

# Ecological site F121XY033KY

## Well Drained & Moderately Well Drained Floodplain

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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

Scientific Name: South-Central Interior Mesophytic Forest Unique Identifier: CES202.887

Deep Soil Mesophytic Forest (Kentucky State Nature Preserves Commission)

### Ecological site concept

State 1. (Reference): Provisional Ecological Site (PES)F121XY033KY

State 1, Phase 1.1: Plant species dominants:

Quercus spp. – Acer spp. /Lindera benzoin/Podophyllum peltatum-Asarum canadense (oak – maple / spicebush/ mayapple-wild ginger).

Narrative: These sites are found on well drained and moderately well drained floodplains with deep soils. Most of these sites in MLRA 121 are utilized as cropland or pasture; however the reference community would be a hardwood deciduous forest.

Reference sites would likely include a mix of *Quercus* spp. (oaks), *Acer saccharum* (sugar maple), *Acer rubrum* (red maple), *Fraxinus* spp. (ash), *Juglans nigra* (black walnut), *Ulmus Americana* (American elm) and *Carya* species (hickories). Tree species vary depending on site conditions, disturbances, and micro-topography. Other tree species may include: Without disturbances, a rich herb and forb layer would be present including an array of spring wildflowers.

**State: 2. Pasture**

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

State 2, Phase 2.2: Minimally Managed Pasture. Plant species dominants: *Rosa multiflora*- *Rubus* spp. /*Schedonorus arundinaceus*

State 2, Phase 2.3: Warm-season Pasture. Plant species dominants depend on landowner objectives and site characteristics, but may include: switchgrass (*Panicum virgatum*), little bluestem (*Andropogon scoparius*), indianagrass (*Sorghastrum nutans*), big bluestem (*Andropogon gerardii*), and eastern gamagrass (*Tripsacum dactyloides*).

**State: 3 – Transitional Field**

State 3, Phases 3.1: Plant species dominants:

*Juniperus virginiana* / *Rosa multiflora*/ *Vernonia gigantea* -*Schedonorus arundinaceus*.  
(Eastern red cedar / multiflora rose/ ironweed-tall fescue)

**State: 4. Cropland**

State 4, Phase 4.1: Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

**Table 1. Dominant plant species**

|            |   |
|------------|---|
| Tree       | (1) <i>Quercus rubra</i><br>(2) <i>Juglans nigra</i>    |
| Shrub      | (1) <i>Asimina triloba</i>                              |
| Herbaceous | (1) <i>Podophyllum peltatum</i><br>(2) <i>Agrimonia</i> |

**Physiographic features**

Soils in this group are in floodplains but are well drained or moderately well drained. flooding and ponding regimes vary, so future field work may result in multiple ESDs being developed from this initial grouping.

Mapunits in this project include common MLRA 121 soils such as Boonesboro, Huntington, Lindside, Nolin and Sensabaugh.

**Table 2. Representative physiographic features**

|                    |   |
|--------------------|---|
| Landforms          | (1) Flood plain   |
| Flooding duration  | Extremely brief (0.1 to 4 hours) to brief (2 to 7 days) |
| Flooding frequency | Occasional to frequent                                  |
| Elevation          | 131–244 m   |
| Slope              | 0–4%  |
| Ponding depth      | 0 cm  |
| Water table depth  | 152 cm  |

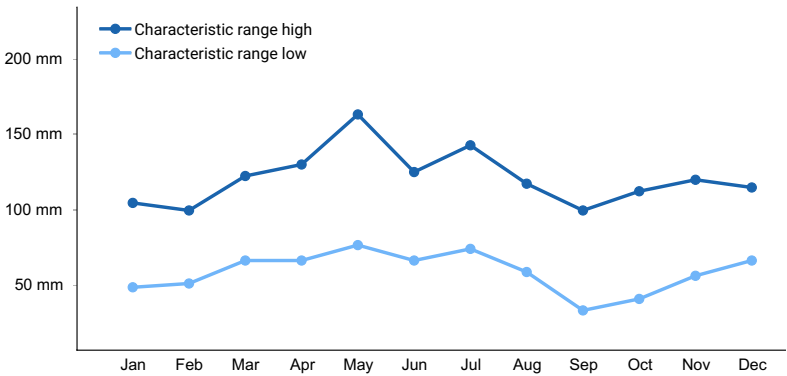
|        |                                    |
|--------|------------------------------------|
| Aspect | Aspect is not a significant factor |
|--------|------------------------------------|

### Climatic features

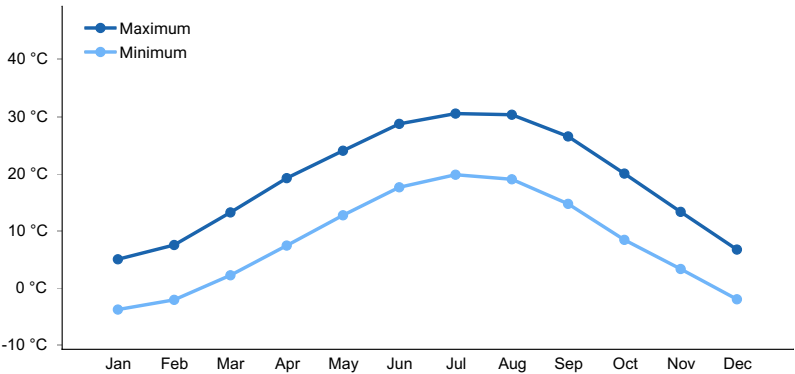
MLRA climate summary: The average annual precipitation in most of this area is 41 to 45 inches. It is 45 to 52 inches along the southern edge of the area. About one-half of the precipitation falls during the growing season. Most of the rainfall occurs as high-intensity, convective thunderstorms. The 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**

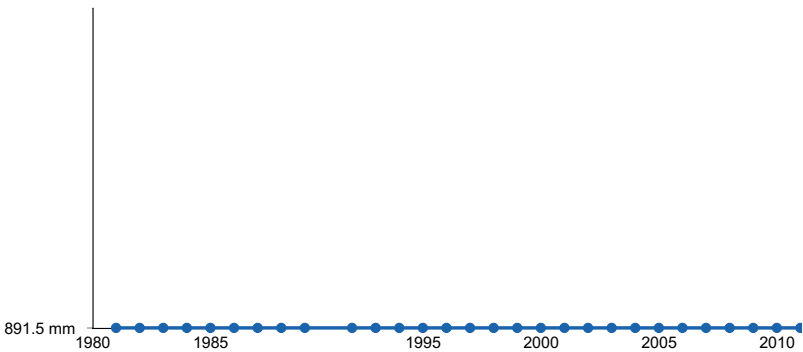
|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 179 days |
| Freeze-free period (average)  | 201 days |
| Precipitation total (average) | 1,168 mm |



**Figure 1. Monthly precipitation range**



**Figure 2. Monthly average minimum and maximum temperature**



**Figure 3. Annual precipitation pattern**

## Climate stations used

- (1) LOUISVILLE INTL AP [USW00093821], Louisville, KY
- (2) CINCINNATI NORTHERN KY AP [USW00093814], Burlington, KY
- (3) LEXINGTON BLUEGRASS AP [USW00093820], Lexington, KY

## Influencing water features

These sites are located near or adjacent to streams and rivers within MLRA 121.

## Soil features

This group are well drained & moderately well drained soils in floodplains.

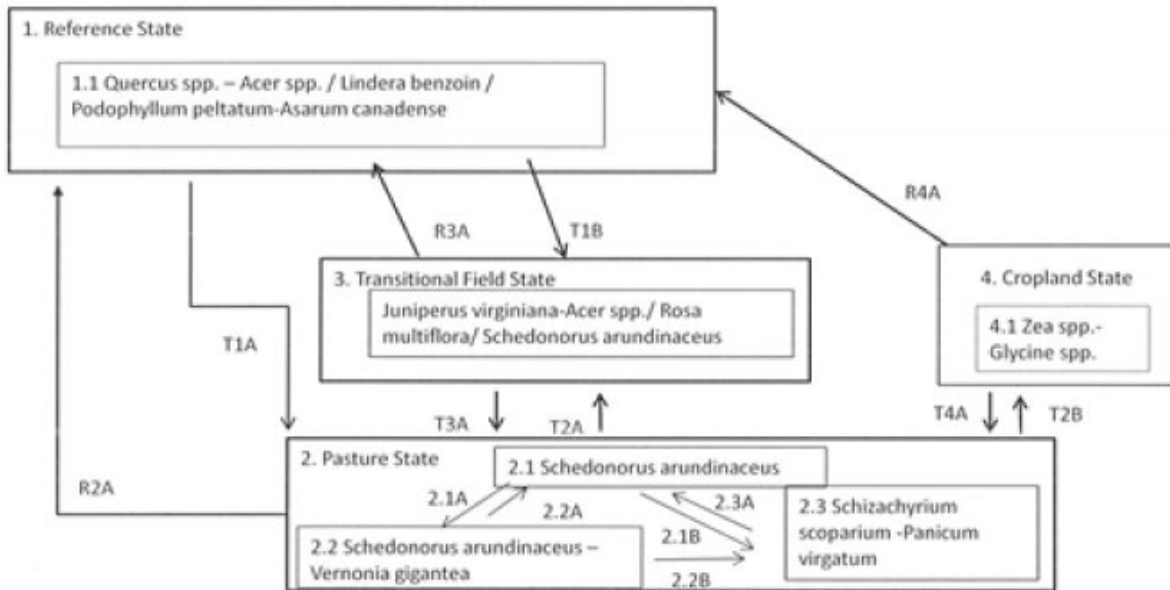
Table 4. Representative soil features

|   |                                      |
|---|--------------------------------------|
| Surface texture   | (1) Silt loam<br>(2) Silty clay loam |
| Family particle size                                    | (1) Loamy                            |
| Drainage class  | Well drained                         |
| Permeability class                                      | Moderate to moderately rapid         |
| Soil depth  | 102–203 cm                           |
| Surface fragment cover ≤3"                              | 0%                                   |
| Surface fragment cover >3"                              | 0%                                   |
| Calcium carbonate equivalent<br>(0-101.6cm)             | 0%                                   |
| Sodium adsorption ratio<br>(0-101.6cm)                  | 0                                    |
| Soil reaction (1:1 water)<br>(0-101.6cm)                | 7–7.3                                |
| Subsurface fragment volume ≤3"<br>(Depth not specified) | 0–20%                                |
| Subsurface fragment volume >3"<br>(Depth not specified) | 0–6%                                 |

## Ecological dynamics

## State and transition model

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T1A T3A, T4A: Pasture establishment.  
T1B: Logging or large scale disturbance.  
T2B: pasture to cropland  
2.1A: Reduction of management inputs.  
2.2A: Increased management inputs – mowing, weed control, etc.  
2.3A: Transition from warm season to cool season grasses.  
2.1B and 2.2B: Development of warm season grass pasture.  
R2A, R3A, R4A: Long-term and large scale management inputs required to restore reference community.

Figure 5. MLRA 121, Group 33

**Contributors**

Arends

**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:**

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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:**

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