USDA Natural Resources Conservation Service

Ecological site F114XB801IN
Sandy Eolian Woodland

Last updated: 11/16/2023
Accessed: 05/11/2025

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

Scientific Name: North-Central Interior Dry Oak Forest and Woodland
Unique Identifier: CES202.047

Ecological site concept

Sandy Eolian Woodland sites are a mosaic of dry woodlands with grass dominated openings. These open canopy woodlands were historically dominated by dry oak and hickory species. Fire frequency and intensity were the principle drivers that maintained these open sites, determined species composition and density, and encouraged a mixed woodland/prairie system.

The herbaceous understory species common in this fire enhanced ecosystem were grasses, sedges, and a diverse assemblage of herbaceous species. An increase in the fire return interval (absence of frequent fires) allows these sites to transition to a dry woodland state. This reduction in fire frequency increases the tree canopy cover, which in

turn can reduce the diversity and production of the understory.

Most of the remaining wooded sites on these soils have a history of disturbance including clearing, selective harvest, invasion of non-native vegetation, absence of fire, grazing, hydrological modifications, and row-crop agriculture. Currently, the majority of this site is in the agriculture state and mostly used for corn and soybean production.

Associated sites

F114XB403IN	**Wet Outwash Upland Forest** Wet Outwash Upland Forest and Sandy Eolian Woodland ecological sites occur on similar landscape positions and are often intermixed. Wet Outwash Upland Forest have outwash as a parent material and ecolian deposits and alluvium are parent material in a Sandy Eolian Woodland. Wet Outwash Forest has a water table from 12-36 inches and Sandy Eolian Woodland doe not have a water table. Sandy Eolian Woodland is coarse-loamy or sandy in texture where as Wet Outwash Forest is fine-silty in texture.

Similar sites

F114XB404IN	**Dry Outwash Upland Forest** Dry Outwash Upland Forest and Sandy Eolian Woodland ecological sites occur on similar landscape positions such as terraces and stream terraces. Both sites have well drained soils but the Dry Outwash Upland Forest soils were formed in outwash. Sandy Eolian Woodland is coarse-loamy or sandy in texture where as Dry Outwash Upland Forest is fine-silty or fine-loamy in texture.

Table 1. Dominant plant species

Tree	(1) *Quercus velutina*
Shrub	(1) *Cornus racemosa*
Herbaceous	(1) *Carex pensylvanica* (2) *Geranium maculatum*

Physiographic features

These sites are located on multiple landforms including dunes, and terraces.

Table 2. Representative physiographic features

Landforms	(1) Dune (2) Terrace (3) Stream terrace
Runoff class	Very low to medium
Flooding frequency	None
Ponding frequency	None
Elevation	350–1,300 ft
Slope	2–18%
Aspect	W, NW, N, NE, E, SE, S, SW

Table 3. Representative physiographic features (actual ranges)

Runoff class	Not specified
Flooding frequency	Not specified
Ponding frequency	Not specified
Elevation	Not specified
Slope	0–60%

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 4. Representative climatic features

Frost-free period (characteristic range)	145-166 days
Freeze-free period (characteristic range)	183-190 days
Precipitation total (characteristic range)	41-46 in
Frost-free period (actual range)	135-168 days
Freeze-free period (actual range)	176-194 days
Precipitation total (actual range)	41-47 in
Frost-free period (average)	155 days
Freeze-free period (average)	186 days
Precipitation total (average)	44 in

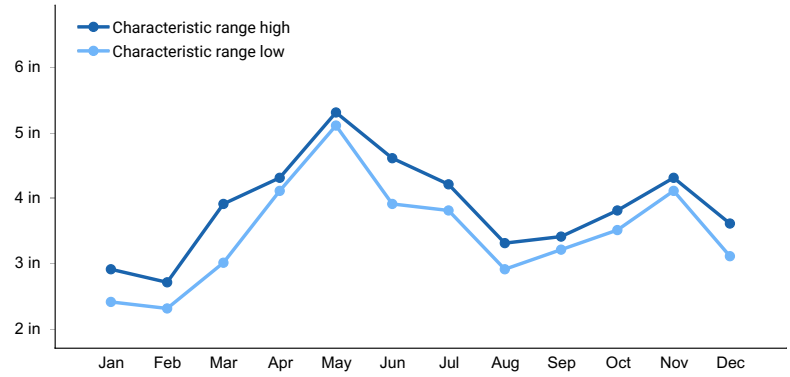


Figure 1. Monthly precipitation range

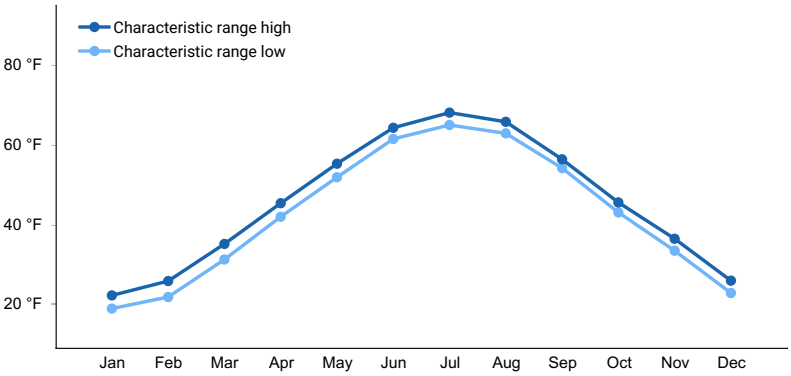


Figure 2. Monthly minimum temperature range

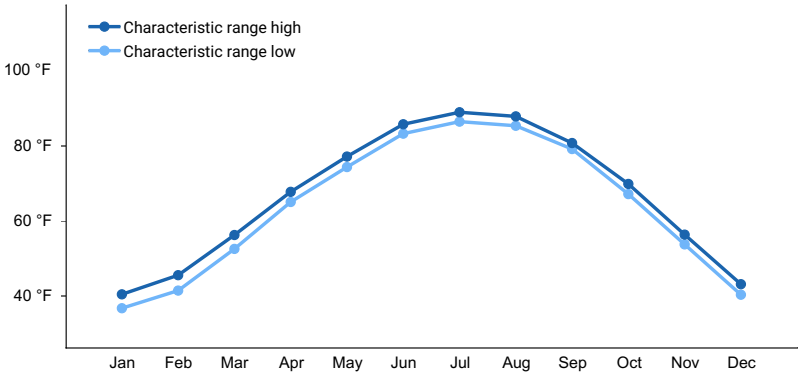


Figure 3. Monthly maximum temperature range

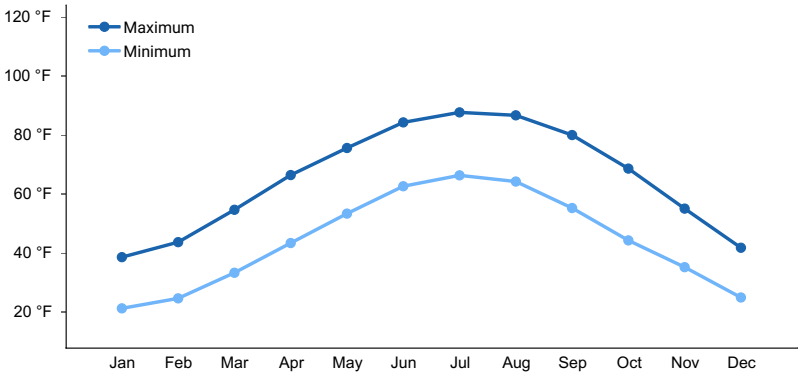


Figure 4. Monthly average minimum and maximum temperature

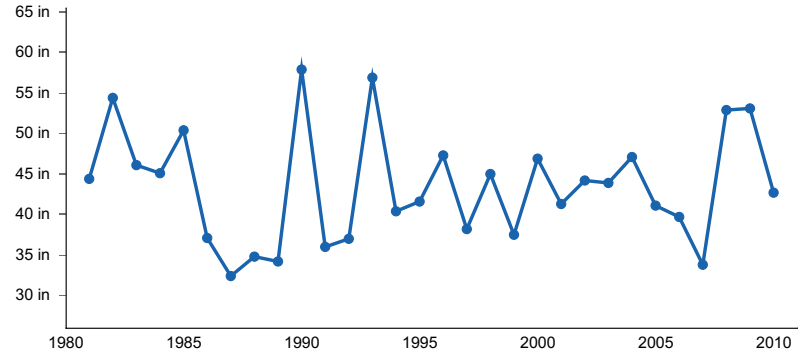


Figure 5. Annual precipitation pattern

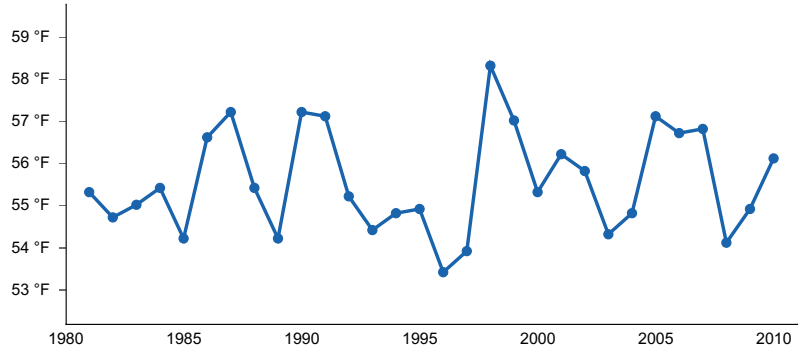


Figure 6. Annual average temperature pattern

Climate stations used

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

- (4) SPENCER [USC00128290], Spencer, IN
- (5) PANA 3E [USC00116579], Pana, IL

Influencing water features

This ecological site is not influenced by wetland or riparian water features. Some sites may have a seasonally high water table.

Soil features

Series currently in this PES group include Bloomfield, and Alvin. They are very deep to very deep.

Table 5. Representative soil features

Parent material	(1) Eolian deposits (2) Eolian sands (3) Alluvium
Surface texture	(1) Fine sandy loam (2) Loamy fine sand (3) Fine sand
Family particle size	(1) Coarse-loamy (2) Sandy
Drainage class	Well drained to somewhat excessively drained
Permeability class	Moderate to rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4–6 in
Calcium carbonate equivalent (0-40in)	0%
Soil reaction (1:1 water) (0-40in)	5.5–7.3
Subsurface fragment volume <=3" (0-40in)	0–2%
Subsurface fragment volume >3" (0-40in)	0%

Ecological dynamics

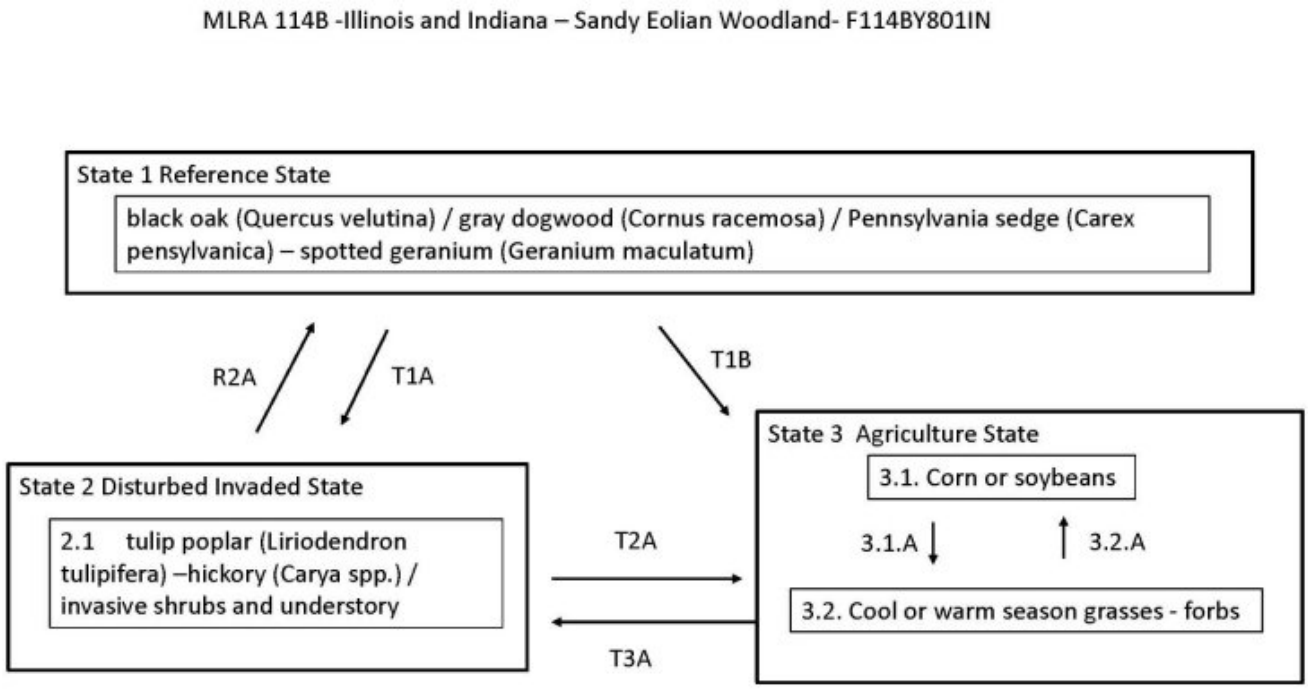
The historic plant community these sites is an open dry oak woodland intermixed with areas of dry-mesic forest and open areas with sedges and grasses. These sites were often a mosaic of woodland, savanna and dry grassland. This dynamic was driven generally by the fire frequency and intensity. These upland sites formed a natural mosaic across the landscape of dunes and depressions on sandy parent material. Drainage and water availability vary according to placement on the landscape. Interdunal sites will have a higher water table and more available water, while higher elevation sites will exhibit drier species. Drainage of the soils on this site ranges from moderately well drained to somewhat excessively drained.

LANDFIRE estimates that ground fires were the most common disturbance for this site. As a natural disturbance regime, low intensity ground fires occurred with relative frequency (10-25 years). These frequent, but lower intensity fires, in conjunction with wind throw would maintain the open woodland/savanna type landscape.

Fire suppression, ground disturbances, logging, and fragmentation has resulted in associate species gaining more dominance. Maples (Acer spp.) and tuliptree (*Liriodendron tulipifera*), are now prevalent on many sites. Many disturbed sites have been invaded by non-native plants.

Few high-quality, old-growth communities remain. Agriculture is the largest use of these soils in MLRA 114X. Most remaining wooded sites have had repeated disturbances and exhibit a denser overstory and less grass species in the understory. As fire return intervals have lengthened, grassland and savanna ecotype sites have been reduced. Trees on these sites include white oak, black oak, shagbark hickory, pignut hickory, scarlet oak, sassafras, and dogwood. The ground layer is a mix of herbs and graminoids. Sites that have been selectively harvested (oaks and/or hickories removed) may be dominated by tulip poplar, red maple, white ash, sweetgum, and sassafras.

State and transition model



State 1
Reference State

Historically these sites were a mosaic of dry woodlands, grass dominated openings, and periodic dry-mesic forests. The open canopy woodlands were dominated mostly by dry oak and hickory species. Fire frequency and intensity were the principle drivers that maintained these open sites and encouraged a mixed woodland/prairie system. The herbaceous understory species common in this fire enhanced ecosystem were grasses, sedges, and a diverse assemblage of forb species. An increase in the fire return interval (absence of frequent fires) allows these sites to transition to a dry woodland state. This reduction in fire frequency increases the tree canopy cover, which in turn can reduce the diversity and production of the understory. Species will vary depending on fire regime (or lack thereof) and microtopography.

