USDA Natural Resources Conservation Service

Ecological site F114XB803IN
Wet Silty Eolian Forest

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

NatureServe Ecological System(s) and/or Associations:
The following NatureServe Explorer Ecological System Record(s) have a high level of probability to match the ecological site reference community found on these soils.
NORTH-CENTRAL INTERIOR WET FLATWOODS (CES202.700)

Ecological site concept

Wet Silty Eolian historic reference sites included numerous oak species including pin oak (*Quercus palustris*), swamp white oak (*Q. bicolor*), bur oak (*Q. macrocarpa*), northern red oak (*Q. rubra*) along with hickories (Carya spp.), green ash (*Fraxinus pennsylvanica*), and maple (Acer spp.)

Microtopography, drainage, and fluctuating water levels can result in a complex mosaic of vegetation on these sites where wetland species are adjacent to more wet-mesic upland forest species across the landscape. Even small

changes in slope and drainage can result in the community composition differences. Areas with more slope and slightly better drainage will exhibit more mesic forest species such as white oak (*Q. alba*), northern red oak (*Q. rubra*), American elm (*Ulmus americana*), and hickories (Carya spp.). Wetter zones will have a higher percentage of water tolerant species.

Most sites today have had some level of disturbance including clearcutting, selective harvest, grazing, hydrological modifications, and/or non-native vegetation.

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

Associated sites

F114XB804IN	**Silty Eolian Forest** The Silty Eolian Forest ecological site is often adjacent to the Wet Silty Eolian Forest ecological site. Silty Eolian Forest either have water table seasonally during the rainy season or no water table where as the Wet Silty Eolian Forest has a water table year round.

Similar sites

F114XB502IN	**Wet Till Upland Forest** Wet Till Upland Forest and Wet Silty Eolian Forest ecological sites occur on multiple similar landscapes. Both have silt loam to silty clay loam soil textures. The Wet Till Upland Forest soils are formed in till whereas Wet Silty Eolian Forest soils are formed in loess.
F114XB403IN	**Wet Outwash Upland Forest** Wet Outwash Upland Forest and Wet Silty Eolian Forest ecological sites occur on multiple similar landscapes. Both sites have poorly drained soils with a seasonally high water table, which influences a highly diverse vegetation community. Wet Outwash Upland Forest soils are formed in outwash whereas Wet Silty Eolian Forest soils are formed in loess.

Table 1. Dominant plant species

Tree	(1) *Quercus* (2) *Fraxinus pennsylvanica*
Shrub	(1) *Cornus*
Herbaceous	(1) *Carex* (2) *Osmunda*

Physiographic features

Sites are generally found on backslopes, shoulders and summits.

Table 2. Representative physiographic features

Landforms	(1) Depression (2) Flat (3) Ground moraine (4) Loess hill (5) Till plain
Runoff class	Low to high
Flooding frequency	None
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to frequent
Elevation	300–1,000 ft
Slope	0–60%
Water table depth	6–72 in

Aspect	W, NW, N, NE, E, SE, S, SW

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 180 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	147-164 days
Freeze-free period (characteristic range)	176-189 days
Precipitation total (characteristic range)	41-45 in
Frost-free period (actual range)	136-168 days
Freeze-free period (actual range)	174-193 days
Precipitation total (actual range)	41-47 in
Frost-free period (average)	153 days
Freeze-free period (average)	183 days
Precipitation total (average)	43 in

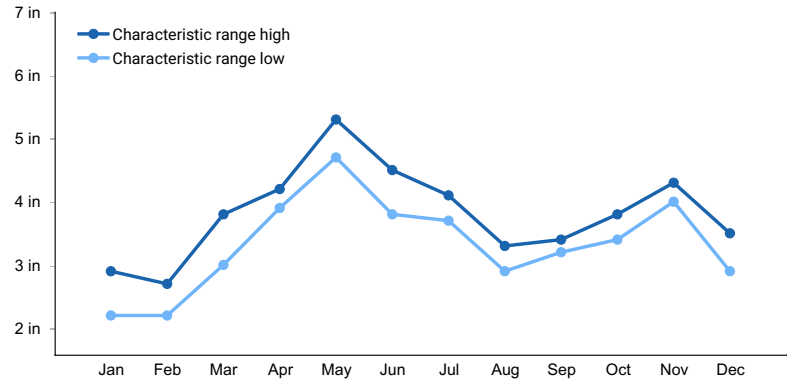


Figure 1. Monthly precipitation range

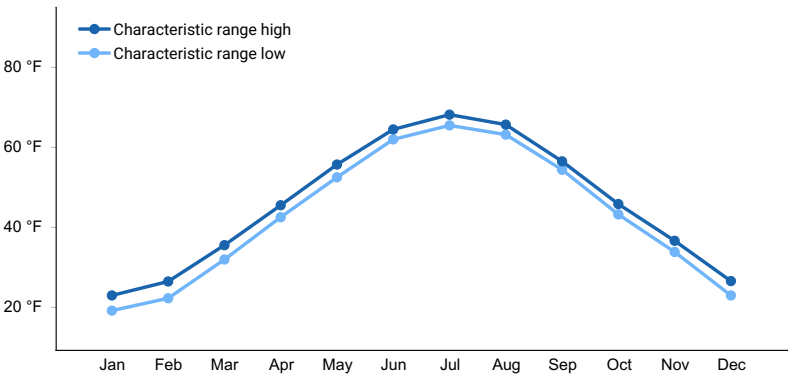


Figure 2. Monthly minimum temperature range

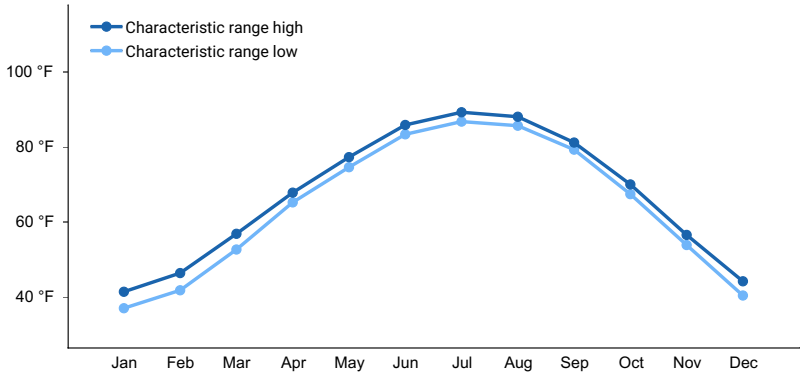


Figure 3. Monthly maximum temperature range

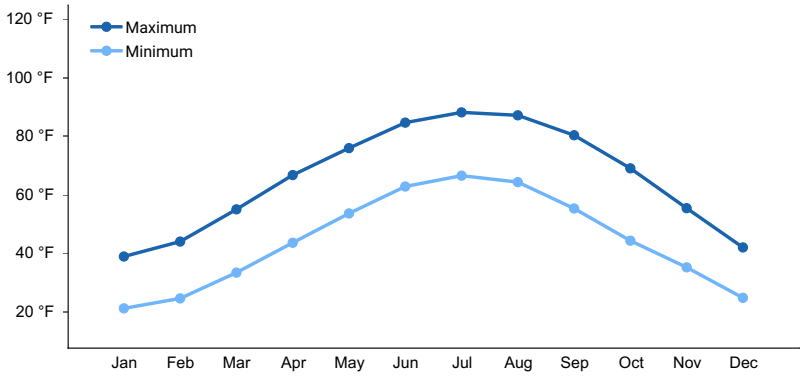


Figure 4. Monthly average minimum and maximum temperature

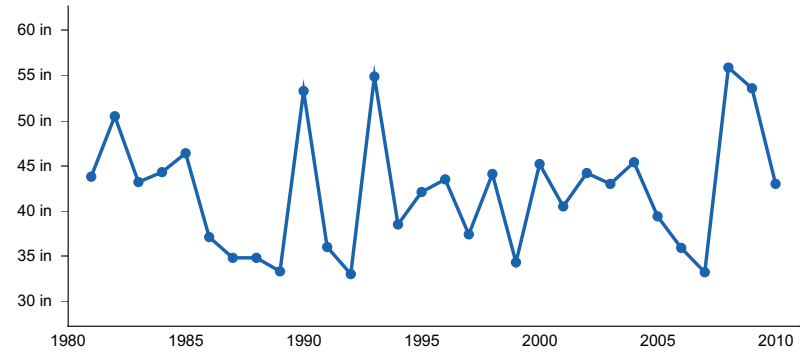


Figure 5. Annual precipitation pattern

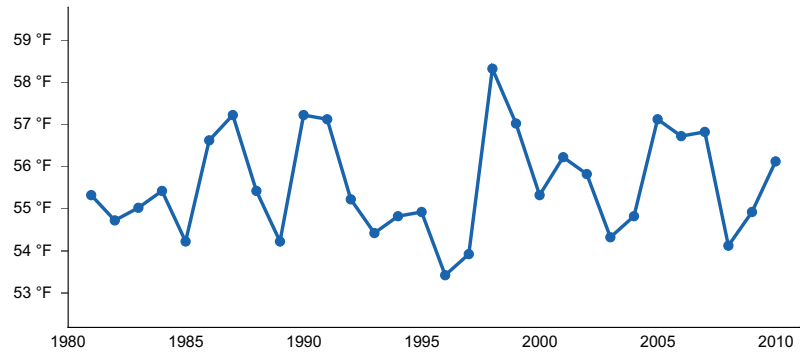


Figure 6. Annual average temperature pattern

Climate stations used

- (1) CARBONDALE SOUTHERN IL AP [USW00093810], De Soto, IL
- (2) HILLSBORO [USC00114108], Hillsboro, IL
- (3) SPENCER [USC00128290], Spencer, IN

- (4) SPARTA 1 W [USC00118147], Sparta, IL
- (5) PANA 3E [USC00116579], Pana, IL
- (6) JERSEYVILLE 2 SW [USC00114489], Jerseyville, IL
- (7) BELLEVILLE SIU RSCH [USW00013802], Mascoutah, IL

Influencing water features

These sites may be influenced by ponding and a seasonally high water table.

Wetland description

The hydric codes associated with this site are: Soils in Aquic suborders, great groups, or subgroups, Albolls suborder, Historthels great group, Histoturbels great group, or Andic, Cumulic, Pachic, or Vitrandic subgroups that: (a) Based on the range of characteristics for the soil series, will at least in part meet one or more Field Indicators of Hydric Soils in the United States, or (b) Show evidence that the soil meets the definition of a hydric soil.
Source: Ecosite Summary Report NASIS – 11/19

Soil features

Series currently include Alford, Avonburg, Burksville, Caseyville, Cobbsfork, Cory, Evansville, Homen, Iva, Marine, Muren, Pierron, Stoy and Weir. These soils are very deep and somewhat poorly drained.

Table 4. Representative soil features

Parent material	(1) Loess
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Fine-silty (2) Fine
Drainage class	Somewhat poorly drained
Permeability class	Slow to moderate
Soil depth	40–80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	5.2–8.8 in
Calcium carbonate equivalent (0-40in)	0%
Electrical conductivity (0-40in)	0–2 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Subsurface fragment volume <=3" (0-40in)	0%
Subsurface fragment volume >3" (0-40in)	0%

Ecological dynamics

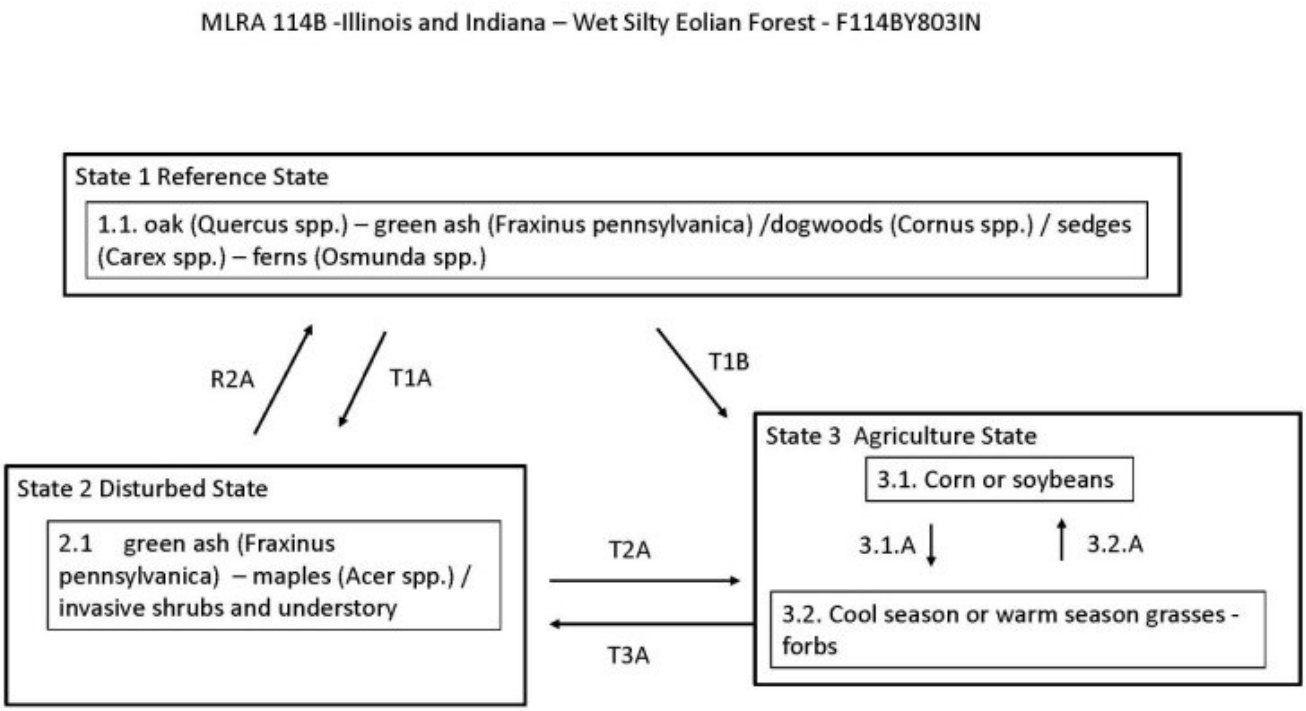
Microtopography, drainage, and fluctuating water levels can result in a variation of forest species on these sites. Soils in this group are somewhat poorly drained and small changes in microtopography form a mosaic of species across the landscape. Sites with more slope and better drainage will include white oak (*Q. alba*), northern red oak (*Q. rubra*), American elm (*Ulmus americana*), maple (Acer spp.) and hickories (Carya spp.). Wetter sites will include pin oak (*Quercus palustris*), green ash (*Fraxinus pennsylvanica*), swamp white oak (*Q. bicolor*) and sweetgum

(*Liquidambar styraciflua*).

Most sites 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. On many locations the oaks have been removed and the community is dominated by species such as maples, ashes, poplar, sweetgum, hackberry, cottonwood, and willows.

The natural hydrology of many sites has been modified through ditching and/or tiling.

State and transition model



State 1
Reference State

Soils in this group range from somewhat poorly drained to poorly drained. Species include pin oak (*Quercus palustris*), swamp white oak (*Q. bicolor*), green ash (*Fraxinus pennsylvanica*) and red maple (*Acer rubrum*) on the wetter portions of sites. Areas with more slope and better drainage will include white oak (*Q. alba*), northern red oak (*Q. rubra*), American elm (*Ulmus americana*), and hickories (Carya spp.). Microtopography, drainage, and fluctuating water levels can result in a complex mosaic of sites where wetland species are adjacent to more wet-mesic upland forest species across the landscape. Most sites today have had some level of disturbance including clearcutting, selective harvest, grazing, hydrological modifications, and/or non-native vegetation.

Dominant plant species

- pin oak (*Quercus palustris*), tree
- swamp white oak (*Quercus bicolor*), tree

- northern red oak (*Quercus rubra*), tree
- green ash (*Fraxinus pennsylvanica*), tree
- maple (*Acer*), tree
- dogwood (*Cornus*), shrub
- sedge (*Carex*), grass
- Virginia wildrye (*Elymus virginicus*), grass
- osmunda (*Osmunda*), other herbaceous

Community 1.1
Reference Community

Common species on undisturbed sites may include pin oak (*Quercus palustris*), swamp white oak (*Q. bicolor*), bur oak (*Q. macrocarpa*), green ash (*Fraxinus pennsylvanica*), and American elm (*Ulmus americana*). Depending on drainage and topography, higher sites may include northern red oak (*Q. rubra*), hickories (Carya spp.), white oak (*Q. alba*) and maples (Acer spp.)

Dominant plant species

- pin oak (*Quercus palustris*), tree
- swamp white oak (*Quercus bicolor*), tree
- bur oak (*Quercus macrocarpa*), tree
- northern red oak (*Quercus rubra*), tree
- dogwood (*Cornus*), shrub
- sedge (*Carex*), grass
- Virginia wildrye (*Elymus virginicus*), grass
- osmunda (*Osmunda*), other herbaceous

State 2
Disturbed Invaded State

This phase is characterized by substantial canopy disturbance. Often the activity is the removal of the higher value tree species such as the oaks. Often this disturbance introduces non-native understory species which, if not controlled, will overtake the site. Species composition will vary depending on the type, severity and length of disturbance(s), available seed sources, and the resilience of the natural community.

Dominant plant species

- maple (*Acer*), tree
- ash (*Fraxinus*), tree
- cottonwood (*Populus*), tree
- honeysuckle (*Lonicera*), shrub
- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous

Community 2.1
Disturbed Invaded Community

Most remaining wooded sites have a history of disturbance including an altered fire regime, non-native vegetation, selective harvest, past clear cutting, and/or grazing. On many locations the oaks have been removed and the community is dominated by species such as maples, ashes, poplar, sweetgum, cottonwood, and willows. Numerous species on non-native plants may be on site depending on seed sources. The natural hydrology of many sites has been modified through ditching and/or tiling.

Dominant plant species

- maple (*Acer*), tree
- cottonwood (*Populus*), tree
- ash (*Fraxinus*), tree
- honeysuckle (*Lonicera*), shrub

- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous

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. Species planted will depend upon site conditions and the producer's goals and objectives. Landowners should be aware of any wetland issues prior to conversion of these sites to agricultural production.

Dominant plant species

- fescue (*Festuca*), grass
- brome (*Bromus*), grass
- Kentucky bluegrass (*Poa pratensis*), grass
- corn (*Zea mays*), other herbaceous
- soybean (*Glycine max*), other herbaceous

Community 3.1
Agricultural - Cropland

This phase is characterized by row crop agriculture of small grains, primarily corn and soybeans. Landowners should be aware of any wetland issues prior to conversion of these sites to agricultural production.

Dominant plant species

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

Community 3.2
Agricultural - Pasture /Forage production

This phase is characterized by forage or grazing agriculture. Different mixes of, generally, cool or warm season grasses and forbs, largely clovers, are grown. Species selection and management inputs will depend upon landowner objectives and production 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

Conversion of a crop field to forage production. Inputs may include site preparation, weed control, seeding of desired species, brush control, etc. Species planted and management will depend on the owners objectives and production 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. Hydrological modification (ditching, tiling) are common. Landowner should be aware of any wetland issues prior to conversion of the site.

Transition T1A
State 1 to 2

Significant disturbances with no long-term control of non-native species or timber stand improvement management activities.

Transition T1B
State 1 to 3

Forest for conversion to agricultural production. Species selection and management inputs will depend upon landowner objectives and production goals. Landowners should be aware of any wetland issues prior to conversion of these sites to agricultural production.

Restoration pathway R2A
State 2 to 1

Restoration of site would include planting of desired tree species, weed and brush control, and long-term timber stand improvement activities to insure high value trees thrive. Hydrology of the site may also need to be restored.

Transition T2A
State 2 to 3

Transition from forest to agricultural state. Species and management 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 usually dominated ash, tuliptree, maples, elms, etc. Species on site will depend on a number of factors including previous changes to the natural hydrology of the site, the type, severity and length of the disturbance, and available seed sources for the site.

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.

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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:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**

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11. **Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):**

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12. **Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):**

    Dominant:

    Sub-dominant:

    Other:

    Additional:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**

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:**