USDA Natural Resources Conservation Service

Ecological site F114XB204IN
Floodplain Forest

Last updated: 11/16/2023
Accessed: 05/20/2024

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

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.
Scientific Name: South-Central Interior Large Floodplain- CES202.705
NorthCentral Interior Floodplain- CES202.694

Ecological site concept

Floodplain Forest sites are found on floodplains and floodplain steps. Some sites may flood occasionally, but usually for only a brief duration. The historic pre-European settlement vegetation on this site was dominated by a continuous canopy of deciduous trees with an understory of shade-tolerant shrubs and ground flora (LANDFIRE 2009). These sites were highly diverse in plant species composition and varied according to topography, flooding frequency, and flooding duration.

Tree species common to these sites included northern red oak (Quercus rubra), American sycamore (Platanus occidentalis), bitternut hickory (Carya cordiformis), mockernut hickory (Carya tomentosa), white oak (Quercus alba), white ash (Fraxinus americana L.), green ash (Fraxinus pennsylvanica Marshall), black walnut (Juglans nigra L.), American elm (Ulmus americana L.), basswood (Tilia americana L.) and slippery elm (Ulmus rubra). Boxelder (Acer negundo), silver maple (Acer saccharinum), tulip poplar, and sugar maple (Acer saccharum) are frequently found on sites where selective harvest (oak removal) has occurred.

Understory communities were lush, structurally and compositionally diverse, and consisted predominately of shade-tolerant species. Common shrubs include pawpaw (Asimina triloba), slippery elm (Ulmus rubra) and dogwoods. Vines may be abundant, including Virginia creeper (Parthenocissus quinquefolia) and eastern poison ivy (Toxicodendron radicans).

Herbaceous species include wingstem (Verbesina alternifolia), orange jewelweed (Impatiens capensis), smallspike false nettle (Boehmeria cylindrica), Virginia wildrye (Elymus virginicus), Canadian clearweed (Pilea pumila), Jack in the pulpit (Arisaema triphyllum), Canadian wildginger (Asarum canadense), and jumpseed (Polygonum virginianum).

Today, the natural hydrology on most sites has been substantially altered due to farming, levees, ditching, tiling, urban development, watershed structures, industry, or recreation. Most of these sites thave been cleared and are being utilized for crop production.

The remaining forested sites are usually small in acreage, tend to be narrow remnant bands along floodplains, and are often highly disturbed through selective cutting, grazing, or hydrological modification. However, these remaining wooded areas are critical ecologically as they serve as a rare shelter for wildlife and provide erosion protection for watersheds.

Associated sites

F114XB403IN	**Wet Outwash Upland Forest** The Wet Outwash Upland Forest ecological site is adjacent to Floodplain Forest sites but Wet Outwash Upland Forest sites are on higher landscape positions, occur on flood plains, stream terraces, terraces and fans, and parent material is outwash. Floodplain Forest ecological site is on flood plains, flood plain steps and natural levees and parent material is alluvium.

Similar sites

F114XB503IN	**Till Upland Forest** Till Upland Forest occurs on till plains and till is the parent material while the Floodplain Forest occurs on flood plains, floodplain-steps and levees and alluvium is the parent material.

Table 1. Dominant plant species

Tree	(1) *Platanus occidentalis* (2) *Quercus*
Shrub	(1) *Asimina triloba*
Herbaceous	(1) *Pilea pumila* (2) *Elymus virginicus*

Physiographic features

These soils are generally located on floodplains and low floodplain steps. Sites generally have slopes of 0-2 %. Areas not protected by levees may be subject to occasional or frequent flooding.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Flood-plain step (3) Natural levee
Runoff class	Negligible to very low
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent
Ponding frequency	None
Elevation	104–305 m
Slope	0–2%
Water table depth	46–203 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 180 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	147-168 days
Freeze-free period (characteristic range)	176-194 days
Precipitation total (characteristic range)	1,067-1,143 mm
Frost-free period (actual range)	136-169 days
Freeze-free period (actual range)	174-195 days
Precipitation total (actual range)	1,041-1,194 mm
Frost-free period (average)	155 days
Freeze-free period (average)	185 days
Precipitation total (average)	1,118 mm

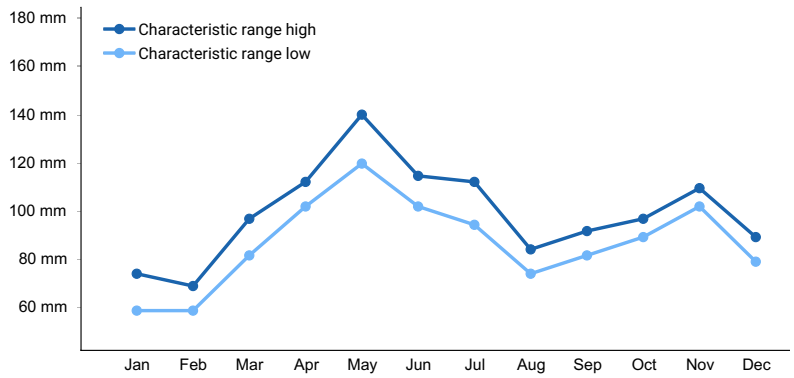


Figure 1. Monthly precipitation range

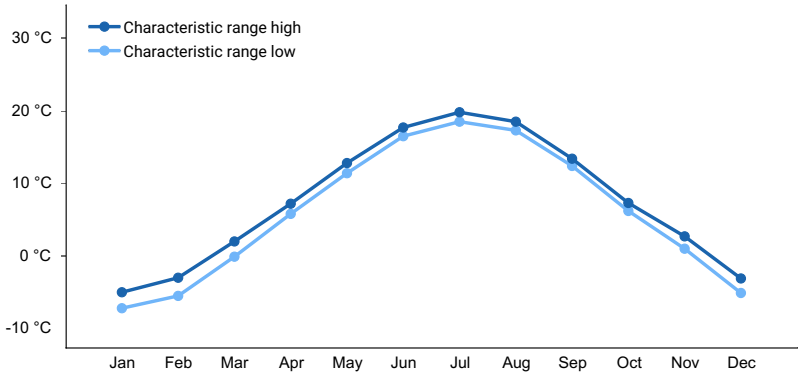


Figure 2. Monthly minimum temperature range

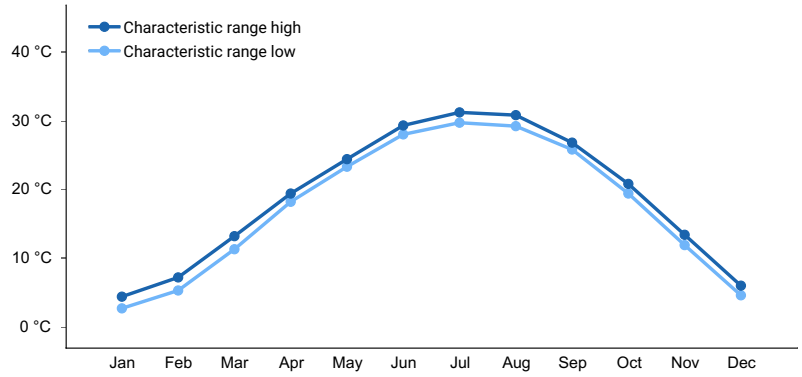


Figure 3. Monthly maximum temperature range

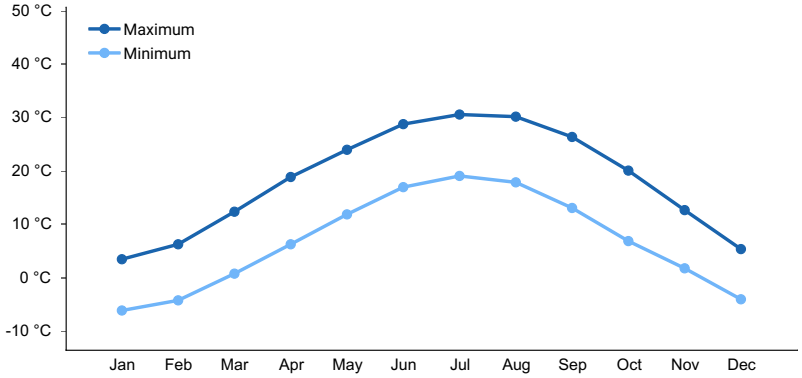


Figure 4. Monthly average minimum and maximum temperature

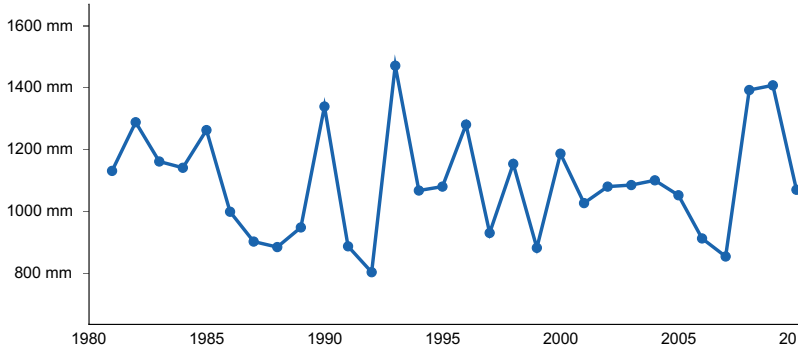


Figure 5. Annual precipitation pattern

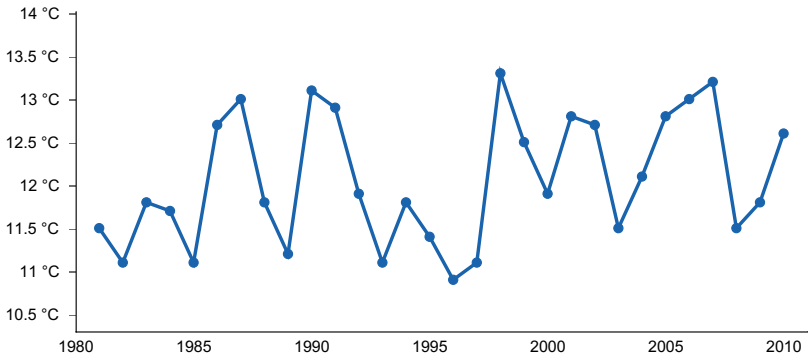


Figure 6. Annual average temperature pattern

Climate stations used

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

Influencing water features

These sites may be subject to periodic flooding. Some soils in this group have a seasonally high water table .

Soil features

The soil are very deep, moderately well drained to well drained, with moderate permeability, and with moderately acidic to neutral soil reaction. Current series include Haymond, Ross, and Steff.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silt loam
Family particle size	(1) Coarse-silty (2) Fine-silty
Drainage class	Moderately well drained to well drained
Permeability class	Moderate
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	18.03–23.88 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.5–7.3

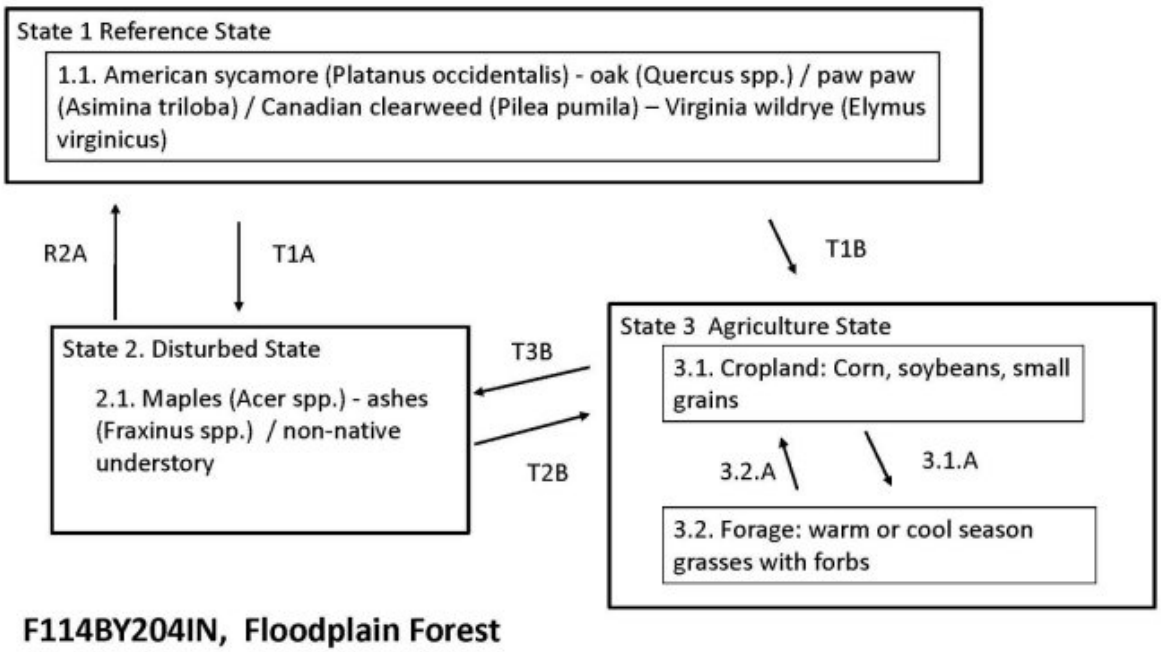
Subsurface fragment volume <=3" (0-101.6cm)	0–3%
Subsurface fragment volume >3" (0-101.6cm)	0%

Ecological dynamics

The Floodplain Forest historical reference state was an mature floodplain forest with multiple canopy species including maple, elm, ash, oak, sycamore, hickory, black walnut, and basswood. Periodic natural disturbances included flooding, wind damage or ice storms; however, catastrophic disturbances were rare and these communities generally evolved into old-growth, dense forests with a high level of canopy cover and diversity.

Sites today have been repeatedly disturbed through clearing, selective harvest (oak, hickory, walnut removal), hydrological modification, grazing, etc. These disturbances have altered the species composition of both the overstory and understory vegetation. Remaining wooded sites often are dominated by shade tolerate species such as boxelder, sugar maple, white ash, American elm, silver maple, and green ash.

State and transition model



F114BY204IN, Floodplain Forest

State 1
Reference State

The historical reference community for this ecological site was an old growth floodplain forest with multiple species including oaks, hickory, sycamore, elm, walnut, maple, ash, Periodic natural disturbances included flooding, wind damage or ice storms; however, catastrophic disturbances were rare and these communities generally evolved into

old-growth, dense forests with a high level of canopy cover and diversity.

Dominant plant species

- oak (*Quercus*), tree
- American sycamore (*Platanus occidentalis*), tree
- hybrid hickory (*Carya*), tree
- American elm (*Ulmus americana*), tree
- pawpaw (*Asimina triloba*), shrub
- dogwood (*Cornus*), shrub
- northern spicebush (*Lindera benzoin*), shrub
- sedge (*Carex*), grass
- Virginia wildrye (*Elymus virginicus*), grass
- Canadian clearweed (*Pilea pumila*), other herbaceous

Community 1.1
Forestland

This community is characterized by a closed canopy with multiple species co-dominate including oak, hickory, sycamore, maple, elm, and ash. Associates include black walnut, basswood, and black cherry. The understory will include a variety of native species including many native spring wildflowers. Species variations may occur due to microtopography and flooding regimes.

Dominant plant species

- oak (*Quercus*), tree
- hybrid hickory (*Carya*), tree
- American sycamore (*Platanus occidentalis*), tree
- American elm (*Ulmus americana*), tree
- dogwood (*Cornus*), shrub
- pawpaw (*Asimina triloba*), shrub
- northern spicebush (*Lindera benzoin*), shrub
- sedge (*Carex*), grass
- Canadian clearweed (*Pilea pumila*), other herbaceous

State 2
Disturbed Invaded State

This community is characterized by the removal of the higher value tree species, primarily oak species, or other disturbances that remove the oaks, hickories and/or black walnuts. Oak regeneration is often limited without timber stand improvement inputs. Disturbance often introduces non-native understory species which, if not controlled, will overtake the site and impede oak reproduction. Fast growing, shade tolerant species often gain in prominence within the community structure.

Dominant plant species

- maple (*Acer*), tree
- ash (*Fraxinus*), tree
- tuliptree (*Liriodendron*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub
- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous

Community 2.1
Disturbed Invaded Community

This community has undergone substantial disturbances such as clearing, selective timber harvest (oak removal) and/or unmanaged grazing. Invasive species are often brought to a site during such disturbances and without

management control, will alter the community composition of the site. Species present will depend upon the severity of disturbances and the available seed sources.

Dominant plant species

- maple (*Acer*), tree
- ash (*Fraxinus*), tree
- tuliptree (*Liriodendron tulipifera*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), 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 depend on landowners management objectives.

Dominant plant species

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

Community 3.1
Cropland

This community is characterized by row crop agriculture of small grains - primarily corn and soybeans, but many species can be grown on these sites depending on management objectives.

Dominant plant species

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

Community 3.2
Pastureland/Forage

Different mixes of, generally, cool and/or warm season grasses and forbs, largely clovers, are grown. Species and management inputs will depend on the landowners goals and objectives.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), 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. Species and management activities will depend upon the landowners goals and objectives.

Pathway 3.2.A
Community 3.2 to 3.1

Planting, either by conventional or no-till methods, of row crops. Management that keeps the site in row crop production may include weed control, fertilizing, and insect control. Activities and species planted will depend upon owner's objectives and goals.

Transition T1A
State 1 to 2

Substantial disturbance such as clearing or selective harvest. Little or no post-harvest timber stand management. No control of non-native species.

Transition T1B
State 1 to 3

Clearing of mature high-quality forest for conversion to agricultural production. This transition is for sites with lower slopes only. Landowners should be aware of any potential wetland issues on or near these sites.

Restoration pathway R2A
State 2 to 1

Restoration of site would include long-term timber stand improvement inputs including planting of desired tree species and continual brush and weed control.

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 usually dominated by low-value trees such as maple, ash, elm, etc. Often non-native species make up all or a portion of the shrub and understory layers.

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)	A. Arends, ESI Specialist
Contact for lead author	
Date	05/20/2024
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):**

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15. **Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annual-production):**

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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:**

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17. **Perennial plant reproductive capability:**
