USDA Natural Resources Conservation Service

Ecological site F114XA204IN
Alluvium Forest

Last updated: 9/26/2024
Accessed: 05/12/2025

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

MLRA 114 makes up about 4,550 square miles (11,795 square kilometers. The three parts of this MRLA are mostly in the Till Plains Section of the Central Lowland Province of the Interior Plains. The western third of the western part is in the Highland Rim Section of the Interior Low Plateaus Province of the Interior Plains. The eastern half of the eastern part is in the Kanawha Section of the Appalachian Plateaus Province of the Appalachian Highlands. Both large and small tributaries of the Ohio River dissect the nearly level to very steep glaciated uplands in this area. The major streams and rivers have well defined valleys with broad flood plains and numerous stream terraces. The flood plains along the smaller streams are narrow. Broad summits are nearly level to gently sloping. Elevation ranges from 320 feet (100 meters) on the southernmost flood plain along the Ohio River to 1,250 feet (380 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. Also, the Ohio River bluffs are as much as 300 feet (90 meters) above the river valley floor.

Classification relationships

USFS: 222 Eastern Broadleaf Forest (Continental) Province

Homoya's Natural Regions of Indiana: Bluegrass Region

The following NatureServe Explorer Ecological System has a high level of probability to match the ecological site found on these soils. Field verification is needed prior to using this information for conservation planning and/or restoration initiatives:

Ecological site concept

Alluvium Forest sites were historically a mature deciduous floodplain forest with a closed canopy consisting of multiple co-dominant species. Canopy trees included American elm (*Ulmus americana*), sugar maple (*Acer saccharum*), northern red oak (*Quercus rubra*), bitternut hickory (*Carya cordiformis*), mockernut hickory (*Carya tomentosa*), black walnut (*Juglans nigra*), and white ash (*Fraxinus americana*) Black walnut would be found on the better drained sites. Forest shrub and understory composition will vary depending on the flooding regime, disturbances, and microtopography. Today, many floodplain sites that are still wooded have had the oaks removed and due to disease, the American elm is no longer dominant.

Active hydrologic and geomorphic process, along with windthrow of established trees, are the causal factors in long interval disturbance regimes on these sites. These macro and micro scale disturbance events may create mixed-aged forests that contains both late and early seral species. Today, these natural dynamics have been drastically changed due to the installation of levees, dams, channeling, ditching and tiling.

Associated sites

F114XA203IN	**Wet Alluvium Forest** Wet Alluvium sites are associated with these sites.

Similar sites

F114XA102IN	**Lacustrine Terrace Forest** Lacustrine Terrace Forest sites share many similar species.

Table 1. Dominant plant species

Tree	(1) *Ulmus americana* (2) *Acer saccharum*
Shrub	(1) *Asimina triloba* (2) *Lindera benzoin*
Herbaceous	(1) *Parthenocissus quinquefolia*

Physiographic features

These sites are found on alluvial floodplains and flood-plain steps.

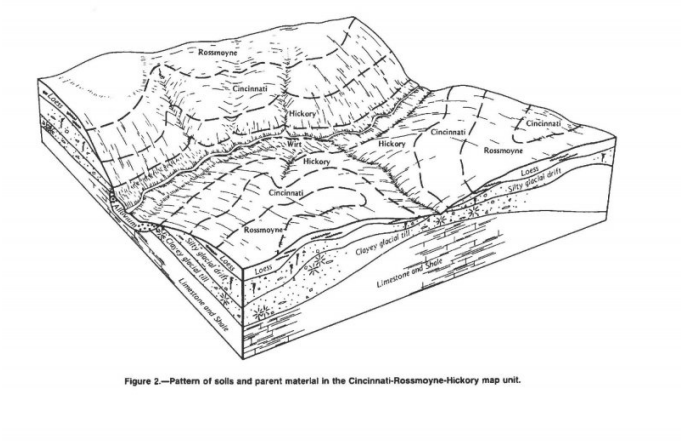


Figure 2.—Pattern of soils and parent material in the Cincinnati-Rossmoyne-Hickory map unit.

