

Ecological site R113XY903IL

Wet Upland Prairie

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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 Illinoian 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 (Illinoian 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 ornata*) 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.
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Table 1. Dominant plant species

Tree	Not specified
Shrub	(1) <i>Cornus obliqua</i>
Herbaceous	(1) <i>Andropogon gerardii</i> (2) <i>Panicum virgatum</i>

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 – 310 m
Slope	0 – 10 %
Ponding depth	0 – 30 cm
Water table depth	0 – 60 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)	160-170 days
Freeze-free period (characteristic range)	190-190 days
Precipitation total (characteristic range)	1,070-1,120 mm
Frost-free period (actual range)	160-170 days
Freeze-free period (actual range)	190-200 days
Precipitation total (actual range)	1,040-1,120 mm
Frost-free period (average)	170 days

Freeze-free period (average)	190 days
Precipitation total (average)	1,090 mm

- (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	180 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	5.08 – 20.32 cm
Calcium carbonate equivalent (Depth not specified)	0 – 10 %
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	0 – 10
Soil reaction (1:1 water) (Depth not specified)	4.5 – 7.8
Subsurface fragment volume <=3" (Depth not specified)	0 – 10 %
Subsurface fragment volume >3" (Depth not specified)	Not specified

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

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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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.

References

Anderson, R.C. and M.R. Anderson. 1975. The presettlement vegetation of Williamson County, Illinois.. *Castanea* 40:345–363.

Anderson, R.C. 1982. An evolutionary model summarizing the roles of fire, climate, and grazing animals in the origin and maintenance of grasslands. Pages 297–308 in , , and , editors. *Grasses and grasslands: systematics and ecology*.

- Anderson R. C., J. S. Fralish, and J. M. Baskin. 2007. Presettlement forests of Illinois. G. V. Burger, J. E. Ebinger, and G. S. Wilhelm, eds., *Proceedings of the Oak Woods Management Workshop* 9–19.
- Barrett, S.W. 1980. Indians and fire.. *Western Wildlands* 17–20.
- Briggs, J.M., A.K. Knapp, and B.L. Brock. 2002. Expansion of woody plants in tallgrass prairie: a fifteen- year study of fire and fire-grazing interactions. *The American Midland Naturalist* 147:287–294.
- Brinson, M.M. 1993. A hydrogeomorphic classification for wetlands.
- Brugam, R.B., P.D. Kilburn, and L.L. Luecking. 2016. Pre-settlement Vegetation of Greene, Jersey and Macoupin Counties along the Prairie/Forest Border in Illinois.. *Transactions of the Illinois State Academy of Science* 109:9–17.
- Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C. Carpenter, and W.H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Conterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC. 1–92.
- Coates, D.T., K.J. Lyman, and J.E. Ebinger. 1992. Woody vegetation structure of a post oak flatwoods in Illinois.. *Castanea* 57:196–201.
- Comer, P.J., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, K. Snow, and J. Teague. 2003 (Date accessed). *Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems*.
- Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep water habitats of the United States.. U.S. Dept. of Interior, Fish & Wildlife Service, Office of Biological Services, Washington DC. FWS/OBS-79/31 1–142.
- Dey, D.C. and J.M. Kabrick. 2015. Restoration of Midwestern oak woodlands and savannas.. Pages 401–428 in *Restoration of Boreal and Temperate Forests*, Second Edition. CRC Press, Boca Raton, Florida, USA..
- Edgin, B. 1996. Barrens of pre-settlement Lawrence County, Illinois.. Pages 59–65 in *Proceedings of the 15th North American Prairie Conference*.
- Edgin, B. and J.E. Ebinger. 1997. Barrens and the pre-settlement prairie/forest interface in Crawford County, Illinois.. *Castanea* 62:260–267.
- Edgin, B., R. Beadles, and J.E. Ebinger. 2002. Woody Composition and Structure of Karcher's Post Oak Woods Nature Preserve, Hamilton County, Illinois.. *Transactions of the Illinois State Academy of Science* 95:251–259.
- Edgin B., W. E. McClain, R. Gillespie, and J. E. Ebinger. 2003. Vegetation composition and structure of Eversgerd Post Oak Flatwoods, Clinton County, Illinois.. *Northeast Naturalist* 10:111–118.
- Illinois Department of Natural Resources (IDNR). March 2018 (Date accessed). Natural Divisions - Southern Till Plain..
- Irland, L.C. 2000. Ice storms and forest impacts.. *The Science of the Total Environment* 262:231–242.
- USGS. 2009 (Date accessed). **Landfire National Vegetation Dynamics Models**. <http://www.LANDFIRE.gov/index.php>.

