

Ecological site F121XY018KY Moderately Well Drained Fragipan Terrace

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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

Interior Highlands Mesic Hardwood Forest. (Plant Communities of the Midwest).

Deep soil Mesophytic Forest (Kentucky State Nature Preserves Commission).

Calcareous Mesophytic Forest ((Kentucky State Nature Preserves Commission).

Ecological site concept

This group includes soils that are moderately well drained with a fragipan. These sites are generally found on terraces within MLRA 121. Sites included in this provisional grouping are on a number of differing aspects, slope shapes, profile positions and geomorphic components. Future field work is needed to refine this grouping into potentially multiple ESDs.

The majority of these sites in MLRA 121 are now pastureland, cropland, urban development or poor-quality stands of highly disturbed hardwoods.

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

State 1, Phase 1.1: Plant species dominants:

Quercus alba-*Liriodendron tulipifera*/*Sanicula odorata*-*Agrimonia*

(white oak – tulip poplar // common black snakeroot – agrimony)

Narrative: These sites are found on moderately well drained terraces with fragipans. These sites are now mostly agricultural but historically were likely dominated by a tall and closed tree canopy, a well-developed shrub layer and a diverse understory. Some sites may be subject to short-duration flooding.

Common tree species may include: *Acer saccharum* (sugar maple), *Fagus grandifolia* (beech), *Fraxinus* spp. (ash), *Juglans nigra* (black walnut), *Tilia americana*, and *Carya cordiformis* (bitternut hickory). Community composition will vary depending on site conditions, disturbances, and micro-topography. Other tree species may include: *Quercus* spp., *Carya laciniata*, *Acer nigrum*, *Acer negundo*, *Gymnocladus dioica*, *Ulmus americana*, *Liquidambar styraciflua*, *Aesculus glabra*, *Magnolia acuminata*, and *Nyssa sylvatica*. Shrub may include *Asimina triloba*, *Lindera benzoin* and *Arundinaria gigantea*.

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, Phases 3.1: Plant species dominants: *Juniperus virginiana*-*Liriodendron tulipifera*/ *Rubus* spp. - *Rosa multiflora*/ *Vernonia gigantea* -*Schedonorus arundinaceus*. (Eastern red cedar- tulip poplar/ berries-multiflora rose/ ironweed-tall fescue)

State 4, Phase 4.1: Plant species dominants: *Acer saccharum* –*Liriodendron tulipifera* /*Lonicera maackii*.

State 5, Phase 5.1: Plant species dominants: dependent upon seeding and management. Most common crops are corn and soybeans.

Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Liriodendron tulipifera</i>
Shrub	Not specified
Herbaceous	(1) <i>Sanicula</i> (2) <i>Agrimonia</i>

Physiographic features

Site: Moderately well drained terrace soils that have a fragipan located within MLRA 121.

Geology(NASIS data):

Parent Material Kind: Alluvium, Colluvium, Lacustrine deposits, Loess

Parent Material Origin: sedimentary rock, shale and siltstone

Landform: terrace

Landscape: valley

Soil mapunits included in this provisional ES include: Captina, Monongahela, Otwell, Otwood, Pekin, and Sciotoville

Future field work may determine that this grouping be modified or split into multiple ESDs.

Table 2. Representative physiographic features

Landforms	(1) Terrace
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding duration	Very brief (4 to 48 hours)
Ponding frequency	None to frequent
Elevation	125–381 m
Slope	0–12%
Ponding depth	0–38 cm
Water table depth	152 cm
Aspect	Aspect is not a significant factor

Climatic features

Influencing water features

These sites may incur extremely brief to brief episodes of flooding or ponding.

Soil features

Very deep, moderately well drained soils with a fragipan located on terraces in MLRA 121.

