USDA Natural Resources Conservation Service

Ecological site R114XB901IN
Sodium Affected Uplands

Last updated: 11/16/2023
Accessed: 04/26/2024

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 in 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 pedisediment on till plains (Marine series); Endoaqualfs that formed in loess or loess over pedisedimenton till plains (Oconee series); Fluvaquents that formed in alluvium on flood plains (Wakeland series); Fragiudalfs that formed in loess over pedisediment 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 pedisediment (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

Ecological site concept

The Sodium Affected Upland historic reference site is a post oak savanna/woodland. The pattern of sodium soils is often quite variable and many of the mapunits in this initial PES grouping are complexes with other non-sodium affected soils. Water is less available to plants in high sodium soils, so there is often a mosaic of plant communities across the landscape varying subtly from sodium to non-sodium soils. Historically these sites were influenced by frequent fires and large ungulate grazing (bison, elk) which maintained an open savanna or prairie landscape with numerous native plants that were sodium and drought tolerant.

Today, most sites are used in agricultural production. Very few remnant prairie or savanna ecosystems still exist. Remaining wooded sites have been repeatedly disturbed (altered fire regime, non-native vegetation, clearing, selective harvest, grazing, etc.) and may be a mix of locust, ash, elm, cottonwood, hickory and maple

Associated sites

R114XB903IN	**Upland Prairie** The Upland Prairie ecological site and Sodium Affected Upland ecological site occurs on similar landscapes with the Upland Prairie site on higher landscapes such as till plains, knolls, and ridges. Upland Prairie sites have higher percentages of clay within the soil texture. Sodium Affected Upland has a natric horizon.
R114XB902IN	**Wet Upland Prairie** The Wet Upland Prairie ecological site and Sodium Affected Upland ecological site occurs on similar landscapes and are often intermixed with little to no slope. The Wet Upland Prairie sites do not have high sodium soils.
F114XB502IN	**Wet Till Upland Forest** Wet Till Upland Forest ecological site and Sodium Affected Upland ecological site occurs on similar landscapes with the Wet Till Upland Forest site on higher landscapes such as till plains, hills, and ridges. Wet Till Upland Forest sites have a higher percentage of clay in soils, formed in till.

Similar sites

R114XB902IN	**Wet Upland Prairie** The Wet Upland Prairie ecological site and Sodium Affected Upland ecological site occurs on similar landscapes and are often intermixed with little to no slope. The Wet Upland Prairie sites do not have high sodium soils.
R114XB903IN	**Upland Prairie** The Upland Prairie ecological site and Sodium Affected Upland ecological site occurs on similar landscapes with the Upland Prairie site on higher landscapes such as till plains, knolls, and ridges. Upland Prairie sites have higher percentages of clay within the soil texture. Sodium Affected Upland has a natric horizon.

Table 1. Dominant plant species

Tree	(1) *Quercus stellata*
Shrub	(1) *Rosa carolina* (2) *Rhus*
Herbaceous	(1) *Carex* (2) *Panicum virgatum*

Physiographic features

Sites are found on a number of different landforms including till plains, depressions, and ground moraine.

Table 2. Representative physiographic features

Landforms	(1) Till plain (2) Ground moraine (3) Depression
Runoff class	Negligible to low
Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to frequent
Elevation	330–1,000 ft
Slope	0–2%
Water table depth	0–24 in
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)	146-165 days
Freeze-free period (characteristic range)	175-189 days
Precipitation total (characteristic range)	41-45 in
Frost-free period (actual range)	135-168 days
Freeze-free period (actual range)	174-194 days
Precipitation total (actual range)	41-47 in
Frost-free period (average)	153 days
Freeze-free period (average)	184 days
Precipitation total (average)	43 in