Dominant plant species

- black oak (*Quercus velutina*), tree
- shagbark hickory (*Carya ovata*), tree

- pignut hickory (*Carya glabra*), tree
- white oak (*Quercus alba*), tree
- blueberry (*Vaccinium*), shrub
- gray dogwood (*Cornus racemosa*), shrub
- sedge (*Carex*), grass
- panicgrass (*Panicum*), grass
- spotted geranium (*Geranium maculatum*), other herbaceous

Community 1.1
Reference Community

The historical reference community is characterized by dry oak and hickory species. Species dominance was dependent on the historic fire regimes. Common species on remaining forested sites today are black oak, white oak, shagbark hickory, pignut hickory, white oak, and sassafras. Lack of fire has increased species such as tuliptree, ashes, and maples.

Dominant plant species

- black oak (*Quercus velutina*), tree
- shagbark hickory (*Carya ovata*), tree
- white oak (*Quercus alba*), tree
- pignut hickory (*Carya glabra*), tree
- dogwood (*Cornus*), shrub
- blueberry (*Vaccinium*), shrub
- Pennsylvania sedge (*Carex pensylvanica*), grass
- panicgrass (*Panicum*), grass
- spotted geranium (*Geranium maculatum*), other herbaceous

State 2
Disturbed Invaded State

This phase is characterized by substantial canopy disturbance such as selective harvest of oaks or clearing with no post management inputs. Often these disturbances introduce non-native understory species which, if not controlled, will gain dominance in the understory and shrub layers. Species regeneration will depend upon the severity and length of disturbances as well as the resiliency of the natural community.

Dominant plant species

- maple (*Acer*), tree
- tuliptree (*Liriodendron tulipifera*), tree
- hybrid hickory (*Carya*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub
- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous
- spindletree (*Euonymus*), other herbaceous
- Japanese honeysuckle (*Lonicera japonica*), other herbaceous

Community 2.1
Disturbed Invaded Community

Many sites today have been cleared and are utilized for agricultural production. Wooded sites generally have a history of disturbance including an altered fire regime, non-native vegetation, selective harvest, past clear cutting, and/or grazing. Disturbance often allows non-native plants to gain dominance on these sites.

Dominant plant species

- maple (*Acer*), tree
- tuliptree (*Liriodendron tulipifera*), tree

- hybrid hickory (*Carya*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub
- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous
- Japanese honeysuckle (*Lonicera japonica*), other herbaceous
- spindletree (*Euonymus*), other herbaceous

State 3
Agricultural State

This state is characterized by the conversion of the site to agricultural use. Most common practice is row crops of various types. A small portion of the historic acres are used for forage and pasture. Species planted and management inputs will depend upon landowner goals and objectives.

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

Community 3.1
Cropland

This phase is characterized by row crop agriculture of small grains, primarily corn and soybeans; however, many crops could be produced on these sites with proper management. Species will depend upon the landowner's goals and objectives.

Dominant plant species

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

Community 3.2
Pasture/ Forage

This phase is characterized by forage or grazing agriculture. Species planted depend on management objectives.

Dominant plant species

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

Pathway 3.1.A
Community 3.1 to 3.2

This phase is characterized by conversion to row crop agriculture of small grains, commonly corn and soybeans. Many species could be grown on these sites with proper management, so species and management inputs depend on landowner goals.

Pathway 3.2.A
Community 3.2 to 3.1

Planting of cool or warm season pasture/forage species and management to maintain them. Many different species

may be appropriate for these sites with proper management.

Transition T1A
State 1 to 2

Significant disturbances and no long-term control of non-native species. Species regeneration will depend upon the type of disturbance, the severity and length of disturbance, available seed sources, any post management activities, and the overall resilience of the natural community.

Transition T1B
State 1 to 3

Clearing of an oak woodland for conversion to agricultural production. Species selection and management inputs will depend upon landowner objectives.

Restoration pathway R2A
State 2 to 1

Restoration of site would include planting of oaks and long-term timber stand improvement activities such as planting of desired species, brush control, weed control, selective thinning, etc.

Transition T2A
State 2 to 3

Transition from forest to agricultural state. Activities would be determined by the landowner’s production objectives.

Transition T3A
State 3 to 2

Cropland or pastureland that is abandoned will slowly, but naturally, transition to a mixed deciduous woodland with numerous non-native species. Species dominance and community composition will depend on type, length and severity of disturbances and the available seed sources.

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

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	05/11/2025
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:**