Table 3. Representative soil features

Surface texture	(1) Silt loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained
Permeability class	Slow to moderate
Soil depth	152 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	12.7–15.24 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	4.8–5.5

Subsurface fragment volume <=3" (Depth not specified)	0–10%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

State and transition model

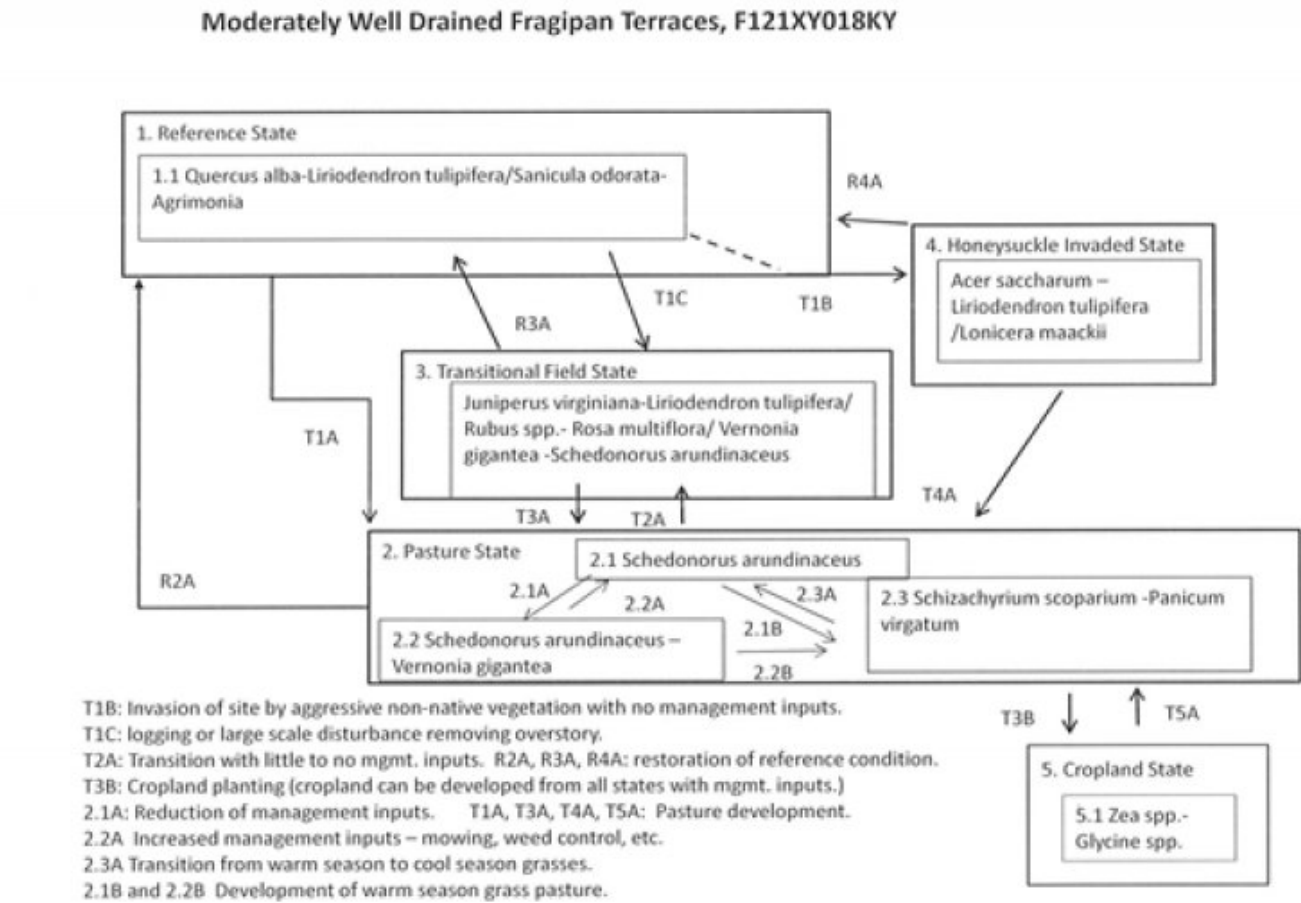


Figure 1. MLRA 121, Group 18

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)	
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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:**

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):**
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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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