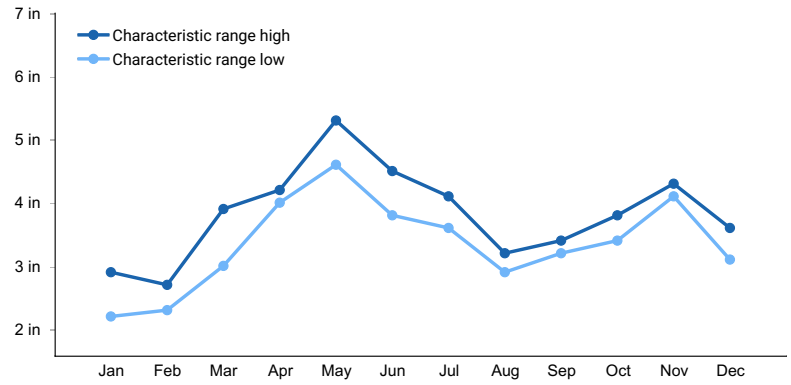


Figure 1. Monthly precipitation range

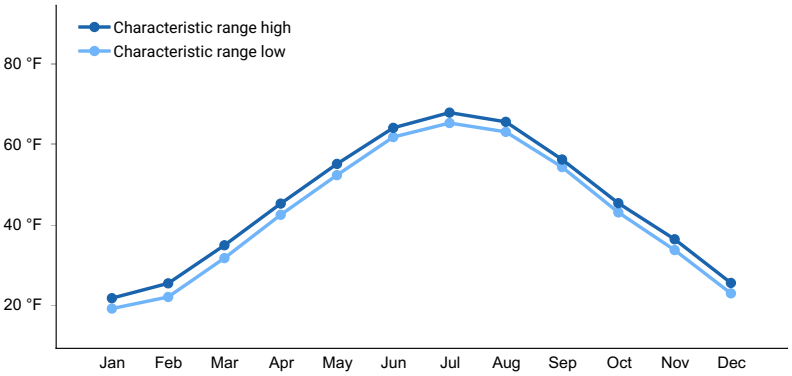


Figure 2. Monthly minimum temperature range

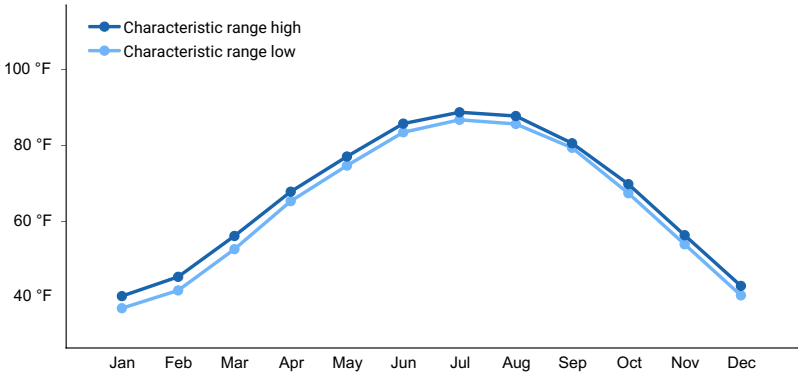


Figure 3. Monthly maximum temperature range

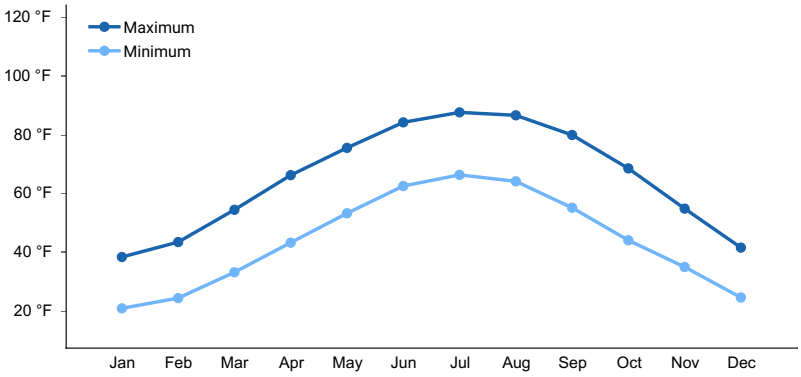


Figure 4. Monthly average minimum and maximum temperature

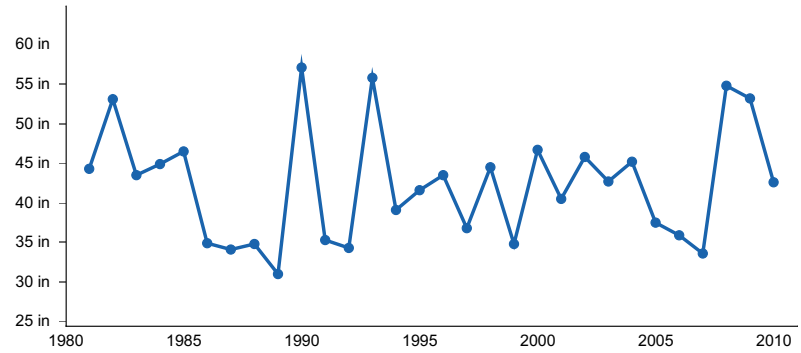


Figure 5. Annual precipitation pattern

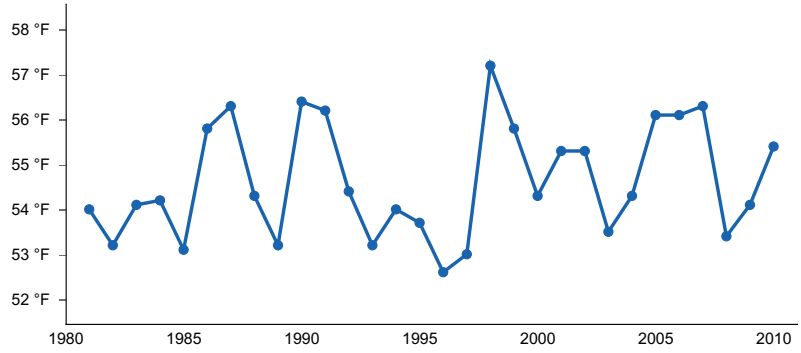


Figure 6. Annual average temperature pattern

Climate stations used

- (1) SPARTA 1 W [USC00118147], Sparta, IL
- (2) HILLSBORO [USC00114108], Hillsboro, IL
- (3) CARBONDALE SOUTHERN IL AP [USW00093810], De Soto, IL

- (4) SPENCER [USC00128290], Spencer, IN
- (5) PANA 3E [USC00116579], Pana, IL
- (6) JERSEYVILLE 2 SW [USC00114489], Jerseyville, IL

Influencing water features

These sites may be influenced by rare to frequent ponding, and by a seasonal high water table. The water table may be near the surface in early winter through spring. Refer to the soil OSD description for detailed information on drainage and hydraulic conductivity. The primary water source for these sites is direct precipitation. The natric horizon in some of these soil series may impede vertical water percolation in the soil. Many sites today have had modifications to hydrology through ditching and/or tiling to facilitate agricultural production objectives.

Wetland description

These sites may contain wetlands which fit into the MINERAL FLATS class in the hydrogeomorphic (HGM) system.

Soil features

Current soil series include Biddle, Fosterburg, and Piasa. These soils are very deep to moderately deep, poorly drained to moderately well drained, and have very slow to moderate permeability. The restrictive layer on this site is a natric horizon.

Table 4. Representative soil features

Parent material	(1) Loess (2) Pedisediment (3) Drift
Surface texture	(1) Silt loam
Family particle size	(1) Fine
Drainage class	Poorly drained to somewhat poorly drained
Permeability class	Slow to moderate
Depth to restrictive layer	9–28 in
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	2.5–7 in
Calcium carbonate equivalent (0-40in)	0–15%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0–10
Soil reaction (1:1 water) (0-40in)	5.1–8.4
Subsurface fragment volume <=3" (0-40in)	0%
Subsurface fragment volume >3" (0-40in)	0%

Ecological dynamics

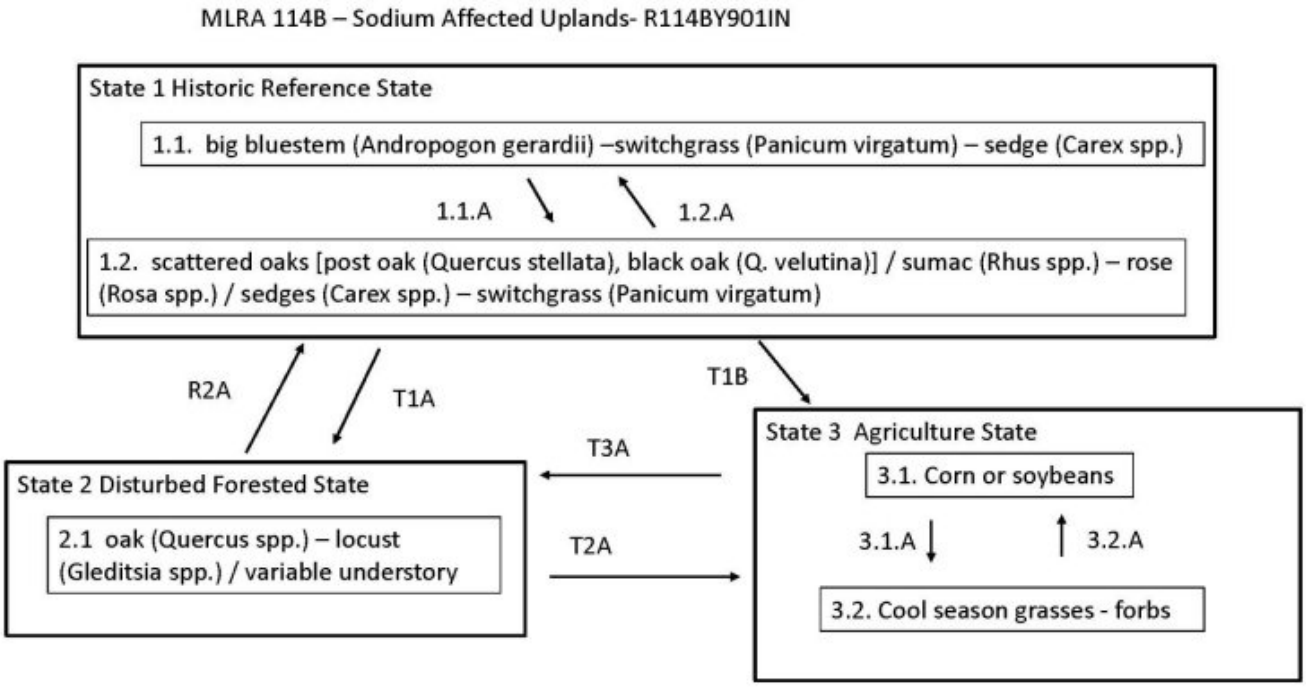
The Sodium Affected Upland site is a mosaic of grassland-woodland species. The pattern of sodium soils is often

quite variable and many of the mapunits in this initial PES grouping are in complexes with other non-sodium affected soils which will create the variability in plant communities across the landscape. Water is less available to plants in high sodium soils, so there is often a change in plant communities across the landscape varying subtly from sodium to non-sodium soils. Historically these sites were continually influenced by fires and large ungulate grazing (bison, elk) which maintained different successional stages including open savanna and prairie landscapes. Disturbance regimes controlled the composition and type of plant communities on site.

Small depressional areas may occur within this landscape and these result in isolated ponded wetlands. Hydric vegetation may be present in these areas, especially during the spring growing season.

Today, most sites are used in agricultural production. Very few remnant prairie or savanna ecosystems still exist. Remaining wooded sites have been repeatedly disturbed (altered fire regime, non-native vegetation, clearing, selective harvest, grazing, etc.) and are generally a mix of deciduous species. On sites were the oaks have been removed, numerous species may be present depending on seed sources but often include locust, elm, cottonwood, maple, hickory and tulip poplar.

State and transition model



State 1
Reference State

Historically, fire and grazing influenced these sites creating different plant communities that were in a continuum of change. Historic reference sites were a oak-savanna landscape dependent upon disturbance regimes. Repeated fires and grazing created tallgrass prairie or open wooded savannas. The type and severity of disturbance influenced the plant composition and community state. Today, most sites have been cleared and are utilized for

agricultural production. Extensive land modifications have altered these sites with very few prairie or savanna type remnants remaining. Remaining wooded sites are largely ruderal with species dependent upon seed sources and disturbance regimes,

Dominant plant species

- post oak (*Quercus stellata*), tree
- Carolina rose (*Rosa carolina*), shrub
- sumac (*Rhus*), shrub
- switchgrass (*Panicum virgatum*), grass
- big bluestem (*Andropogon gerardii*), grass
- sedge (*Carex*), grass

Community 1.1
Tallgrass Prairie

With repeated fire and grazing, many of these sites were a tallgrass prairie community with a diverse composition. Switchgrass, bluestem and sedge were dominant grasses.

Dominant plant species

- switchgrass (*Panicum virgatum*), grass
- big bluestem (*Andropogon gerardii*), grass
- sedge (*Carex*), grass

Community 1.2
Post Oak Savanna

With a reduction of fire and grazing, tree seedling and saplings will become common across the landscape. Species will depend on seed sources and fire tolerance. Post oak and black oak are two species that are both drought and fire tolerant. Small groves would have dotted the landscape.