Figure 1. Physiographic Image - Block diagram with Wirt soils on the landscape.

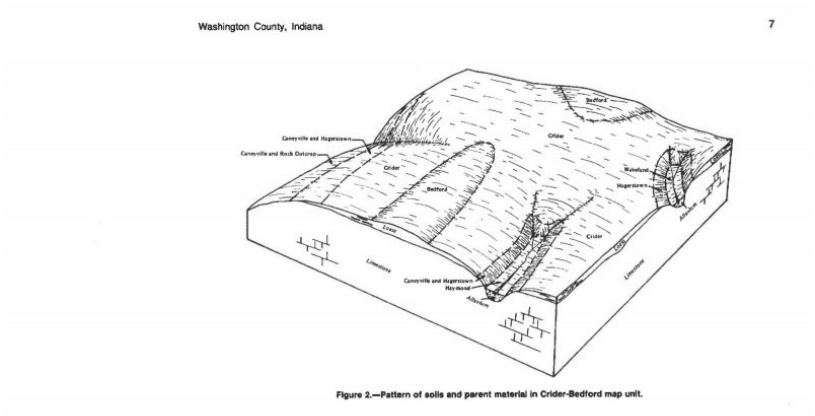


Figure 2.—Pattern of soils and parent material in Crider-Bedford map unit.

Figure 2. Physiographic Image - Block diagram with Haymond soils on the landscape.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain (2) Alluvial plain > Flood-plain step
Runoff class	Negligible to medium
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Ponding frequency	None to frequent
Elevation	104–344 m
Slope	0–2%
Ponding depth	0–76 cm
Water table depth	15–183 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)	153-158 days
Freeze-free period (characteristic range)	178-181 days
Precipitation total (characteristic range)	1,168-1,194 mm
Frost-free period (actual range)	153-159 days
Freeze-free period (actual range)	177-181 days
Precipitation total (actual range)	1,168-1,194 mm
Frost-free period (average)	156 days
Freeze-free period (average)	179 days
Precipitation total (average)	1,168 mm

