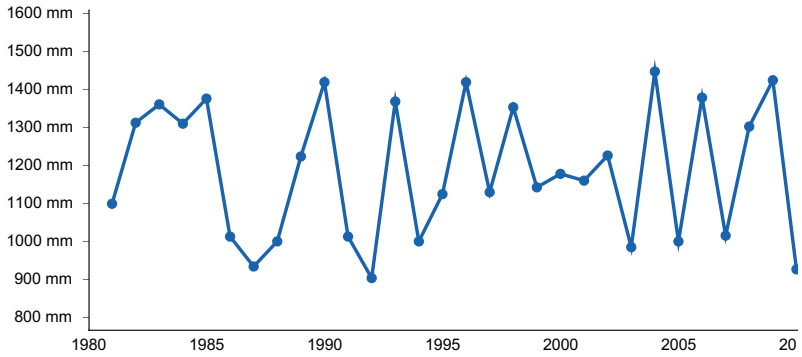


Figure 5. Annual precipitation pattern

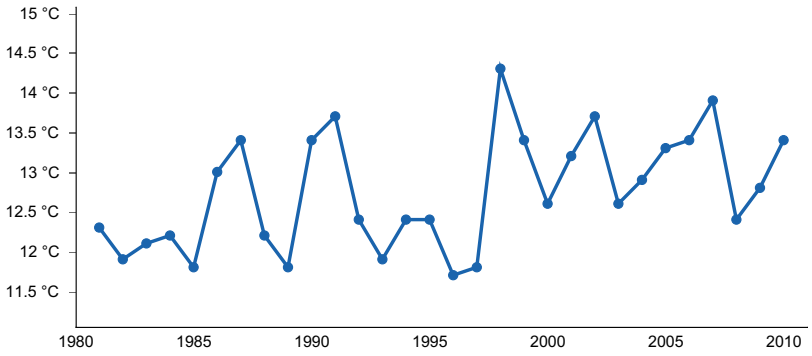


Figure 6. Annual average temperature pattern

Climate stations used

- (1) FAIRFIELD RADIO WFIW [USC00112931], Fairfield, IL
- (2) CARMI 3 [USC00111302], Carmi, IL

Influencing water features

This ecological site is influenced by a seasonal high water table from high groundwater levels, as well as slow hydraulic conductivity, which impedes through flow from precipitation. The water table is typically near the surface in late fall through spring, receding in the summer. Some areas pond for short periods of time, mostly in the spring. Infiltration is very slow and surface runoff is negligible (SSS NRCS WSS, 2018). These areas have a clay layer horizon near the surface, with a slow rate of water transmission. (SSS NRCS OSD, 2018).

Wetland description

This ecological site contains wetlands which fit into the MINERAL FLAT class in the hydrogeomorphic (HGM) system (Brinson, 1993). Vertical water percolation in the soil is impeded by the clayey subsoil resulting in significant lateral discharge to adjacent downslope ecological sites. This discharge supports surface saturation in the adjacent areas. In general, MINERAL FLAT areas provide watershed recharge and runoff that accumulates in downslope reaches as groundwater discharge and surface water accumulation. Wetland hydrology is effectively removed by surface ditches or subsurface tile drainage that directs vertical downward movement in a horizontal direction to the drainage element.

Soil features

These soils are very deep, poorly drained and seasonally wet. They formed in in loess and lacustrine sediments on lacustrine terraces and lake plains. A seasonal high water table, at or near the surface to 1 foot below the surface, is present through the spring, receding in the summer. Soils of this ecological site are in the Mollisol order, further classified as fine, mixed, superactive, mesic Vertic Argiaquolls. Soil series associated with this site include Lakaskia (NCSS, 2018; SSS NRCS OSD, 2018).

Table 4. Representative soil features

Parent material	(1) Loess (2) Lacustrine deposits
Surface texture	(1) Silt loam
Family particle size	(1) Fine
Drainage class	Poorly drained
Permeability class	Very slow
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	15.24 cm
Calcium carbonate equivalent (Depth not specified)	0–5%
Soil reaction (1:1 water) (Depth not specified)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

The MLRA lies within the transition zone between the eastern deciduous forests and the tallgrass prairies. The heterogeneous topography of the area results in variable microclimates and fuel matrices that in turn are able to support prairies, savannas, woodlands, and forests. Wet Lacustrine Terrace Prairies form an aspect of this vegetative continuum. This ecological site occurs on lacustrine terraces and lake plains on poorly-drained soils.

Species characteristic of this ecological site consist of hydrophytic herbaceous vegetation.

Structural and species variation in a Wet Lacustrine Terrace Prairie is regulated by the duration and depth of ponding, depth to water table, and soil physical properties. Soils are slowly permeable due to a high clay content. This results in a ponded or shallow, perched water table during the winter and spring. Ponding of water encourages growth of hydrophytic vegetation during the growing season. (Robertson et al. 1984)

Periodic ponding and fire were natural disturbances that prevented woody vegetation from dominating this community. Fire plays a role in the maintenance of this wet prairie, with an average fire frequency of every two to five years. Ignition sources included summertime lightning strikes from convective storms and bimodal, human ignitions during the spring and fall seasons. Native Americans regularly set fires to improve sight lines for hunting, driving large game, improving grazing and browsing habitat, agricultural clearing, and enhancing vital ethnobotanical plants (Barrett 1980). Woody species can become more abundant in the absence of fire. These periodic fires removed the litter, and stimulated the growth and flowering of the grasses and forbs. During fire free intervals, woody understory species increased and the herbaceous understory diminished. The return of fire would open up the prairies again and stimulate the abundant ground flora species. (Anderson, 1975; Brugam et.al., 2016; White, 1978).

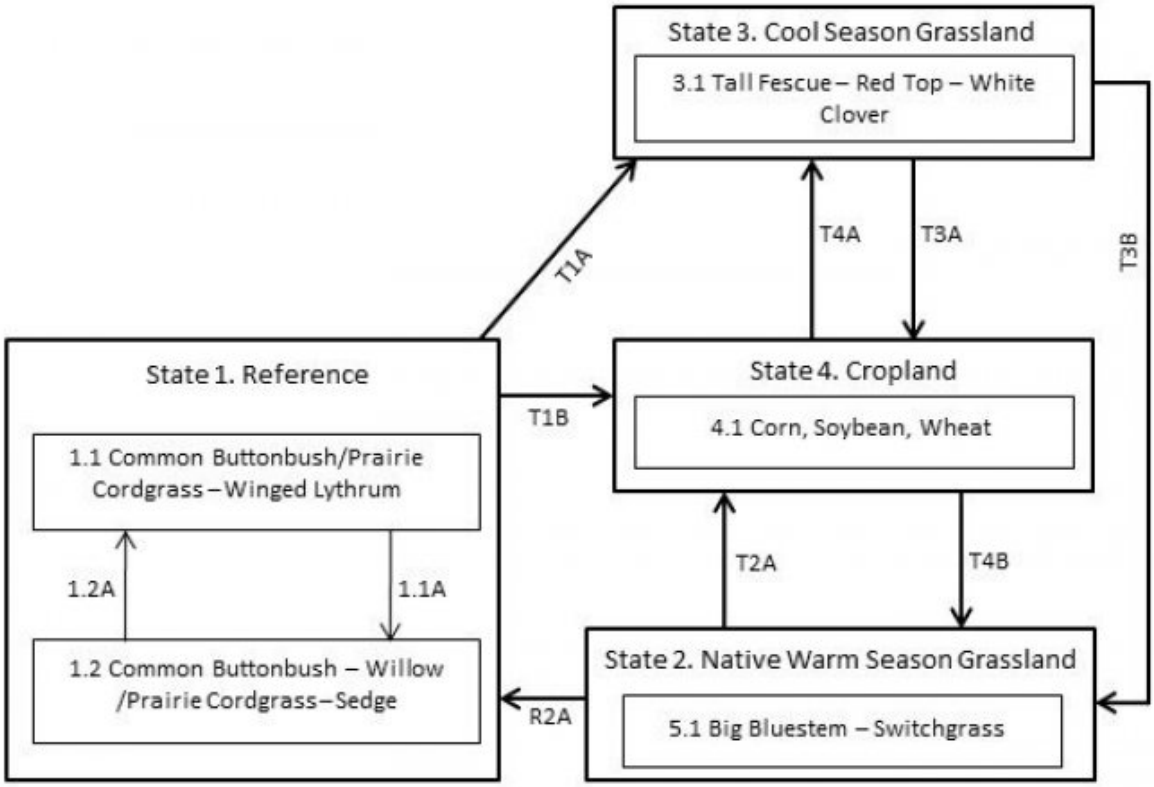
Wet Lacustrine Terrace Prairies were also subjected to disturbances from grazing by native large herbivores, such as bison (Bos bison), prairie elk (Cervus elaphus), and white-tailed deer (Odocoileus virginianus). (Anderson, 1982). This activity served a more limited role, compared to fire, in impacting community composition and structure but likely contributed to woody species reduction.

Today, most Wet Lacustrine Terrace Prairies have been drained and converted to agricultural production. Corn (*Zea mays* L.) and soybeans (*Glycine max* (L.) Merr.) are the dominant crops grown, but small patches of forage land may be present. A return to the historic plant community may not be possible following extensive land modification, but long-term conservation agriculture or prairie reconstruction efforts can help to restore some biotic diversity and ecological function.

A provisional state and transition diagram is depicted in Figure 2. Detailed descriptions of each state, transition, plant community, and pathway follow the model. This model is based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios may not be included. It may change as knowledge increases.

State and transition model

Wet Lacustrine Terrace Prairie, R113XY914IL



Code	Event/Activity/Process
T1A	Tillage; vegetative seeding; water management; grassland management
T1B, T3A, T2A	Tillage; conservation cropping system; water management
T4A	Vegetative seeding ; grassland management
T4B	Vegetative seeding; prescribed fire; grassland management
1.1A	Fire-free interval 10+ years; drought 5+ years
1.2A	Fire interval 2-5 years; normal precipitation patterns
R2A	Vegetative seeding; prescribed fire 2-5 years; restore hydrology

State 1
Reference

The reference state is characterized by common buttonbush, prairie cordgrass and winged lythrum.

Dominant plant species

- common buttonbush (*Cephalanthus occidentalis*), shrub
- prairie cordgrass (*Spartina pectinata*), grass
- winged lythrum (*Lythrum alatum*), other herbaceous

Community 1.1
Common buttonbush-prairie cordgrass-winged lythrum

Native grasses dominante this community.

Dominant plant species

- common buttonbush (*Cephalanthus occidentalis*), shrub
- prairie cordgrass (*Spartina pectinata*), grass
- winged lythrum (*Lythrum alatum*), other herbaceous

Community 1.2
Common buttonbush - willow/prairie cordgrass-sedge

Shrubs and saplings increase due to longer fire free intervals.

Dominant plant species

- common buttonbush (*Cephalanthus occidentalis*), shrub
- willow (*Salix*), shrub
- prairie cordgrass (*Spartina pectinata*), grass
- sedge (*Carex*), grass

Pathway 1.1A
Community 1.1 to 1.2

Fire-free interval 10+ years; drought 5 plus years

Pathway 1.2A
Community 1.2 to 1.1

Fire interval 2-5 years; normal precipitation patterns

State 2
Native Warm Season Grassland

Conversion from the Cool Season Grassland (State 3) or the Cropland (State 4) to this state is increasing due to renewed interest in warm season grasses as a supplement to cool season grazing systems or as a native restoration activity. This state is the most easily transformable state back to a Reference State. Substantial restoration time and management inputs will be needed.

Dominant plant species

- big bluestem (*Andropogon gerardii*), grass
- switchgrass (*Panicum virgatum*), grass

State 3
Cool Season Grassland

Conversion of other states to non-native cool season species such as tall fescue (*Schedonorus arundinaceus* (Schreb.) Dumort., nom. cons.) and white clover (*Trifolium repens* L.) has been common in the MLRA.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- bentgrass (*Agrostis*), grass
- white clover (*Trifolium repens*), other herbaceous

Community 3.1
Tall fescue - Red Top - White Clover

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- bentgrass (*Agrostis*), grass
- white clover (*Trifolium repens*), other herbaceous

State 4
Cropland

This is the dominant state that exists currently with intensive cropping of corn (*Zea mays* L.), soybeans (*Glycine max* (L.) Merr.), and common wheat (*Triticum aestivum* L.) occurring. Some conversion to cool season hay land occurs for a limited period of time before transitioning back to cropland. Limited acres are sometimes converted to native warm season grassland.

Dominant plant species

- corn (*Zea mays*), grass
- common wheat (*Triticum aestivum*), grass
- soybean (*Glycine max*), other herbaceous

Transition T1A
State 1 to 3

Tillage; vegetative seeding; water management; grassland management

Transition T1B
State 1 to 4

Tillage; conservation cropping system; water management

Restoration pathway R2A
State 2 to 1

Vegetative seeding; prescribed fire 2-5 years; restore hydrology

Transition T2A
State 2 to 4

Tillage; conservation cropping system; water management

Transition T3B
State 3 to 2

Vegetative seeding, prescribed fire,, grassland management

Transition T3A
State 3 to 4

Tillage; conservation cropping system; water management.

Restoration pathway T4B
State 4 to 2

Vegetative seeding; prescribed fire; grassland management

Transition T4A
State 4 to 3

Vegetative seeding ; grassland management

Additional community tables

Inventory data references

No field plots were available for this site. A review of the scientific literature and professional experience were used to approximate the plant communities and ecological dynamics for this provisional ecological site. Information for the state-and-transition model was obtained from the same sources. All community phases are considered provisional based on the sources identified in ecological site description.

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Other references

Relationship to other established ecological classifications:
Biophysical Setting (LANDFIRE, 2018); the reference community of this ecological site is most similar to: Central Wet-Mesic Tallgrass Prairie.

National Vegetation Classification System (NatureServe, 2018): the reference community of this ecological site is most similar to the following NVC Association: Spartina pectinata - Carex spp. - Calamagrostis canadensis - Lythrum alatum - (Oxypolis rigidior) Wet Meadow; CEGL002224.

Illinois Natural Areas Survey (INAS) (White, 1978); the reference community of this ecological site is most similar to: INAS Community Class – Prairie; Natural community – Wet Prairie

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Approval

Suzanne Mayne-Kinney, 5/17/2024

Acknowledgments

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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	08/17/2024
Approved by	Suzanne Mayne-Kinney
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:**