

Ecological site R114XB902IN

Wet Upland Prairie

Last updated: 11/16/2023
Accessed: 09/24/2026

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): 114X–Southern Illinois and Indiana Thin Loess and Till Plain

This MLRA is a loess-covered till plain with broad, nearly level summits and steeper slopes in areas dissected by tributaries of the Ohio and Mississippi Rivers. It is used to produce cash crops, feed grain, and livestock. This MLRA is in Indiana (47 percent), Illinois (38 percent), and Ohio (15 percent) in four separate areas. It makes up about 10,388 square miles (26,904 square kilometers). This area is in the Till Plains section of the Central Lowland province of the Interior Plains. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level or gently sloping. Steep slopes are along rivers and streams. Elevation ranges from 310 feet (90 meters) on the southernmost flood plains to 1,340 feet (410 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters) but can be 50 to 100 feet (15 to 30 meters) along drainageways and streams. The Little Miami River flows through the part of this MLRA in Ohio. The Ohio River flows along the southernmost boundary in some parts of this area in Ohio. The Kaskaskia River flows through the part of this area in Illinois. Tributaries to the Mississippi and Ohio Rivers drain this MLRA. This area is covered dominantly by loess and Illinoian-age till or outwash. Most of the loess is Late Wisconsin-age Peoria Loess. In some places the Peoria Loess is underlain by Early Wisconsin-age Roxana Silt or by sandier or grittier loess. The loess ranges from 3 to 7 feet (1 or 2 meters) in thickness on stable summits and does not occur on some of the steeper slopes. The underlying Illinoian-age till and outwash commonly contain a paleosol. Meltwater outwash and lacustrine and alluvial deposits are on some of the stream terraces along the major tributaries. The till and outwash are underlain by several bedrock systems. Mississippian and Pennsylvanian bedrock occurs mostly in the western part of the MLRA. Ordovician, Silurian, and Devonian bedrock occurs mostly in the central part. Bedrock outcrops are common on the bluffs along the large rivers and their major tributaries. They also are evident at the base of steep slopes along minor streams and drainageways. The average annual precipitation ranges from 39 to 47 inches (990 to 1,190 millimeters) with a mean of 42 inches (1,060 millimeters). The annual temperature ranges from 53 to 56 degrees F (11.8 to 13.6 degrees C) with a mean of 55 degrees F (13 degrees C). The freeze-free period ranges from 185 to 215 days with a mean of 200 days. The dominant soil orders are Alfisols and Entisols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or smectitic mineralogy. They are deep or very deep, poorly drained to well drained, and loamy, silty, or clayey. Although limited in extent, some soils have a natric horizon in the part of the MLRA in Illinois. The main soils and their series: Albaqualfs that formed in loess or loess over pedisodiment on till plains (Marine series); Endoaqualfs that formed in loess or loess over pedisodiment on till plains (Ocone series); Fluvaquents that formed in alluvium on flood plains (Wakeland series); Fragiudalfs that formed in loess over pedisodiment over till (Cincinnati series) and loess over till (Rossmoyne series) on till plains; Glossaqualfs that formed in loess over till on till plains (Avonburg, Clermont, and Cobbsfork series) Hapludalfs that formed in till (Hickory series) and loess over pedisodiment (Homen series) on till plains. The soils on uplands support natural hardwoods. Oak, hickory, beech, and sugar maple are the dominant species. Native grasses grow in some scattered areas between the trees. The soils in low-lying areas support mixed forest vegetation. Pin oak, shingle oak, sweetgum, and black oak are the dominant species on the wetter sites. White oak, black oak, northern red oak, hickory, yellow-poplar, ash, sugar maple, and black walnut grow on the better drained sites. Honey locust is dominant on soils that formed in shaly limestone residuum. Silver maple, eastern cottonwood, American sycamore, pin oak, elm, and sweetgum grow along rivers and streams. Black walnut is abundant on very deep, well drained soils on some small flood plains. Sedge and grass meadows and scattered trees are on some low-lying sites. Most of this MLRA is in farms and used to produce corn, soybeans, and livestock. Some small grains, including winter wheat, oats, and grain sorghum, also are grown. A small acreage is used for specialty crops, such as popcorn and apple orchards. The grassland supports introduced and native grasses. The forested areas are mainly on steep valley sides and in low-lying parts of flood plains. Surface coal mines make up a small acreage. (USDA, Natural Resources Conservation Service. 2022).