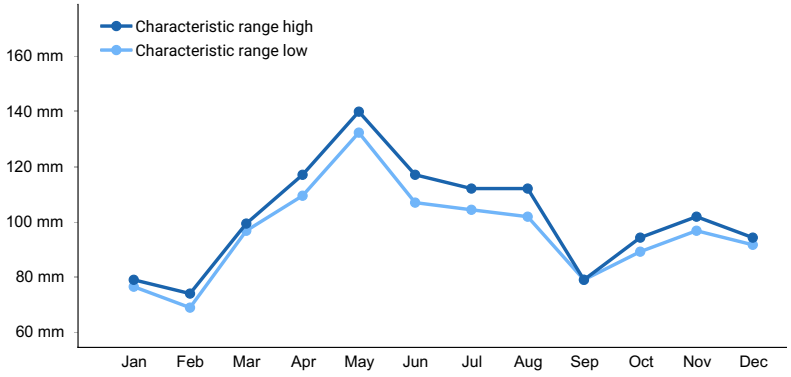


Figure 3. Monthly precipitation range

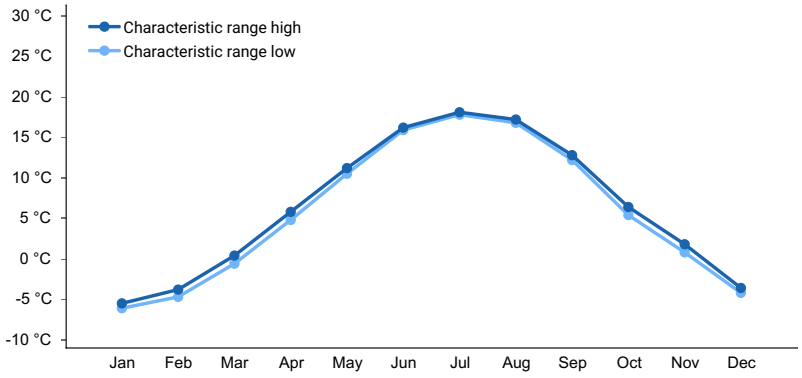


Figure 4. Monthly minimum temperature range

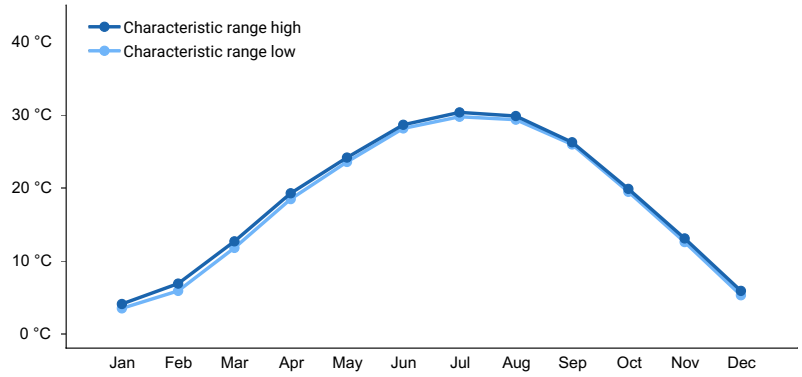


Figure 5. Monthly maximum temperature range

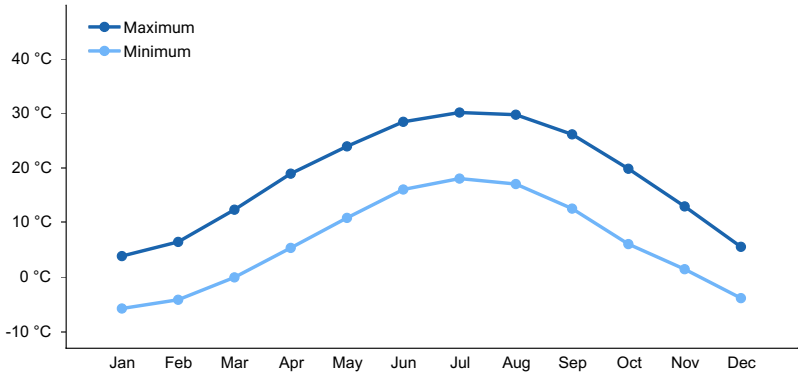


Figure 6. Monthly average minimum and maximum temperature

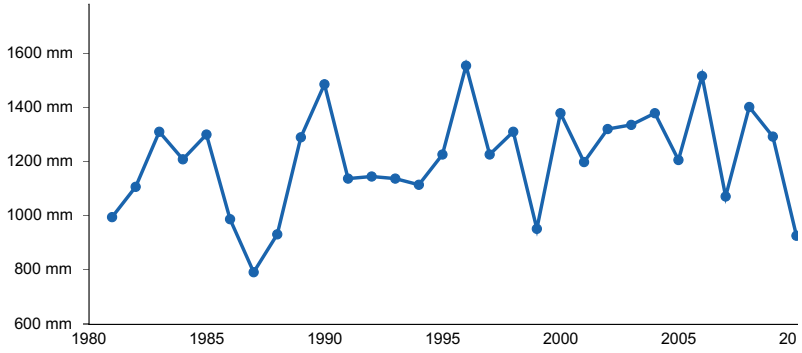


Figure 7. Annual precipitation pattern

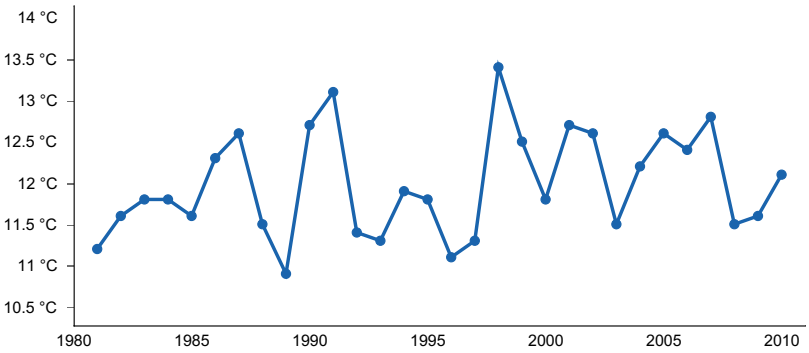


Figure 8. Annual average temperature pattern

Climate stations used

- (1) NORTH VERNON 2 ESE [USC00126435], North Vernon, IN
- (2) SEYMOUR 2 N [USC00127935], Seymour, IN
- (3) MILFORD [USC00335268], Milford, OH

Influencing water features

The hydro-geographic model classification for this site is Riverine: alluvial plain, stream terrace, floodplain, forested. This site has a Cowardin classification of PFO6An: it is a forested palustrine system that can be temporarily flooded/ponded on mineral soil.

Soil features

These soils are formed in alluvium. They are somewhat poorly drained to well drained with moderate to moderately rapid permeability. Series included in this group Algiers, Chagrin, Cuba, Eel, Genesee, Gessie, Hatfiled, Haymond, Jules, Lanier, Lobdell, Medway, Mondhaven, Newark, Oldenburg, Ross, Sciotoville, Steff, Stonelick, Wilbur, and Wirt. This group will be further refined during ESD development.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silt loam (3) Gravelly fine sandy loam
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderate to moderately rapid
Depth to restrictive layer	127–152 cm
Soil depth	152 cm
Surface fragment cover <=3"	0–5%
Surface fragment cover >3"	0–1%
Available water capacity (Depth not specified)	13.97–19.05 cm
Calcium carbonate equivalent (Depth not specified)	0–17%
Soil reaction (1:1 water) (Depth not specified)	5–7.9
Subsurface fragment volume <=3" (Depth not specified)	0–15%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

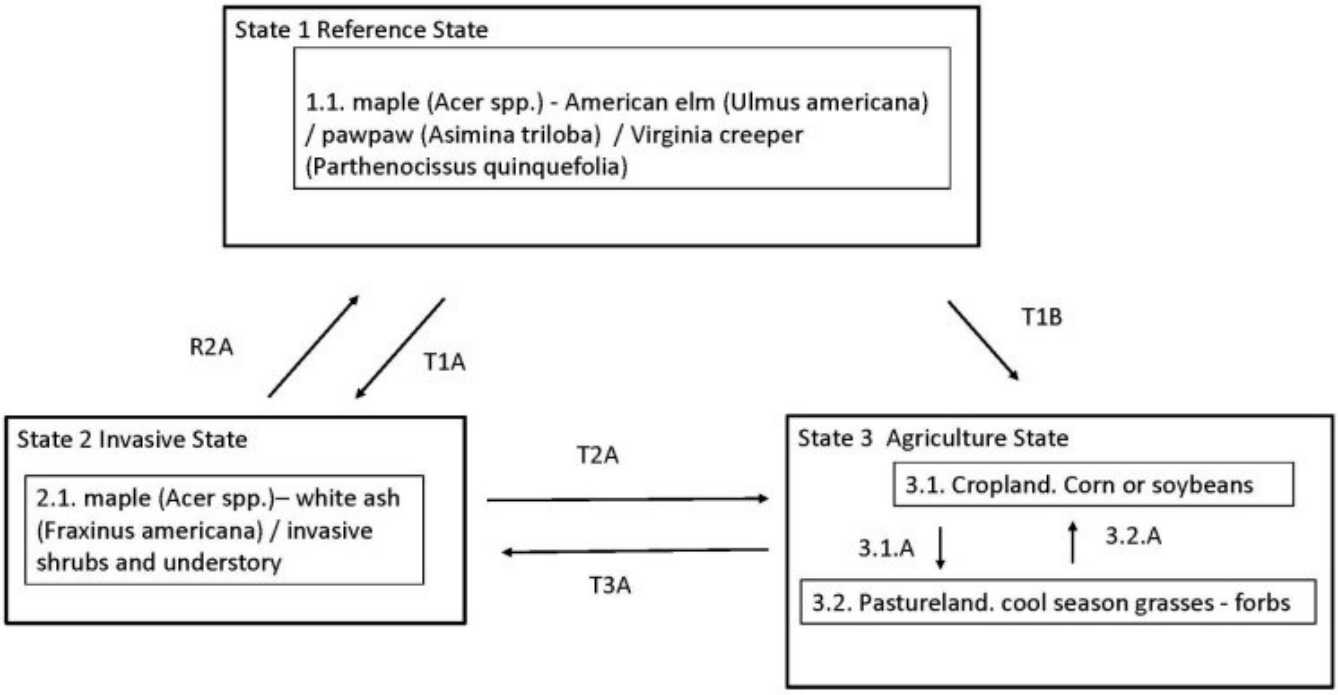
High-quality, mature sites will have a closed, deciduous tree canopy inclusive of many species but often with few dominants. Typical constants include a mix of wet-tolerant and upland species as this area is a transition zone between the lowest floodplain and upland sites. Historically American elm was a dominant species; however, due to disease, this is no longer the case. Common species include sugar maple (*Acer saccharum*), black walnut (*Juglans nigra*), bitternut hickory (*Carya cordiformis*), mockernut hickory (*Carya tomentosa*), hackberry (*Celtis occidentalis*), white ash (*Fraxinus americana*), basswood (*Tilia americana*), American elm (*Ulmus americana*), boxelder (*Acer negundo*), red maple (*Acer rubrum*), and green ash (*Fraxinus pennsylvanica*). Northern red oak (*Quercus rubra*) or bur oak (*Quercus macrocarpa*) may be present in better drained areas with little flooding.