- Mohlenbrock R. H. and D. M. Ladd. 1978. Distribution of Illinois Vascular Plants. Southern Illinois Univ. Press, Carbondale and Edwardsville, IL. 281p.
- Mohlenbrock R. H. 2003. Vascular Flora of Illinois. Vascular Flora of Illinois, 3rd edition. Southern Illinois University Press, Carbondale, Illinois. 1–736.
- National Cooperative Soil Survey (NCSS). 2018 (Date accessed). **National Cooperative Soil Characterization Database**. <https://ncsslabsdata.mart.sc.egov.usda.gov/>.
- National Oceanic and Atmospheric Administration (NOAA). 2018 (Date accessed). **Climate Data 1980-2010**. <https://www.ncdc.noaa.gov/data-access/land-based-station-data/find-station>.
- NatureServe. 2018 (Date accessed). **Association Detail Report: CEG002427**. <http://explorer.natureserve.org>.
- Nelson, P. 2010. The Terrestrial Natural Communities of Missouri. Revised edition. Missouri Natural Areas Committee, Department of Natural Resources and the Department of Conservation, Jefferson City. 549p.
- Pyne, S.J., P.L. Andrews, and R.D. Laven. 1996. Introduction to Wildland Fire, Second Edition. Introduction to Wildland Fire, Second Edition. John Wiley and Sons, Inc. New York, New York. 1–808.
- Schwegman, J.E., G.B. Fell, M.D. Hutchinson, G. Paulson, W.M. Shephard, and J. White. 1973. The natural divisions of Illinois. Comprehensive plan for the Illinois Nature Preserve system. Part 2. Illinois Nature Preserves Commission, Rockford, IL 1–32.
- . 2018 (Date accessed). **Web Soil Survey (SSS NRCS WSS)**. <https://websoilsurvey.sc.egov.usda.gov/>.
- SSS NRCS OSD and . 2018 (Date accessed). **Official Soil Series Descriptions**. <https://soilseries.sc.egov.usda.gov/osdname.aspx>.
- Taft, J.B., M.W. Schwartz, and L.R. Philippe. 1995. Vegetation ecology of flatwoods on the Illinoian till plain. Journal of Vegetation Science 6:647–666.
- United States Department of Agriculture, . 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin... USDA Handbook 296 1–682.
- USDA, N. 2018 (Date accessed). **The PLANTS Database**. <http://plants.usda.gov>.
- Voigt J. W. and R. H. Mohlenbrock. 1964. Plant communities of southern Illinois. Plant communities of southern Illinois. Southern Illinois University Press, Carbondale 1–202.
- White J. 1978. Natural Areas Inventory Technical Report. Natural Areas Inventory Technical Report: Volume I, Survey Methods and Results. Illinois Natural Areas Inventory, Department of Landscape Architecture, University of Illinois at Urbana/Champaign 1–426.
- White, J. and M. Madany. 1978. Classification of natural communities in Illinois (Appendix 30). In J. White, Illinois Natural Areas Inventory Technical Report. Volume 1: Survey Methods and Results. Illinois Natural Areas Inventory, Department of Landscape Architecture, University of Illinois at Urbana/Champaign. 310–405.

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; CEGLO02024.

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

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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	09/14/2026
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:
