USDA Natural Resources Conservation Service

Ecological site R113XY903IL
Wet Upland Prairie

Last updated: 5/17/2024
Accessed: 05/13/2025

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.

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). Northern crayfish frog (Lithobates areolatus), ornate box turtle (Terrapene ornata ornate) and remnant populations of greater prairie-chickens (Tympanuchus cupido) are characteristic animals of this region (IDNR, 2018).

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-mesic prairie community type is found in south-central Illinois throughout the Central Claypan Areas MLRA. Wet Upland Prairies occur on broad, flat summits of hillslopes and knolls with slopes of 0 to 2 percent in soils that formed in loess and clayey glacial till that seasonally perches water. The soils are somewhat poorly to poorly drained and 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-mesic grassland with a tree canopy of less than 10 percent.

There is a single layer of dominant graminoids intermixed with abundant forbs and occasional scattered shrubs (NatureServe 2018). Big bluestem (Andropogon gerardii Vitman*) and prairie cordgrass (Spartina pectinata Bosc ex Link) are common in this wet-mesic community. Switchgrass (Panicum virgatum L.) is typically present as well. Other characteristic plants found in this community are fourflower yellow loosestrife (Lysimachia quadriflora Sims), meadow evening primrose (Oenothera pilosella Raf.), golden zizia (Zizia aurea (L.) W.D.J. Koch), inland rush (Juncus interior Wiegand), eastern gamagrass (Tripsacum dactyloides (L.) L), sawtooth sunflower (Helianthus grosseserratus M. Martens), common cinquefoil (Potentilla simplex Michx.), rattlesnake master (Eryngium yuccifolium Michx.), Bicknell's sedge (Carex bicknellii Britton) and bluejoint (Calamagrostis canadensis (Michx.) P. Beauv.) (White 1978; NatureServe 2018). Shrubs, such as silky dogwood (Cornus obliqua Raf.) and narrow-leaved meadowsweet (Spiraea alba), were present but not overly abundant (Mohlenbrock and Ladd, 1978; Mohlenbrock, 1986). Species diversity does not tend to be as high as in more mesic grassland communities. Fire was common in 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

R113XY902IL	**Natric Till Plain Savanna** Similar landscape position and drainage but soil profile has high sodium levels that impact species composition.
F113XY905IL	**Wet Upland Woodland** Similar drainage and landscape position but woody species have a greater species dominance due to Fragic soil characteristics.
R113XY904IL	**Upland Prairie** Prairie ecological site is often on better drained soils associated with loess over till plains.

Similar sites

R113XY904IL	**Upland Prairie** Prairie ecological site is often on better drained soils associated with loess over till plains.

Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) *Cornus obliqua*
Herbaceous	(1) *Andropogon gerardii* (2) *Panicum virgatum*

Physiographic features

This site is on broad, flat summits of hillslopes (with some depressions), structural benches, and knolls with slopes generally 0 to 2 percent but occasionally up to 7 percent. The site generates runoff to adjacent, downslope ecological sites. This site does not flood.

Table 2. Representative physiographic features

Hillslope profile	(1) Summit
Slope shape across	(1) Concave
Landforms	(1) Upland > Till plain (2) Upland > Depression (3) Upland > Ground moraine (4) Upland > Flat (5) Upland > Knoll
Runoff class	Negligible to high
Flooding frequency	None

Ponding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	110–311 m
Slope	0–7%
Ponding depth	0–30 cm
Water table depth	0–61 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)	161-171 days
Freeze-free period (characteristic range)	188-193 days
Precipitation total (characteristic range)	1,067-1,118 mm
Frost-free period (actual range)	156-173 days
Freeze-free period (actual range)	188-195 days
Precipitation total (actual range)	1,041-1,118 mm
Frost-free period (average)	166 days
Freeze-free period (average)	191 days
Precipitation total (average)	1,092 mm

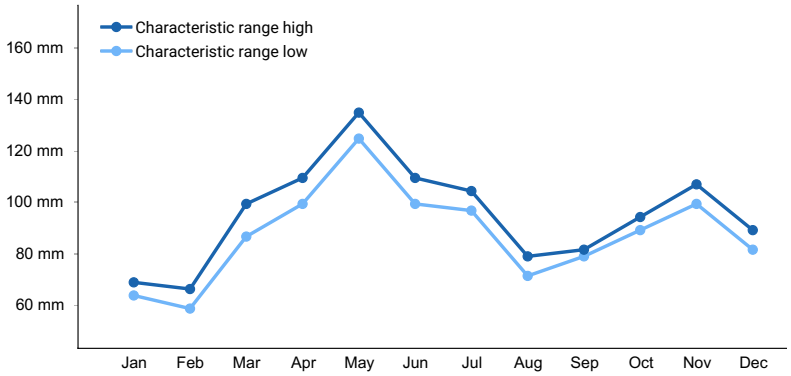


Figure 1. Monthly precipitation range

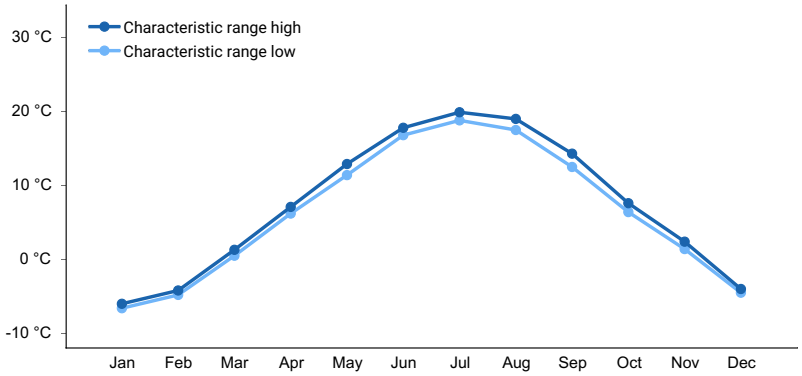


Figure 2. Monthly minimum temperature range

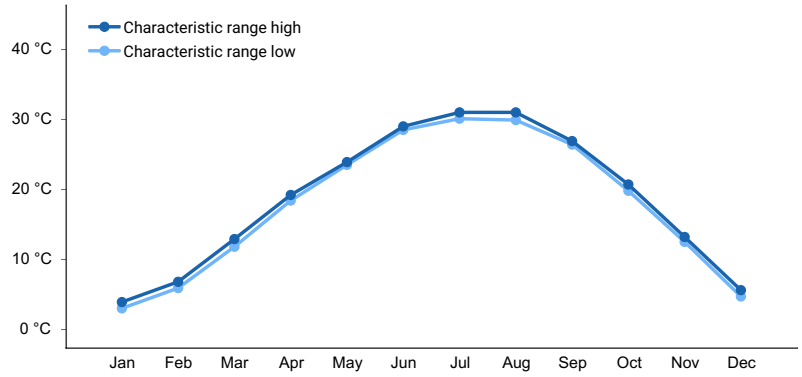


Figure 3. Monthly maximum temperature range

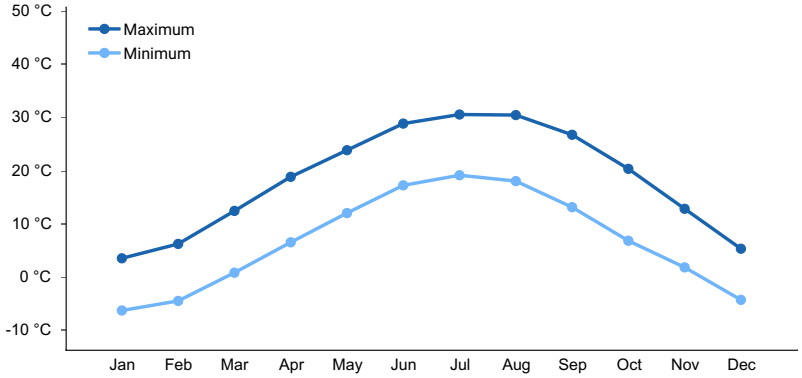


Figure 4. Monthly average minimum and maximum temperature

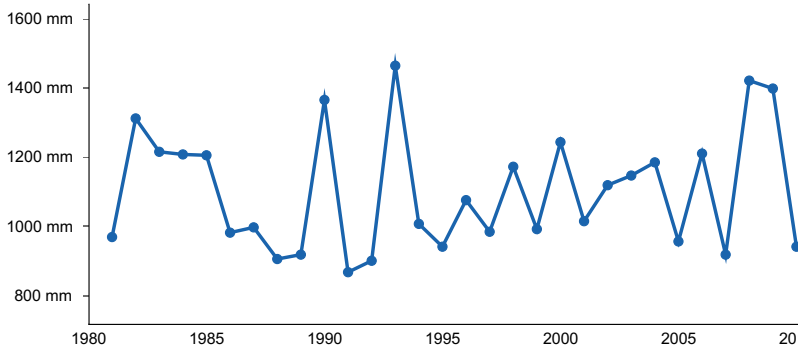


Figure 5. Annual precipitation pattern

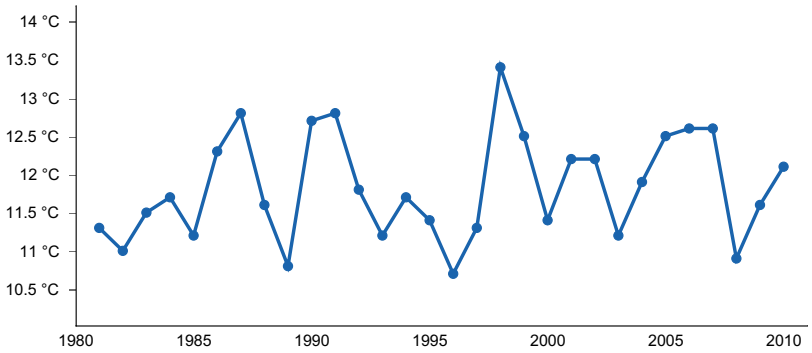


Figure 6. Annual average temperature pattern

Climate stations used

- (1) REND LAKE DAM [USC00117187], Benton, IL
- (2) RAMSEY [USC00117126], Ramsey, IL
- (3) ROBINSON [USC00117345], Robinson, IL
- (4) CARLYLE RSVR [USC00111290], Carlyle, IL
- (5) IUKA 12 SW [USC00114400], Centralia, 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 depression areas pond for short periods of time, mostly in the spring. These shallow depression areas were more common prior to the conversion of many areas of this ecological site from woodland to cropland. Leveling and surface drainage have reduced or eliminated the shallow depressions. Infiltration is very slow and surface runoff is low to negligible (SSS NRCS WSS, 2018). These areas have a claypan, clay layer or fragic 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). The water source is direct precipitation, because there are no upslope contributing sites. Vertical water percolation in the soil is impeded by the clayey subsoil (claypan) 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, somewhat poorly and poorly drained and seasonally wet. They formed in loess or silty sediments overlying Illinoian till that contains a strongly developed Sangamon paleosol. A seasonal high water table, at or near the surface to 2 feet below the surface, is present through the spring, receding in the summer. Some of these soils pond water as much as 1 foot deep for brief to long periods of time. Soils of this ecological site are in the Mollisol and Alfisol orders, further classified as fine, smectitic, mesic Mollic Albaqualfs; fine, smectitic, mesic Typic Argialbolls; fine-silty, mixed, superactive, mesic Argiaquic Argialbolls; fine, smectitic, mesic Aquollic Hapludalfs; fine-silty, mixed, superactive, mesic Mollic Endoaqualfs; fine, smectitic, mesic Cumulic Vertic Endoaquolls (Table 5). Soil series associated with this site include Chauncey, Cisne, Ebbert, Hoyleton, Lukin, Newberry, and Shiloh (NCSS, 2018; SSS NRCS OSD, 2018).

Table 4. Representative soil features

Parent material	(1) Loess (2) Till (3) Drift (4) Colluvium
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Fine (2) Fine-silty
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Very slow to slow
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	5.08–20.32 cm
Calcium carbonate equivalent (Depth not specified)	0–5%
Electrical conductivity (Depth not specified)	0–2 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0–13
Soil reaction (1:1 water) (Depth not specified)	4.5–7.8
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–2%

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 Upland Prairies form an aspect of this vegetative continuum. This ecological site occurs on upland flats and high stream terraces on somewhat poorly to poorly-drained soils, spanning the hydric/non-hydric boundary. As a result, species characteristic of this ecological site consist of both mesic and hydrophytic herbaceous vegetation.

Structural and species variation in a Wet Upland Prairie is regulated by the duration and depth of ponding, depth to water table, and soil physical properties. Soils are slowly to very slowly permeable due to a high clay content or an abrupt textural change. This results in a ponded or shallow, perched water table during the winter and spring, and dry conditions during the summer and fall, thereby restricting rooting depth. Ponding of water in shallow depressions encourages growth of hydrophytic vegetation during the growing season. During the summer and periods of drought, soils in this community can become quite dry. (Robertson et al. 1984)

Fire plays a role in the maintenance of this wet-mesic 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).

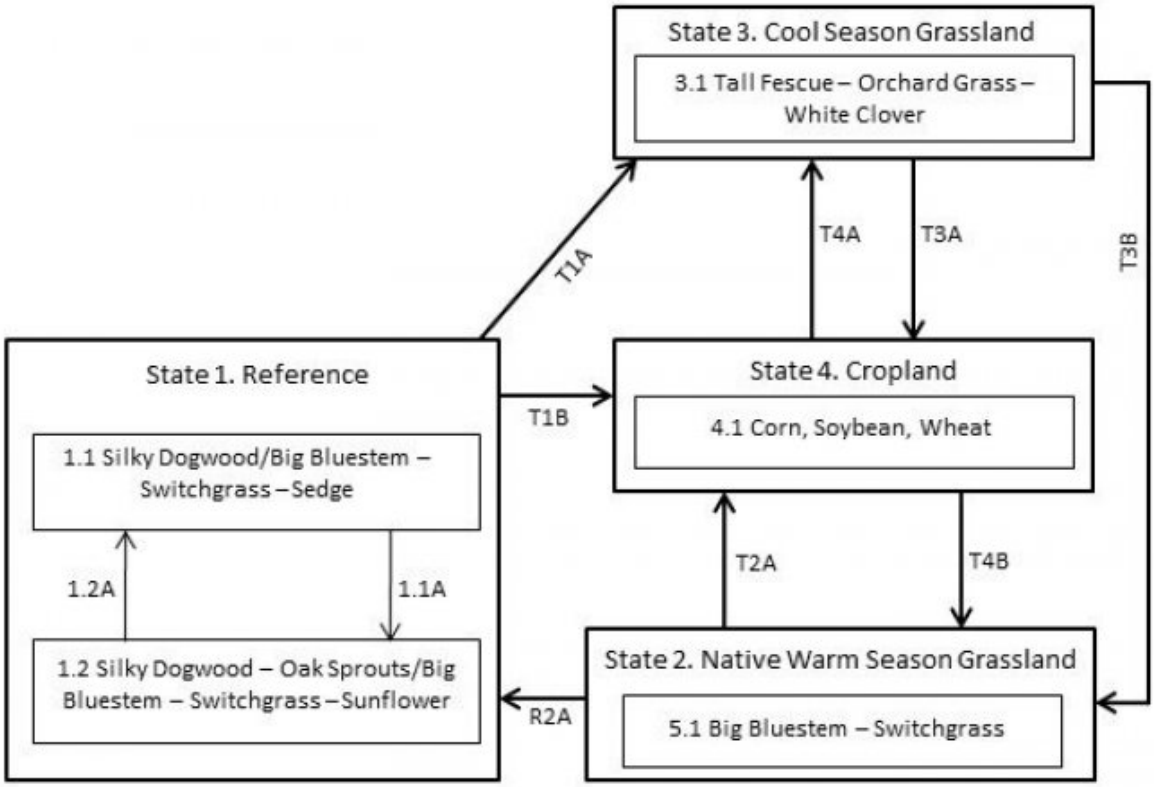
Wet Upland Prairies were also subjected to disturbances from grazing by native large herbivores, such as bison (Bos bison), prairie elk (Cervus elaphus), and white-tailed deer (Odocoileus virginianus). (Anderson, 1982). This activity served a more limited role, compared to fire, in impacting community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

Today, most Wet Upland 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. Remnants that do exist show evidence of indirect anthropogenic influences from fire suppression, subsurface drainage, and non-native species invasion. 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 Upland Prairie, R113XY903IL



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
T3B, T4B	Vegetative seeding; prescribed fire; grassland management
1.1A	Fire-free interval 10+ years
1.2A	Fire interval 2-5 years
R2A	Vegetative seeding; prescribed fire 2-5 years; restore hydrology

State 1
Reference

This state is a wet-mesic prairie community dominated by big bluestem, switchgrass and forbs, but also a substantial component of wet tolerant sedges. This state occurs on level to gently sloping soils that have a seasonal high water table that is perched above the abrupt textural change or clayey subsoil during the spring months in most years. Some ponding may also occur. This condition influences the species composition and site productivity. Two phases can occur that will transition back and forth depending on fire and ponding frequencies. Longer fire free intervals will allow woody species to increase such as silky dogwood and oak sprouts. When fire intervals shorten these woody species will decrease. This state is extremely rare. Nearly all sites have been converted to cool season grassland and cropland.

Dominant plant species

- silky dogwood (*Cornus amomum*), shrub
- big bluestem (*Andropogon gerardii*), grass
- switchgrass (*Panicum virgatum*), grass
- sedge (*Carex*), grass

Community 1.1
Silky Dogwood/Big bluestem-Switchgrass-Sedge

Native grasses dominante this community.

Dominant plant species

- silky dogwood (*Cornus amomum*), shrub
- big bluestem (*Andropogon gerardii*), grass
- switchgrass (*Panicum virgatum*), grass
- sedge (*Carex*), grass

Community 1.2
Silky dogwood -oak sprouts / big bluestem-switchgrass-sunflower

Shrubs and saplings increase due to longer fire free intervals.

Dominant plant species

- silky dogwood (*Cornus amomum*), shrub
- oak (*Quercus*), shrub
- big bluestem (*Andropogon gerardii*), grass
- switchgrass (*Panicum virgatum*), grass
- sunflower (*Helianthus*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

Fire-free interval 10+ years

Pathway 1.2A
Community 1.2 to 1.1

Fire interval 2-5 years

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. Occasionally, these grassland will have scattered pin oaks. A return to the Reference State may be impossible, requiring a very long term series of management options.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- orchardgrass (*Dactylis glomerata*), 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; 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: Andropogon gerardii - Panicum virgatum - Helianthus grosseserratus Wet Meadow; CEGL002024.

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-Mesic Prairie (S)

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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	05/13/2025
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:**

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

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

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

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

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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):**

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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:

    Sub-dominant:

    Other:

    Additional:

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

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

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

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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:

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17. **Perennial plant reproductive capability:**