Shrubs, subcanopy trees, and vine species include *Carpinus caroliniana*, *Hamamelis virginiana*, *Lindera benzoin*, *Parthenocissus quinquefolia*, and *Toxicodendron radicans*.
Shrub species will vary from site to site depending on microtopography and flooding/ponding regimes.

Understory variability of species and composition will vary considerably as a result of the mosaic of moisture conditions as controlled by site topography and seasonal flooding. Most sites will display an array of herbaceous and graminoid species. Common understory plants include Canadian woodnettle (*Laportea canadensis*), stinging nettle (*Urtica dioica*), sedges (Carex spp.), spikerush (Eleocharis spp.), Virginia dayflower (*Commelina virginica*), and numerous other mesic herbs. Common vines on these sites include grape (Vitis spp.), greenbrier (Smilax spp.) poison ivy (*Toxicodendron radicans*) and trumpet creeper (*Campsis radicans*).

Much of the historic acres for this ecosite have been transitioned to agriculture with the bulk of those acres being in corn and soybean rotations. Restoration of these sites to a reference community condition would require many years of timber stand improvement activities, especially planting of desired trees, thinning, brush control, and control of non-native vegetation. Any previous hydrological modifications would have to be removed (tiling, ditching) to restore the natural available water capacity.

State and transition model



State 1
Reference State

This floodplain forest community is found on well drained alluvium. The closed, deciduous canopy is a mix of species and many communities may have multiple co-dominants. Historically, American elm was dominant, but this is no longer the case due to disease. Other species include sugar maple, ash, northern red oak, bur oak, black walnut, bitternut hickory, mockernut hickory, basswood and wild black cherry. Numerous understory species may be found on these sites.

Dominant plant species

- American elm (*Ulmus americana*), tree
- sugar maple (*Acer saccharum*), tree
- oak (*Quercus*), tree
- ash (*Fraxinus*), tree
- pawpaw (*Asimina triloba*), shrub
- dogwood (*Cornus*), shrub
- Virginia creeper (*Parthenocissus quinquefolia*), other herbaceous

Community 1.1
Reference Community

This community is a mature mixed hardwood forest with numerous canopy species and a diverse community. Many native herbs, vines, and shrubs may be present and community composition will vary depending on microtopography and flooding regimes.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- northern red oak (*Quercus rubra*), tree
- mockernut hickory (*Carya tomentosa*), tree
- white ash (*Fraxinus americana*), tree
- pawpaw (*Asimina triloba*), shrub
- northern spicebush (*Lindera benzoin*), shrub
- Virginia creeper (*Parthenocissus quinquefolia*), other herbaceous
- eastern poison ivy (*Toxicodendron radicans*), other herbaceous

State 2
Disturbed -Invaded State

This state reflects the disturbance of the site and the subsequent invasion of non-native species. Many of the remaining wooded sites are in a transition from native to non-native species. High-quality trees are often been removed and the sites are ruderal and successional. The increase in non-native vegetation will fundamentally alter the natural community structure and impact tree reproduction. Bush honeysuckle, garlic mustard, Japanese stiltgrass, and stinging nettle are common understory invasives.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- white ash (*Fraxinus americana*), tree
- Amur honeysuckle (*Lonicera maackii*), shrub
- western burning bush (*Euonymus occidentalis*), shrub
- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous
- Japanese honeysuckle (*Lonicera japonica*), other herbaceous
- winter creeper (*Euonymus fortunei*), other herbaceous

Community 2.1
Disturbed -Invaded Community

A current ecological threat to these sites is invasive, non-native species. Selective harvest, clear cut, and unmanaged grazing often allows non-native plants to rapidly invade. These invasive species persist in the understory as a component and then rapidly dominate especially with an opening in the canopy. With no control measures, these plants will eventually dominate the entire understory of the site. After invasion, the initial canopy level species remain, relatively, unchanged. However, regeneration of oaks are greatly reduced.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- ash (*Fraxinus*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub
- sedge (*Carex*), grass
- Nepalese browntop (*Microstegium vimineum*), grass
- garlic mustard (*Alliaria petiolata*), other herbaceous
- Japanese honeysuckle (*Lonicera japonica*), other herbaceous
- winter creeper (*Euonymus fortunei*), 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. A smaller percentage of the acres are used for forage and pasture.

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*), other herbaceous

Community 3.1
Row crop

Many of these sites are being utilized to grow row crops. A corn-soybean rotation is most common. Other small grains and specialty crops can be grown on these sites. Management, and therefore, plant species, will vary according to landowner goals and objectives.

Dominant plant species

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

Community 3.2
Pastureland Community

A wide variety of cool-season or warm-season grasses and forbs/herbs can be grown on these sites. Species and management activities will depend on the goals and objectives of the landowner.

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 3.1A
Community 3.1 to 3.2

Management inputs are applied to move the community from cropland to pastureland. Site preparation, seeding, and weed control are common practices.

Pathway 3.2A
Community 3.2 to 3.1

Management inputs are applied to move the community from pastureland to cropland. Site preparation, seeding, and weed control are common practices.

Transition T1A
State 1 to 2

The establishment of an invasive species without management to remove or control it will transition the site to the Invaded State.

Transition T1B
State 1 to 3

Removal of the trees and, in some cases, the installation of a drainage system are the first steps in converting the site to an agricultural state. Practices will depend upon the goals and objectives of the landowner.

Restoration pathway R2A
State 2 to 1

Restoration of a reference community state will require significant management inputs including planting desired species, brush control, weed control, timber stand improvement (thinning/selection), and restoration of the natural hydrology (if modified).

Transition T2A
State 2 to 3

Removal of the trees/brush and, in some cases, the installation of a drainage system are the first steps in converting the site to an agricultural state. Practices will depend upon the goals, objectives, and budget of the landowner. Prior to any clearing, landowners should understand the possible implications of federal wetland laws and obtain professional assistance if needed.

Transition T3A
State 3 to 2

Abandonment of the property will result in a series of successional plant communities likely consisting of both native and non-native species. Community composition will depend upon the type and length of disturbance and the seed sources that 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

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Approval

Greg Schmidt, 9/26/2024

Acknowledgments

PES documents developed for adjacent MLRAs in Indiana and Ohio served as a source of information as these MLRAs often shared similar soil series with MLRA 114A. NRCS county soil surveys where a valuable reference including tree species observed on site by NRCS staff. Soil Survey and NRCS Indiana resource soil scientists contributed field observation, field notes, and extensive soil mapping expertise.

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	05/12/2025
Approved by	Greg Schmidt
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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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):**

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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:**
