Ecological site R110XY021IL
Ponded Organic Alkaline Peatland

Last updated: 4/22/2020
Accessed: 08/31/2026

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 Wisconsinan glaciation – 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 Alkaline Fen (CES202.702) (NatureServe 2018) National Vegetation Classification – Plant Associations: Dasiphora fruticosa/Carex sterilis – Andropogon gerardii – Arnoglossum plantagineum Fen (CEGL005139) (Nature Serve 2018) Biophysical Settings: Central Interior and Appalachian Shrub-Herbaceous Wetland System (BpS 4314930) (LANDFIRE 2009) Illinois Natural Areas Inventory: Fen (White and Madany 1978) Wisconsin Natural Communities: Calcareous fen (WDNR 2015)

Ecological site concept

Ponded Organic Alkaline Peatland are located within the green areas on the map. They occur on outwash plains. The soils are Histosols that are very poorly drained and very deep, formed in herbaceous organic material. The historic pre-European settlement vegetation on this ecological site was dominated by hydrophytic herbaceous vegetation adapted to alkaline environments. Dioecious sedge (Carex sterilis Willd.) and Ontario lobelia (Lobelia kalmia L.) are the dominant and characteristic species on the site, respectively. Other important monocots include prairie sedge (Carex prairea Dewey ex Alph. Wood), water sedge (Carex aquatilis Wahlenb.), Buxbaum's sedge (Carex buxbaumii Wahlenb.), marsh muhly (Muhlenbergia glomerata (Willd.) Trin.), big bluestem (Andropogon gerardii Vitman), and tufted hairgrass (Deschampsia caespitosa (L.) P. Beauv.). Species typical of an undisturbed plant community associated with this ecological site may include white lady's slipper (Cypripedium candidum Muhl. ex Willd.), Ohio goldenrod (Oligoneuron ohioense (Frank ex Riddell) G.N. Jones), fen grass of Parnassus (Parnassia glauca Raf.), and fewflower spikerush (Eleocharis quinqueflora (Hartmann) O. Schwarz) (Taft et al. 1997; WDNR 2015). Constant, calcareous groundwater discharge is the primary disturbance factor that maintains the site, while occasional fire and drought are secondary disturbances (LANDFIRE 2009; WDNR 2015).

Associated sites

R110XY008IL	**Wet Glacial Drift Upland Prairie** Loess or other silty or loamy material, loamy outwash, glacial till, lacustrine deposits, and colluvium that are 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

Similar sites

R110XY020IL	**Ponded Organic Acidic Peatland** Ponded Organic Acidic Peatlands have a similar vegetation type but the site is an ORGANIC SOIL FLATS wetland

Table 1. Dominant plant species

Tree	Not specified
Shrub	Not specified
Herbaceous	(1) *Carex sterilis* (2) *Lobelia kalmii*

Physiographic features

Ponded Organic Alkaline Peatland occur on outwash plains. They are situated on elevations ranging from approximately 499 to 1020 feet ASL. The site does not experience flooding, but rather is continuously saturated due to groundwater discharge moving laterally throughout the soil and discharging along hillside.

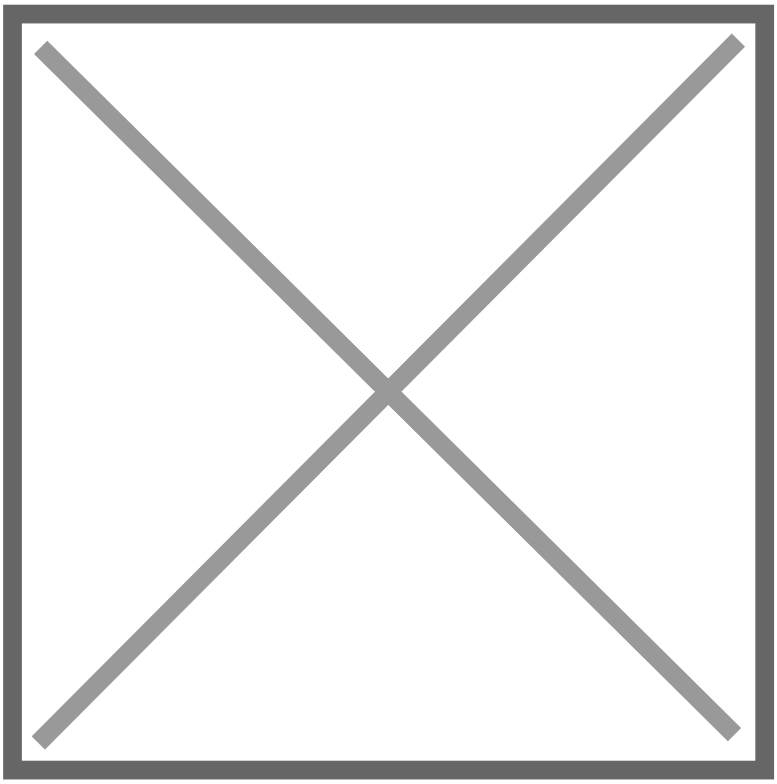

Figure 1.

Table 2. Representative physiographic features

Slope shape up-down	(1) Concave (2) Concave
Landforms	(1) Outwash plain
Runoff class	Negligible
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Frequent
Elevation	150 – 310 m
Slope	0 %
Ponding depth	0 – 30 cm
Water table depth	10 – 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 149 days, while the frost-free period is about 132 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 39.6 and 58.1°F, respectively.

Table 3 Representative climatic features

Frost-free period (characteristic range)	120-150 days
Freeze-free period (characteristic range)	130-170 days

Precipitation total (characteristic range)	910-990 mm
Frost-free period (actual range)	110-150 days
Freeze-free period (actual range)	110-180 days
Precipitation total (actual range)	910-1,020 mm
Frost-free period (average)	130 days
Freeze-free period (average)	150 days
Precipitation total (average)	970 mm

- (1) PARK FOREST [USC00116616], Chicago Heights, IL
- (2) WEST CHICAGO DUPAGE AP [USW00094892], Saint Charles, IL
- (3) MUNDELEIN 4WSW [USC00115961], Lake Zurich, IL
- (4) CHICAGO WAUKEGAN RGNL AP [USW00014880], Waukegan, IL

Influencing water features

Ponded Organic Alkaline Peatlands are classified as a SLOPE: groundwater influenced, discharge, herbaceous wetland under the Hydrogeomorphic (HGM) classification system (Smith et al. 1995; USDA-NRCS 2008) and as a Palustrine, Persistent, Emergent, Continuously Saturated wetland under the National Wetlands Inventory (FGDC 2013). Groundwater discharge from a perched water table is the main source 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 Organic Alkaline Peatland may include: A2 High water table and A3 Saturation. Secondary wetland hydrology indicators may include: C2 Dry-season water table and D5 FAC-neutral test (USACE 2010).

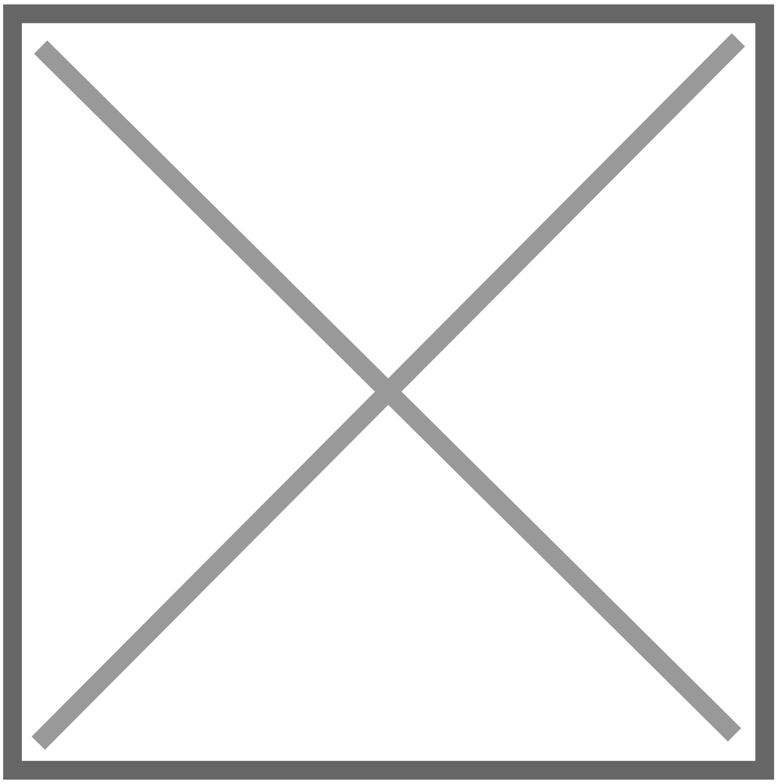

Figure 8. Hydrologic cycling in Ponded Organic Alkaline Peatland ecological site.

Soil features

Soils of Ponded Organic Alkaline Peatlands are in the Histosols order, further classified as Limnic Haplosaprists and Typic Haplosaprists with very slow infiltration and negligible runoff potential. The soil series associated with this site includes Houghton, Lena, and Muskego. The parent material is herbaceous organic matter, and the soils are very poorly drained and very deep with seasonal high-water tables. Soil pH classes are neutral to moderately alkaline (WDNR 2015) . 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 1 of the hydric soils list (77 FR 12234).

Figure 9. Profile sketches of soil series associated with Ponded Organic Alkaline Peatland.

Table 4. Representative soil features

Parent material	(1) Organic material
Drainage class	Very poorly drained
Permeability class	Very slow to moderate
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)	33.02 – 40.64 cm
Calcium carbonate equivalent (Depth not specified)	0 – 60 %
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	6.6 – 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 Organic Alkaline Peatlands form an aspect of this vegetative continuum. This ecological site occurs on outwash plains on very poorly drained, alkaline, organic soils. Species characteristic of this ecological site consist of hydrophytic herbaceous vegetation adapted to alkaline environments.

Ponded Organic Alkaline Peatlands are dependent on consistent, calcareous groundwater discharge. These conditions are present where surface slopes intersect a perched water table, allowing the groundwater to slowly seep from the hillside (Richardson and Brinson 2001; Dixon 2014). While water levels may fluctuate throughout the year, they generally remain at or near the soil surface (LANDFIRE 2009). The near-constant anaerobic conditions maintain the herbaceous wetland plant community and prevent woody species from dominating.

Drought and fire have also played a role in shaping this ecological site. The periodic episodes of reduced soil moisture in conjunction with the very poorly-drained soils have favored the proliferation of plant species tolerant of such conditions. Drought can also slow the growth of plants and result in dieback of certain species. Occasional fires reduced plant litter and aided in preventing declines in species richness. Drought coupled with fire would keep woody plants from encroaching (LANDFIRE 2009).

Today, Ponded Organic Alkaline Peatlands have been greatly reduced in abundance and diversity as a result of type-conversion to agricultural or other human-modified landscape. Sites that have not been directly altered show evidence of indirect anthropogenic influences from hydrologic alterations, long-term fire suppression, and non-native invasive species. These land conversions and alterations to the natural groundwater flow can be irreversible, making restoration an improbability. 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 (%)

Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 8. Community 2.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 10. Community 3.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 11. Community 3.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 12. Community 4.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 13. Community 4.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 14. Community 4.3 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

Table 15. Community 5.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)

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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Contributors

Lisa Kluesner
Kristine Ryan
Sarah Smith
Tiffany Justus

Approval

Chris Tecklenburg, 4/22/2020

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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	08/31/2026
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:**

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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:**