LRU notes

LRU 114XB is in two separate areas in Illinois (66 percent) and Indiana (34 percent). It makes up about 7,005 square miles (18,150 square kilometers). It includes the towns of Brazil, Bloomfield, Cloverdale, and Spencer, Indiana, and Carlyle, Nashville, Hillsboro, Greenville, Vandalia, and Pinckneyville, Illinois. Interstates 55, 64, and 70 cross the part of the MLRA in Illinois. They converge in St.

Louis, which is just west of this MLRA. The east edge of the Scott Air Force Base is on the western edge of the area in Illinois. This area is in the Till Plains Section of the Central Lowland Province of the Interior Plains. Both large and small tributaries of the West Fork of the White River, the Eel River, the Kaskaskia River, and the Little Muddy River dissect the nearly level to very steep uplands. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to gently sloping. Elevation ranges from 350 feet (105 meters) on the southernmost flood plains along the Ohio and Wabash Rivers to 1,190 feet (365 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters), but it can be 50 to 100 feet (15 to 30 meters) along drainageways and streams. It generally is low on broad, flat till plains and flood plains and high on the dissected hills bordering rivers or drainage systems.

Classification relationships

Major Land Resource Area (MLRA) (USDA-NRCS, 2022): 114X–Southern Illinois and Indiana Thin Loess and Till Plain 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 The following NatureServe Ecological System has a high level of probability to match the ecological site found on these soils: Central Tallgrass Prairie CES205.683

Ecological site concept

The Wet Upland Prairie sites are part of the Central Tallgrass Prairie System (NatureServe) which ranges from eastern Kansas and Nebraska to northwestern Indiana. This system differs from other prairie systems to the north and south by being the most mesic with primarily deep, rich Mollisol soils. These soils are usually greater than 1 meter deep. This system is dominated by tallgrass species such as big bluestem (*Andropogon gerardii*), Indiangrass (*Sorghastrum nutans*), and switchgrass (*Panicum virgatum*). These species typically grow to 1-2 m tall in the rich soils found in this system. Wet grasses include prairie cordgrass (*Spartina pectinata*), rush (*Juncus* spp.), and bluejoint (*Calamagrostis canadensis*). Other mid- and shortgrass species, such as sideoats grama (*Bouteloua curtipendula*) and little bluestem (*Schizachyrium scoparium*) are often present and can be common or locally dominant on patches of this system, particularly slopes or other areas with drier habitats. Herbaceous species on Wet Upland Prairie sites include common cinquefoil (*Potentilla simplex*), rattlesnake master (*Eryngium yuccifolium*), fourflower yellow loosestrife (*Lysimachia quadriflora*), sawtooth sunflower (*Helianthus grosseserratus*), and narrow-leaved meadowsweet (*Spiraea alba*). Historically, fires prevented the invasion of shrubs and trees. High-quality examples of Wet Upland Prairie sites have trees and shrubs widely scattered or clustered in areas that are wetter and/or more sheltered from fire than the surrounding grassland. Fire, drought, and grazing are the primary natural dynamics influencing this system and help prevent woody species from invading. Most of these sites have been converted to agricultural production and few, high-quality communities still exist.

Associated sites

R114XB903IN	Upland Prairie The Upland Prairie ecological site and the Wet Upland Prairie ecological site occurs on similar landscapes with the Upland Prairie site on higher landscapes such as till plains, knolls, and ridges. The Upland Prairie sites are moderately well to well drained with a season water table from 24 to 42 inches in depth whereas Wet Upland Prairie sites are somewhat poorly to poorly drained with a year round water table from 0 to 24 inches in depth.
R114XB901IN	Sodium Affected Uplands Sodium Affected Upland ecological site and the Wet Upland Prairie ecological site occurs on similar landscapes and are often intermixed with little to no slope. The Sodium Affected Upland sites have high sodium soils that include a restrictive layer.

Similar sites

R114XB903IN	Upland Prairie The Upland Prairie ecological site and the Wet Upland Prairie ecological site occurs on similar landscapes such as ground moraines and till plains. Both sites have very deep soils; however, the Upland Prairie sites are moderately well to well drained with a season water table from 24 to 42 inches in depth whereas Wet Upland Prairie sites are somewhat poorly to poorly drained with a year round water table from 0 to 24 inches in depth.
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Table 1. Dominant plant species

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

Physiographic features

Site are found on depressions, ground moraines, and till plains.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Ground moraine (3) Till plain
Runoff class	Negligible to low
Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to frequent
Elevation	100 – 310 m
Slope	0 – 10 %
Water table depth	20 – 60 cm
Aspect	Aspect is not a significant factor

Climatic features

About 60 percent of the precipitation falls during the freeze-free period. Most of the rainfall occurs as high-intensity, convective thunderstorms during summer. Snowfall is common in winter. The freeze-free period averages about 185 days.

Table 3 Representative climatic features

Frost-free period (characteristic range)	150-170 days
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Freeze-free period (characteristic range)	180-190 days
Precipitation total (characteristic range)	1,040-1,140 mm
Frost-free period (actual range)	140-170 days
Freeze-free period (actual range)	170-200 days
Precipitation total (actual range)	1,040-1,190 mm
Frost-free period (average)	160 days
Freeze-free period (average)	190 days
Precipitation total (average)	1,120 mm

- (1) SPENCER [USC00128290], Spencer, IN
- (2) SPARTA 1 W [USC00118147], Sparta, IL
- (3) HILLSBORO [USC00114108], Hillsboro, IL
- (4) CARBONDALE SOUTHERN IL AP [USW00093810], De Soto, IL
- (5) SHAKAMAK SP [USC00127959], Jasonville, IN
- (6) PANA 3E [USC00116579], Pana, IL
- (7) WATERLOO [USC00119002], Waterloo, IL
- (8) JERSEYVILLE 2 SW [USC00114489], Jerseyville, IL

Influencing water features

This site has a water table from 6 to 24 inches and may pond briefly for up to 7 days.

Wetland description

Soils in this group may contain wetlands which fit into the MINERAL FLAT class in the hydrogeomorphic (HGM) system. Today, most sites are being used for agricultural production and the wetland hydrology has been modified through ditching and tiling.

Soil features

Soils are very deep, somewhat poorly to poorly drained and formed in loess.

Soils included in this initial group are Bethalto, Herrick, Keller, and Virden. Sites have seasonal high water tables.

Table 4. Representative soil features

Parent material	(1) Loess (2) Pedisegment
Surface texture	(1) Silt loam

Family particle size	(1) Fine (2) Fine-silty
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Slow to moderate
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-101.6cm)	14.73 – 22.35 cm
Electrical conductivity (0-101.6cm)	Not specified
Sodium adsorption ratio (0-101.6cm)	Not specified
Soil reaction (1:1 water) (0-101.6cm)	5.1 – 7.8
Subsurface fragment volume <=3" (0-101.6cm)	0 – 10 %
Subsurface fragment volume >3" (0-101.6cm)	Not specified

Ecological dynamics

Fire, drought, and grazing are the primary natural dynamics that influence the Wet Upland Prairie sites and determine the plant community composition. These disturbances resulted in the maintenance of a grassland by preventing woody species from invading. These sites are part of a landscape formed by a mosaic of differing ecological systems that result from heterogeneous topography, variations in soil characteristics, and a long history of fire and grazing disturbance regimes. Soils in the groups are somewhat poorly drained to poorly drained, so vegetation communities will range between mesic and hydrophytic.

Plant community structure is influenced by disturbances, microtopography, soil drainage, depth of ponding, depth to water table, and

permeability. During the spring growing season, sites may have ponded water and shallow depressions will allow for a numerous hydrophytic species. However, during period of heat and drought, the soils can become dry resulting in the presence of more mesic species.

Fire was a main influence on these sites as native Americans regularly burned to encourage vegetative regrowth which attracted large game. By extending the fire return interval, woody species will increase, and herbaceous community dominance will be reduced.

Few high-quality, old-growth communities remain. Agriculture is the largest use of these soils in MLRA 114X.

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 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.2 plant community composition

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

No field monitoring was conducted as part of this PES development. Future ESD development may result in plant community edits, soil mapunits being added or removed from this grouping, and/or additions or modifications to the narratives, tables, vegetation descriptions and state and transition model.

Other references

Anderson, R. C., ?J. S. Fralish, ?Jerry M. Baskin. 2007. Presettlement forests of Illinois. In Proceedings of the Oak Woods Management Workshop, ed. G. V. Burger, J. E. Ebinger, and G. S. Wilhelm, pp. 9-19. Charleston, Ill.: Eastern Illinois University.

Barrett, S.W. 1980. Indians and fire. Western Wildlands Spring: 17-20.

Braun, E. Lucy. 2001. Deciduous forests of eastern North America. Caldwell, N.J.: Blackburn Press.

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. 92 pp.

Comer PJ, Faber-Langendoen D, Evans R, Gawler SC, Josse C, Kittel G, Menard S, Pyne M, Reid M, Schulz K, Snow K, and Teague J. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia.

Cowardin, L.M., V. Carter, F.C. Golet, & 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.

Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC

Homoya, M. A., Abrell, D. B., Aldrich, J. R., & Post, T. W. (1985). The Natural Regions of Indiana. Indiana Academy of Science , 94, 245-269.

Illinois Department of Natural Resources (IDNR). 2018. Natural Divisions - Southern Till Plain. Accessed; March 2018.
<https://www.dnr.illinois.gov/conservation/IWAP/Documents/NaturalDivisions/SouthernTillPlain>

Jackson, Marion T. 1997. The Natural heritage of Indiana. Bloomington: Indiana University Press, published in association with the Indiana Department of Natural Resources and the Indiana Academy of Science.

Keyser, Tara L.; Arthur, Mary; Loftis, David L. 2017. Repeated burning alters the structure and composition of hardwood regeneration in oak-dominated forests of eastern Kentucky, USA. *Forest Ecology and Management*. 393: 1-11.
<https://doi.org/10.1016/j.foreco.2017.03.015>.

Kilburn, P. and R. B. Brugam. 2014. Inventory of Vegetation Studies in Illinois Based on the Public Land Survey Records. *Transactions of the Illinois State Academy of Science*. Vol. 107, pp. 13-17.

Landfire (Landfire National Vegetation Dynamics Database). 2009. Landfire National Vegetation Dynamics Models. Landfire Project, USDA Forest Service, U.S. Department of Interior. (<http://www.LANDFIRE.gov/index.php>: accessed 22 February 2018).

Mohlenbrock, R. H. and D. M. Ladd. 1978. Distribution of Illinois Vascular Plants. Southern Illinois Univ. Press, Carbondale and Edwardsville, Ill. 282 pp.

Mohlenbrock, R. H. 2014. Vascular Flora of Illinois, 4rd edition. Carbondale, Illinois: Southern Illinois University Press. 736 pp.

National Cooperative Soil Survey (NCSS). National Cooperative Soil Characterization Database. Available online: <https://ncsslabsdata.mart.sc.egov.usda.gov/>. Accessed: February 2018.

National Oceanic and Atmospheric Administration (NOAA). 1980-2010. <https://www.ncdc.noaa.gov/data-access/land-based-station-data/find-station>.

NatureServe. 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Association Detail Report: CEGLO02427) (Accessed: May 22, 2018).

Nowacki, Gregory J.; Abrams, Marc D. 2008. The demise of fire and "mesophication" of forests in the eastern United States. *BioScience*. 58(2): 123-138.

Schwegman, J. E., G. B. Fell, M. D. Hutchinson, G. Paulson, W. M. Shephard, and J. White. 1973. Comprehensive plan for the Illinois Nature Preserve system. Part 2. The natural divisions of Illinois. Illinois Nature Preserves Commission, Rockford, IL. 32 pp.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions (SSS NRCS OSD). Available online. Accessed 2019.

USDA. 2019. The PLANTS Database (<http://plants.usda.gov>, 1 March 2018). National Plant Data Team, Greensboro, NC 27401-4901 USA.

USDA, Natural Resources Conservation Service. 2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

USDA-NRCS. 2008. Hydrogeomorphic Wetland Classification System: An Overview and Modification to Better Meet the Needs of the Natural Resources Conservation Service. Technical Note No. 190–8–76. Washington D.C.

USGS. (2010). LANDFIRE Biophysical Settings. Retrieved from <http://www.landfire.gov>

Voigt, J. W., and R. H. Mohlenbrock. 1964. Plant communities of southern Illinois. Southern Illinois University Press, Carbondale. 202 pp.

Whitaker, John O., Charles J. Amlaner, Marion T. Jackson, George R. Parker, and Peter Evans Scott. 2012. Habitats and ecological communities of Indiana presettlement to present. Bloomington: Indiana University Press.

White, J. 1994. How the terms savanna, barrens, and oak openings were used in early Illinois. In J.S. Fralish, R. C. Anderson, J.E. Ebinger and R. Szafoni, eds., *Proceedings of the North American Conference on Barrens and Savannas*, Illinois State University, Normal Illinois.

White, J. 1978. Classification of natural communities in Illinois. 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. 426 pp.

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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	09/24/2026
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:
