

Ecological site R110XY025IL

Ponded Calcareous Sedge Meadow

Last updated: 4/22/2020
Accessed: 08/29/2026

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): 110X–Northern Illinois and Indiana Heavy Till Plain

The Northern Illinois and Indiana Heavy Till Plain (MLRA 110) encompasses the Northeastern Morainal, Grand Prairie, and Southern Lake Michigan Coastal landscapes (Schwegman et al. 1973, WDNR 2015). It spans three states – Illinois (79 percent), Indiana (10 percent), and Wisconsin (11 percent) – comprising about 7,535 square miles (Figure 1). The elevation is about 650 feet above sea level (ASL) and increases gradually from Lake Michigan south. Local relief varies from 10 to 25 feet. Silurian age fractured dolomite and limestone bedrock underlie the region. Glacial drift covers the surface area of the MLRA, and till, outwash, lacustrine deposits, loess or other silty material, and organic deposits are common (USDA-NRCS 2006). The vegetation in the MLRA has undergone drastic changes over time. At the end of the last glacial episode – the Wisconsin glacialiation – the evolution of vegetation began with the development of tundra habitats, followed by a phase of spruce and fir forests, and eventually spruce-pine forests. Not until approximately 9,000 years ago did the climate undergo a warming trend which prompted the development of deciduous forests dominated by oak and hickory. As the climate continued to warm and dry, prairies began to develop approximately 8,300 years ago. Another shift in climate that resulted in an increase in moisture prompted the emergence of savanna-like habitats from 8,000 to 5,000 years before present (Taft et al. 2009). Forests maintained footholds on steep valley sides, morainal ridges, and wet floodplains. Fire, droughts, and grazing by native mammals helped to maintain the prairies and savannas until the arrival of European settlers, and the forests were maintained by droughts, wind, lightning, and occasional fire (Taft et al. 2009; NatureServe 2018).

Classification relationships

USFS Subregions: Southwestern Great Lakes Morainal (222K) and Central Till Plains and Grand Prairies (251D) Sections; Kenosha-Lake Michigan Plain and Moraines (222Kg), Valparaiso Moraine (Kj), and Eastern Grand Prairie (251Dd) Subsections (Cleland et al. 2007) U.S. EPA Level IV Ecoregion: Kettle Moraines (53b), Illinois/Indiana Prairies (54a), and Valparaiso-Wheaton Morainal Complex (54f) (USEPA 2013) National Vegetation Classification – Ecological Systems: North-Central Interior Shrub-Graminoid Fen (CES202.702) (NatureServe 2018) National Vegetation Classification – Plant Associations: *Dasiphora fruticosa* ssp. *floribunda*/*Carex sterilis* – *Andropogon gerardii* – *Arnoglossum plantagineum* Fen (CEGL005139) (Nature Serve 2018) Biophysical Settings: Central Interior and Appalachian Shrub-Herbaceous Wetland Systems (BpS 4314930) (LANDFIRE 2009) Illinois Natural Areas Inventory: Calcareous seep, Sedge Meadow (White and Madany 1978) Wisconsin Natural Communities: Sedge Meadow (WDNR 2015)

Ecological site concept

Ponded Calcareous Sedge Meadows are located within the green areas on the map. They occur on upland depressions. The soils are Mollisols that are poorly-drained and deep, formed in calcareous loess or other silty material. The historic pre-European settlement vegetation on this ecological site was dominated by herbaceous vegetation adapted to temporarily ponded, calcareous conditions. Dioecious sedge (*Carex sterilis* Willd.) and Ohio goldenrod (*Oligoneuron ohioense* (Frank ex Riddell) G.N. Jones) are the dominant species on the site. Other monocots present can include upright sedge (*Carex stricta* Lam.), prairie sedge (*Carex prairea* Dewey ex Alph. Wood), bluejoint (*Calamagrostis canadensis* L.), spiked muhly (*Muhlenbergia glomerata* (Willd.) Trin.) and big bluestem (*Andropogon gerardii* Vitman). Species typical of an undisturbed plant community associated with this ecological site may include lesser fringed gentian (*Gentianopsis virgata* (Raf.) Holub ssp. *virgata*), fen grass of Parnassus (*Parnassia glauca* Raf.), and tobacco root (*Valeriana edulis* Nutt. ex Torr. & A. Gray var. *ciliata* (Torr. & A. Gray) Cronquist) (Taft et al. 1997; INHIS 2012). Depth and duration of ponding as well as periodic fire are the primary disturbance factors that maintain this site, while drought is a secondary factor (LANDFIRE 2009; NatureServe 2018).

Associated sites

R110XY008IL	Wet Glacial Drift Upland Prairie Loess or other silty or loamy material, loamy outwash, glacial till, lacustrine deposits or colluvium that is shallow to a high-water table including Ashkum, Bryce, Drummer, Dunham, Elpaso, Matherton, Milford, Monee, Montgomery, Pella, Reddick, Rowe, Selma, Selmass, Westland, and Will soils
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Similar sites

R110XY024IL	Ponded Depressional Sedge Meadow Ponded Depressional Sedge Meadows are in a similar landscape position, but the parent material is non-calcareous and the site is a DEPRESSIONAL: recharge wetland
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Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) <i>Carex sterilis</i> (2) <i>Oligoneuron ohioense</i>

Physiographic features

Ponded Calcareous Sedge Meadows occur on upland depressions. They are situated on elevations ranging from approximately 449 to 1020 feet ASL. The site experiences frequent ponding that can last up to seven days.

Figure 1. Representative block diagram of Ponded Calcareous Sedge Meadow and associated ecological sites.

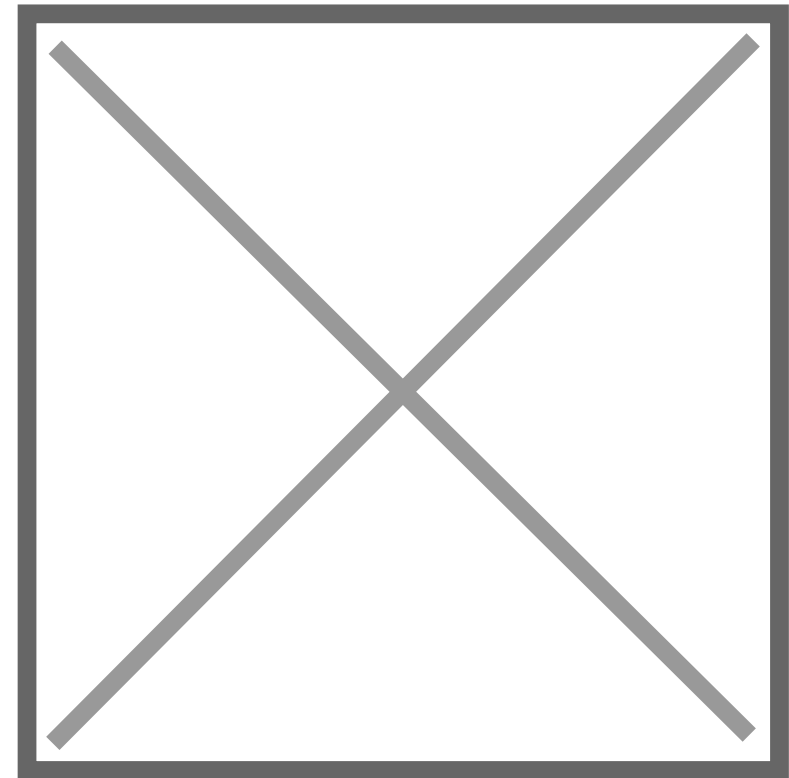


Figure 2.

Table 2. Representative physiographic features

Slope shape across	(1) Concave
Slope shape up-down	(1) Concave
Landforms	(1) Upland > Depression
Runoff class	Negligible
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	None to frequent
Elevation	140 – 310 m
Slope	0 %
Ponding depth	0 – 30 cm
Water table depth	20 cm
Aspect	Aspect is not a significant factor

Climatic features

The Northern Illinois and Indiana Heavy Till Plain falls into the hot-summer humid continental climate (Dfa) and warm-summer humid continental climate (Dfb) Köppen-Geiger climate classifications (Peel et al. 2007). The two main factors that drive the climate of the MLRA are latitude and weather systems. Latitude, and the subsequent reflection of solar input, determines air temperatures and seasonal variations. Solar energy varies across the seasons, with summer receiving three to four times as much energy as opposed to winter. Weather systems (air masses and cyclonic storms) are responsible for daily fluctuations of weather conditions. High-pressure systems are responsible for settled weather patterns where sun and clear skies dominate. In fall, winter, and spring, the polar jet stream is responsible for the creation and movement of low-pressure systems. The clouds, winds, and precipitation associated with a low-pressure system regularly follow high-pressure systems every few days (Angel n.d.).

The soil temperature regime of MLRA 110 is classified as mesic, where the mean annual soil temperature is between 46 and 59°F (USDA-NRCS 2006). Temperature and precipitation occur along a north-south gradient, where temperature and precipitation increase the further south one travels. The average freeze-free period of this ecological site is about 167 days, while the frost-free period is about 135 days (Table 2). The majority of the precipitation occurs as rainfall in the form of convective thunderstorms during the growing season. Average annual precipitation is 38 inches, which includes rainfall plus the water equivalent from snowfall (Table 3). The average annual low and high temperatures are 39.7 and 59.8°F, respectively.

Table 3 Representative climatic features

Frost-free period (characteristic range)	130-140 days
Freeze-free period (characteristic range)	160-180 days

Precipitation total (characteristic range)	940-990 mm
Frost-free period (actual range)	130-140 days
Freeze-free period (actual range)	140-180 days
Precipitation total (actual range)	940-1,020 mm
Frost-free period (average)	140 days
Freeze-free period (average)	170 days
Precipitation total (average)	970 mm

- (1) RANTOUL [USW00014806], Rantoul, IL
- (2) WATSEKA 2 NW [USC00119021], Watseka, IL
- (3) MORRIS 1 NW [USC00115825], Morris, IL
- (4) CHICAGO AURORA MUNI AP [USW00004808], Sugar Grove, IL
- (5) ANTIOCH [USC00110203], Antioch, IL

Influencing water features

Ponded Calcareous Sedge Meadows are classified as a DEPRESSIONAL: Discharge, Ponded, Closed Depression; herbaceous wetland under the Hydrogeomorphic (HGM) classification system (Smith et al. 1995; USDA-NRCS 2008) and as a Palustrine Persistent Emergent Wetland under the National Wetlands Inventory (FGDC 2013). Precipitation, overland flow from adjacent uplands, and groundwater discharge are the main sources of water for this ecological site (Smith et al. 1995). Infiltration is very slow (Hydrologic Group D) for undrained soils, and surface runoff is negligible.

Wetland description

Primary wetland hydrology indicators for an intact Ponded Calcareous Sedge Meadows may include: A1 Surface water, A2 High water table, A3 Saturation, and B7 Inundation visible on aerial photography. Secondary wetland hydrology indicators may include: C2 Dry-season water table, D2 Geomorphic position, and D5 FAC-neutral test (USACE 2010).

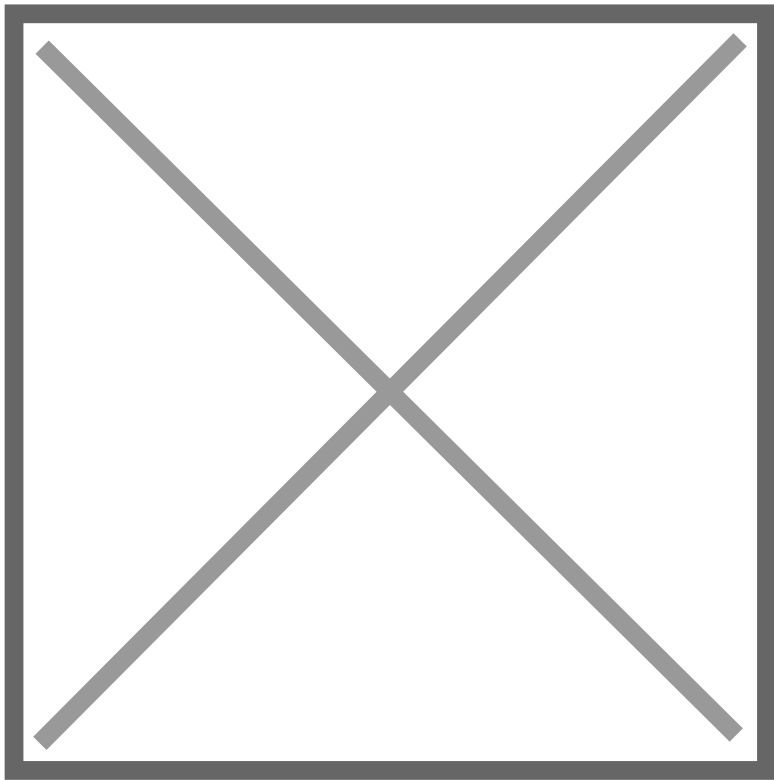


Figure 9. Hydrologic cycling in Ponded Calcareous Sedge Meadow ecological site.

Soil features

Soils of Ponded Calcareous Loess Sedge Meadows are in the Mollisols order, further classified as Typic Calciaquolls with very slow infiltration and negligible runoff potential. The soil series associated with this site includes Harpster. The parent material is calcareous loess or other silty material and the soils are poorly-drained and deep with seasonal high-water tables. Soil pH classes are slightly to moderately alkaline. No rooting restrictions are noted for the soils of this ecological site.

Some soil map units in this ecological site, if not drained, may meet the definition of hydric soils and are listed as meeting criteria 2 of the hydric soils list (77 FR 12234).

Figure 10. Profile sketches of soil series associated with Ponded Calcareous Sedge Meadow.

Table 4. Representative soil features

Parent material	(1) Loess
Family particle size	(1) Fine-silty
Drainage class	Poorly drained
Permeability class	Moderately slow
Depth to restrictive layer	200 cm
Soil depth	200 cm

Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	17.78 – 20.32 cm
Calcium carbonate equivalent (Depth not specified)	10 – 40 %
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	7.4 – 8.4
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

The information in this Ecological Site Description, including the state-and-transition model (STM), was developed based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

The MLRA lies within the tallgrass prairie ecosystem of the Midwest, but a variety of environmental and edaphic factors resulted in landscape that historically supported prairies, savannas, forests, and various wetlands. Ponded Calcareous Sedge Meadows form an aspect of this vegetative continuum. This ecological site occurs on upland depressions on poorly-drained soils. Species characteristic of this ecological site consist of hydrophytic herbaceous vegetation.

Ponding and fire are the most important ecosystem drivers for maintaining this ecological site. The depth and duration of ponding affect species composition, cover, and vegetative production due to alternating aerobic and anaerobic surface substrate conditions. Replacement fires likely occurred on a ten-year rotation interval and helped to reduce the accumulation of peat. The combination of fire and high-water levels prevented the establishment of shrubs for any significant amount of time (LANDFIRE 2009).

Drought has also played a role in shaping this ecological site. The periodic episodes of reduced soil moisture in conjunction with the poorly-drained soils have favored the proliferation of plant species tolerant of such conditions. Drought can slow the growth of plants and

result in dieback of certain species. When coupled with fire, periods of drought can eliminate or greatly reduce the occurrence of woody vegetation, substantially altering the extent of shrubs and trees (Pyne et al. 1996).

Today, Ponded Calcareous Sedge Meadows have been virtually eliminated as the land has mostly been converted to agricultural production. Corn (*Zea mays* L.) and soybeans (*Glycine max* (L.) Merr.) are the dominant crops grown. Some areas may have been converted to other human-modified landscapes. A return to the historic plant community is likely not possible due to significant hydrologic and water quality changes in the watershed, but long-term conservation agriculture or habitat reconstruction efforts can help to restore some natural diversity and ecological functioning. The state-and-transition model that follows provides a detailed description of each state, community phase, pathway, and transition. This model is based on available experimental research, field observations, literature reviews, professional consensus, and interpretations.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 10. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 11. Community 4.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 12. Community 4.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 13. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 14. Community 5.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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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 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 these plots and the sources identified in this ecological site description.

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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	08/29/2026
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:
