

## **Ecological site F121XY014KY**

### **Poorly Drained & Very Poorly Drained Terrace Lakebed**

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#### **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): 121X–Kentucky Bluegrass

General: MLRA 121 is in Kentucky (83 percent), southern Ohio (11 percent), and southern Indiana (6 percent). It makes up about 10,680 square miles (27,670 square kilometers). The cities of Cincinnati, Ohio, and Louisville, Frankfort, and Lexington, Kentucky, are in this area.

Physiography: This area is primarily in the Lexington Plain Section of the Interior Low Plateaus Province of the Interior Plains.

Soils: The dominant soil orders in MLRA 121 are Alfisols, Inceptisols, and Mollisols. The soils in the area dominantly have a mesic soil temperature regime, an udic soil moisture regime, and mixed mineralogy. They are shallow to very deep, generally well-drained, and loamy or clayey. Hapludalfs formed in residuum on hills and ridges (Beasley, Cynthiana, Eden, Faywood, Lowell, and McAfee series) and in loess over residuum on hills and ridges (Carmel and Shelbyville series). Paleudalfs (Crider and Maury series) formed in loess or other silty sediments over residuum on hills and ridges. Fragiudalfs (Nicholson series) formed in loess over residuum on ridges. Hapludolls formed in residuum on hills and ridges (Fairmount series) and in alluvium on floodplains (Huntington series). Eutrudepts (Nolin series) formed in alluvium on flood plains.

Geology: Most of this area has an Ordovician-age limestone that has been brought to the surface in the Jessamine Dome, a high part of a much larger structure called the Cincinnati Arch. The strata of limestone have a propensity to form caves and karst topography. Younger units of thin-bedded shale, siltstone, and limestone occur at the eastern and western edges of the area.

The area has no coal-bearing units. Pleistocene-age loess deposits cover most of the bedrock units in this MLRA, and some glacial lake sediments are at the surface in the northwest corner of the area. Unconsolidated alluvium is deposited in the river valleys.

#### **Classification relationships**

Wet bottomland forest (Kentucky State Nature Preserves Commission)

#### **Ecological site concept**

This site is characterized by poorly drained/very poorly drained soils generally located on terrace lakebeds. The natural vegetation of these sites will vary in relationship to the setting, patterns of drainage, disturbances, and previous vegetation communities.

State 1. (Reference), Phase 1.1:

*Acer saccharinum*- *Populus deltoides* / *Forestiera acuminata*- *Cephalanthus occidentalis* / *Bidens* spp. – *Carex* spp.  
(Silver maple – cottonwood / eastern swamp privet – buttonbush / beggartick – sedges)

These locations are characterized by poorly drained and very poorly drained soils. Most of these sites in MLRA 121 are tiled or drained and utilized as cropland, pasture, urban, or low-quality successional woodlands; therefore, the exact characteristics of a true historic reference community is difficult to accurately define.

State: 2. Pasture

State 2, Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

State: 3 – Transitional (Abandoned) Field

State 3, Phases 3.1: *Acer* spp. - *Populus deltoides* / *Schedonorus arundinaceus*

Narrative: Tree species regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, adjacent plant communities and seed sources, post-disturbance management inputs, presence or absence of continued site disturbances (grazing), slope, and aspect. Silver maple, red maple, cottonwood, and sycamore seedlings would likely be common on many wet sites.

State: 4. Old Cropfield Pioneer Woodland

State 4, Phase 4.1: Plant species dominants: henbit deadnettle (*Lamium amplexicaule*)- mouse-eared chickweed (*Cerastium* L.)

State: 5. Cropland

Phase 5.1: Plant species dominants: *Zea* spp. – *Glycine* spp.

Plants on these sites will be dependent upon seeding and management. Most common crops are corn and soybeans. Due to the drainage issues on these soil, many have been tiled extensively to facilitate crop production.

**Table 1. Dominant plant species**

Tree	(1) <i>Acer saccharinum</i> (2) <i>Populus deltoides</i>
Shrub	(1) <i>Forestiera acuminata</i> (2) <i>Cephalanthus occidentalis</i>
Herbaceous	(1) <i>Bidens</i> (2) <i>Carex</i>

## Physiographic features

The Zipp series consists of very deep, poorly drained or very poorly drained soils on lake plains, lacustrine terraces and flood-plain steps. They formed in fine-textured lacustrine or slackwater sediments. Most areas are drained and used for growing cultivated crops and hay and pasture.

**Table 2. Representative physiographic features**

Landforms	(1) Lake plain (2) Terrace (3) Flood-plain step
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding duration	Brief (2 to 7 days)
Ponding frequency	None to occasional
Elevation	131–293 m
Slope	0–2%
Ponding depth	0–76 cm
Water table depth	0 cm

Aspect	Aspect is not a significant factor
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### Climatic features

These ecological sites are located in MLRA 121 and are at the northern periphery of the humid subtropical climate zone. Generally characterized by hot, humid summers and cold winter, the area has four distinct seasons. The expected annual precipitation for sites included in this ecological site description is generally in the range of 40 to 50 inches. The majority of precipitations falls during the freeze-free months, and thunderstorms with heavy rainfall are common during the spring and summer months. The freeze-free period varies somewhat based on localized topography and longitude.

MLRA climate summary: The average annual precipitation in most of this area is 41 to 45 inches. It is 45 to 52 inches along the southern edge of the area. About one-half of the precipitation falls during the growing season. Most of the rainfall occurs as high-intensity, convective thunderstorms. The annual snowfall averages about 14 inches (370 millimeters). The average annual temperature is 51 to 57 degrees F (10 to 14 degrees C). From: Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin (U.S. Department of Agriculture Handbook 296, 2006)

Table 3. Representative climatic features

Frost-free period (average)	179 days
Freeze-free period (average)	199 days
Precipitation total (average)	1,194 mm

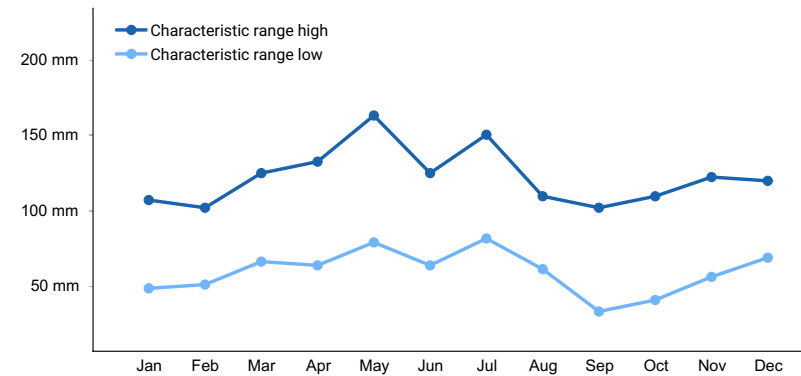


Figure 1. Monthly precipitation range

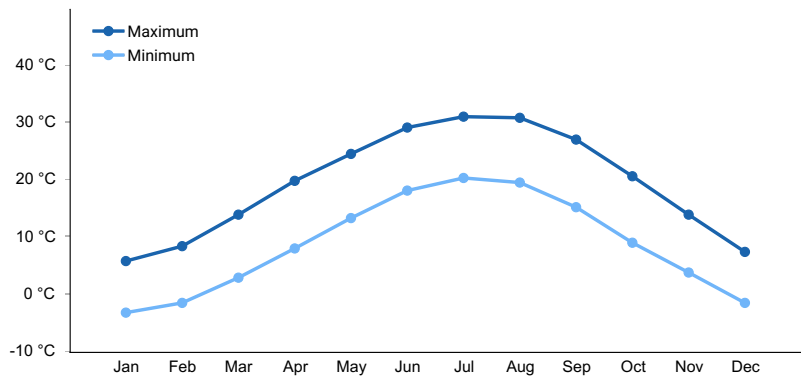
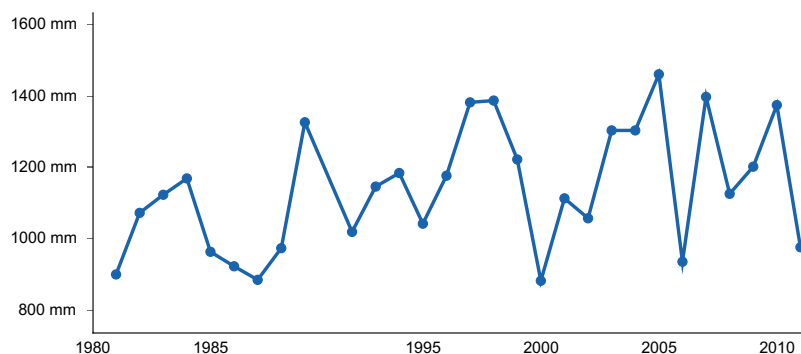


Figure 2. Monthly average minimum and maximum temperature



**Figure 3. Annual precipitation pattern**

### Climate stations used

- (1) LEXINGTON BLUEGRASS AP [USW00093820], Lexington, KY
- (2) LOUISVILLE INTL AP [USW00093821], Louisville, KY

### Influencing water features

These soils are very poorly drained to poorly drained and influenced by a water table that is within 12" of the surface.

### Soil features

This group consists of poorly drained and very poorly drained terrace lakebeds.

Currently, mapunits of Zipp make up this group.

**Table 4. Representative soil features**

Surface texture	(1) Sandy clay loam (2) Silty clay
Family particle size	(1) Clayey
Permeability class	Moderate
Soil depth	152–216 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.45–13.46 cm
Calcium carbonate equivalent (0-101.6cm)	0–8%
Soil reaction (1:1 water) (0-101.6cm)	6.5–7.9
Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

### Ecological dynamics

Ecological Dynamics

Individual sites deserve a detailed understanding before conservation and restoration practices are implemented;

therefore, it should be noted that the communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been field verified. This PES describes hypotheses based on available data of many different scales and sources and has not been developed utilizing site-specific ecological field monitoring. This PES also does not encompass the entire complexity or diversity of these sites. Field studies would be required to develop a comprehensive and science-based native plant restoration plan for these sites.

This site is characterized by poorly drained/very poorly drained soils generally located on terrace lakebeds. The natural vegetation of these sites will vary in relationship to the setting, patterns of drainage, disturbances, and previous vegetation communities.

State 1. (Reference), Phase 1.1:

*Acer saccharinum*- *Populus deltoides* /*Forestiera acuminata*- *Cephalanthus occidentalis* /*Bidens* spp. – *Carex* spp.  
(Silver maple – cottonwood / eastern swamp privet – buttonbush / beggartick – sedges)

These locations are characterized by poorly drained and very poorly drained soils. Most of these sites in MLRA 121 are tilled or drained and utilized as cropland, pasture, urban, or low-quality successional woodlands; therefore, the exact characteristics of a true historic reference community is difficult to accurately define. Field studies would be required to develop a restoration plan for conservation purposes.

Wooded sites would likely include silver maple, red maple, cottonwood, sycamore and other deciduous trees. Understory plants commonly found in MLRA 121 which prefer higher levels of available water (Facultative Wetland or FACW) include:

*Apois americana* (groundnut)  
*Arisaema dracontium* (green dragon)  
*Arundinaria gigantea* (giant cane)  
*Arisaema triphyllum* (Jack in the pulpit)  
*Bidens aristosa* (bearded beggarticks)  
*Bidens frondosa* (devils' beggartick)  
*Bidens tripartita* (threelobe beggartick)  
*Boehmeria cylindrica* (smallspike false nettle)  
*Carex annectens* (yellowfruit sedge)  
*Carex conjuncta* (soft fox sedge)  
*Carex cristatella* (crested sedge)  
*Carex squarrosa* (squarrosa sedge)  
*Carex tribuloides* (blunt broom sedge)  
*Celtis laevigata* (sugarberry)  
*Chaerophyllum procumbens* (spreading chervil)  
*Chamaesyce serpens* (matted sandmat)  
*Chaerophyllum tainturieri* (hairy chervil)  
*Cinna arundinacea* (sweet woodreed)  
*Cornus amomum* (silky dogwood)  
*Commelina diffusa* (climbing dayflower)  
*Cornus sericea* subsp. *sericea* (red osier dogwood)  
*Cyperus bipartitus* (slender flatsedge)  
*Platanus occidentalis* (sycamore)  
*Pilea pumila* (Canadian clearweed)  
*Osmunda cinnamomea* (cinnamon fern) Knobs region  
*Physocarpus opulifolius* (common ninebark)  
*Lobelia puberula* (downy lobelia) Knobs region  
*Panicum dichotomiflorum* (fall panic grass)  
*Lobelia siphilitica* (great blue lobelia)  
*Ranunculus abortivus* (littleleaf buttercup)  
*Onoclea sensibilis* (sensitive fern)  
*Mertensia virginica* (Virginia bluebells)  
*Poa sylvestris* (woodland bluegrass)

State: 2. Pasture

State 2, Phase 2.1: Managed Pasture. Plant species dominants: *Schedonorus arundinaceus* (tall fescue)

Tall fescue is the most common pasture grass in the central Kentucky area and is a cool-season perennial grass with very good tolerance to a wide range of conditions. There are many varieties, and all perform best on good, moist soils that are heavy to medium in texture; however, fescue is also able to form dense sods on poorly drained soils where few other cool-season grasses survive. As with all sites, soil characteristics and management will influence production levels.

Transitioning this state to a reference condition would require timber stand improvement practices.

State: 3 – Transitional (Abandoned) Field

State 3, Phases 3.1: *Acer* spp. - *Populus deltoides* / *Schedonorus arundinaceus*

Narrative: Tree species regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, adjacent plant communities and seed sources, post-disturbance management inputs, presence or absence of continued site disturbances (grazing), slope, and aspect. Silver maple, red maple, cottonwood, and sycamore seedlings would likely be common on many wet sites.

State: 4. Old Cropfield Pioneer Woodland

State 4, Phase 4.1: Plant species dominants: henbit deadnettle (*Lamium amplexicaule*)- mouse-eared chickweed (*Cerastium* L.)

Narrative: This State is characterized by plant species considered weeds – predominately non-native, undesirable annual and perennial plants that quickly invade an abandoned cropfield. Species composition will depend on length of abandonment, previous and ongoing disturbances, and adjacent seed sources.

Common non-native species on abandoned croplands include: Lambsquarters (*Chenopodium album*), Hedge Bindweed (*Calystegia sepium*), Common Ragweed (*Ambrosia artemisiifolia*), Redroot Pigweed (*Amaranthus retroflexus*), Green Pigweed (*Amaranthus powellii*), Shepherd's-Purse (*Capsella bursa-pastoris*), redtop (*Agrostis gigantea* Roth), hairy beggarticks (*Bidens pilosa*), creeping jenny (*Lysimachia nummularia*), barnyard grass (*Echinochloa crus-galli*), chickweed (*Myosoton aquaticum*), narrowleaf plantain (*Plantago lanceolata*), knotweed (*Polygonum* spp.), buttercups (*Ranunculus* spp.), docks (*Rumex* spp.), nettle (*Urtica dioica*), creeping yellowcress (*Rorippa sylvestris*), meadow foxtail (*Alopecurus pratensis*), yellow nutsedge (*Cyperus esculentus*), poison hemlock (*Conium maculatum*), Johnson grass (*Sorghum halepense*), creeping Charlie (*Glechoma hederacea*), various thistles (*Cirsium* spp.), sowthistles (*Sonchus* spp.),

Transitioning this state to a reference condition would require long-term timber stand improvement practices to control non-native vegetation and manage for desired species.

State: 5. Cropland

State 5, Phase 5.1: Plant species dominants: *Zea* spp. – *Glycine* spp.

Plants on these sites will be dependent upon seeding and management. Most common crops are corn and soybeans. Due to the drainage issues on these soil, many have been tiled extensively to facilitate crop production.

Narrative: This state can be transitioned to any of the other states with sufficient management inputs: forest restoration and timber stand management, pasture plantings, long-term weed control, etc. Transitioning this state to a reference condition will require extensive timber stand improvement practices to control non-native vegetation and manage for desired species.

## State and transition model

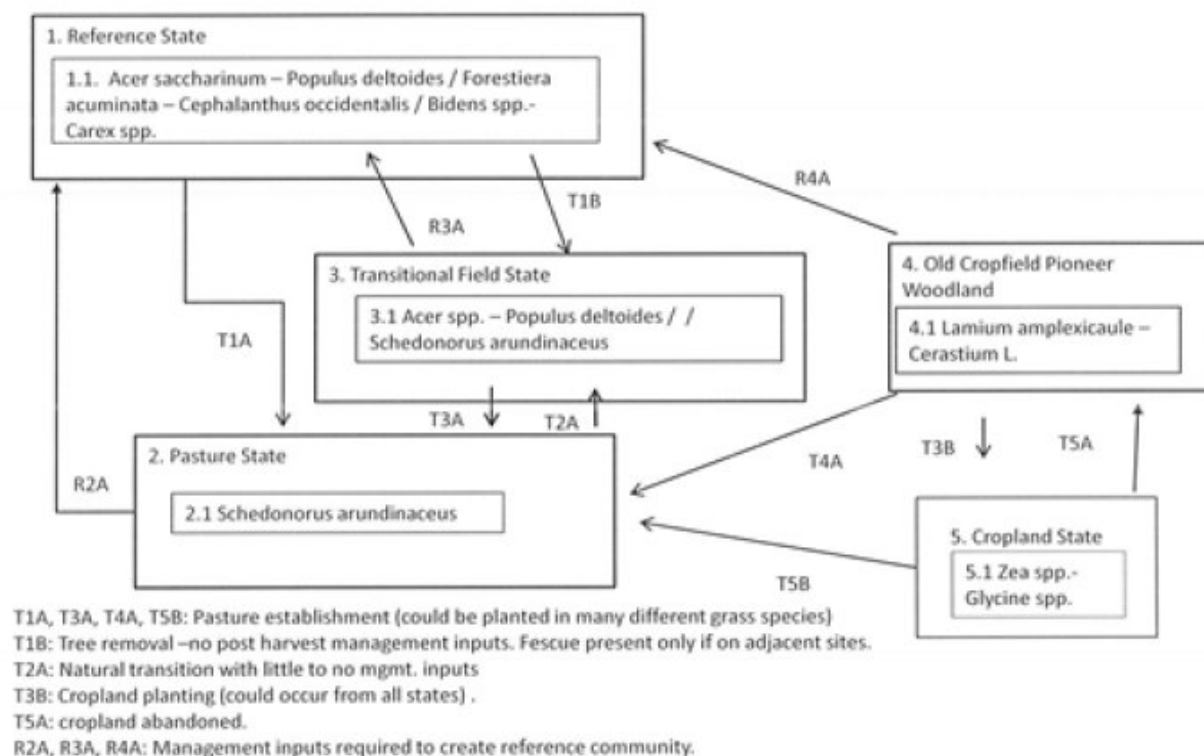


Figure 5. MLRA 121, Group 14

## 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	
Approved by	
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):**



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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:**

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