Dominant plant species

- post oak (*Quercus stellata*), tree
- black oak (*Quercus velutina*), tree
- rose (*Rosa*), shrub
- sumac (*Rhus*), shrub
- switchgrass (*Panicum virgatum*), grass
- big bluestem (*Andropogon gerardii*), grass
- sedge (*Carex*), grass

Pathway 1.1.A
Community 1.1 to 1.2

Reduction in disturbances allowing tree saplings to encroach on site.

Pathway 1.2.A
Community 1.2 to 1.1

Increase in disturbances such as fire that reduce tree seedlings and saplings.

State 2
Disturbed Invaded Woodland

Remaining wooded sites today generally have a history of disturbance such as clearing, grazing, and/or selective harvest. Oaks and hickories have often been removed. Disturbances may introduce a number of invasive non-native plants species.

Dominant plant species

- oak (*Quercus*), tree
- maple (*Acer*), tree
- ash (*Fraxinus*), tree
- elm (*Ulmus*), tree
- sumac (*Rhus*), shrub
- rose (*Rosa*), shrub
- Amur honeysuckle (*Lonicera maackii*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub

Community 2.1
Disturbed Invaded Woodland

Most remaining wooded sites have a history of disturbance. Species on site will depend upon the severity and type of disturbances and the available seed sources. Numerous non-native species may be present.

Dominant plant species

- maple (*Acer*), tree
- oak (*Quercus*), tree
- locust (*Gleditsia*), tree
- Amur honeysuckle (*Lonicera maackii*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub
- sumac (*Rhus*), shrub
- rose (*Rosa*), shrub

State 3
Agricultural State

This state is characterized by the conversion of the site to agricultural use. Most common practice is a corn and soybean rotation of various types. A small portion of the historic acres are used for forage and pasture.

Dominant plant species

- fescue (*Festuca*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- soybean (*Glycine max*), other herbaceous
- corn (*Zea mays*), other herbaceous
- red clover (*Trifolium pratense*), other herbaceous
- white clover (*Trifolium repens*), other herbaceous

Community 3.1
Cropland

This phase is characterized by row crop agriculture of small grains, primarily corn and soybeans. Many sites have hydrological modification such as ditching and tiling.

Dominant plant species

- soybean (*Glycine max*), other herbaceous
- corn (*Zea mays*), other herbaceous

Community 3.2
Pastureland

Planting of cool or warm season pasture/forage species and management to maintain them. Numerous species can be planted and management will depend upon the landowner's goals.

Dominant plant species

- fescue (*Festuca*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- red clover (*Trifolium pratense*), other herbaceous
- white clover (*Trifolium repens*), other herbaceous

Pathway 3.1.A
Community 3.1 to 3.2

Planting of cool or warm season pasture/forage species and management to maintain them. Numerous species can be planted and management will depend upon the landowner's goals

Pathway 3.2.A
Community 3.2 to 3.1

Planting, either by conventional or no-till methods, of row crop. Management that keeps the site in row crop production. Numerous species are possible depending on landowner objectives.

Transition T1A
State 1 to 2

Lack of historic fire regimes and grazing transitions the prairie/savanna state to a forested state.

Transition T1B
State 1 to 3

Conversion to agricultural production. Management inputs and species selected will depend upon landowner goals and objectives. Landowner should be aware of any potential wetland issues prior to conversion.

Restoration pathway R2A
State 2 to 1

Restoration of site would include planting of desired species and long term management to encourage desired native species. Prescribed fire would be a management tool to maintain a prairie or savanna state.

Transition T2A
State 2 to 3

Transition from woodland to agricultural state. Activities would be determined by the landowner’s production objectives. Landowners should be aware of any potential wetland issues prior to conversion.

Transition T3A
State 3 to 2

Cropland or pastureland that is abandoned will slowly, but naturally, transition to a mixed deciduous woodland. Species will depend upon seed sources and presence of any disturbances. Prairie species may be absent unless seed sources are available.

Additional community tables

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 Coterminous 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

Irland, L.C. 2000. Ice storms and forest impacts. The Science of the Total Environment 262: 231-242.

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://ncsslabdatamart.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: CEGL002427) (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.

Contributors

John Allen, Acting Soil Survey Office Leader, USDA-NRCS, Indiana
Dena Anderson, Resource Soil Scientist, USDA-NRCS, Indiana
Ralph Tucker, Soil Survey Office Leader, USDA-NRCS, Missouri
Anita Arends, Ecological Site Specialist, USDA-NRCS, Illinois

Approval

Suzanne Mayne-Kinney, 11/16/2023

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	04/26/2024
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:**

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:**
