

## **Ecological site F122XY014KY Loamy Alluvial Headwaters**

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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): 122X–Highland Rim and Pennyroyal

MLRA 122 is in Tennessee (47 percent), Kentucky (43 percent), Indiana (7 percent), and Alabama (3 percent). It makes up about 21,530 square miles (55,790 square kilometers).

#### **SOILS:**

Many of the soils in this MLRA are Udalfs. The moderately deep to very deep, well drained, clayey soils formed in limestone residuum. They are dominantly in rolling to steep areas of the “Outer Basin” (Mimosa, Braxton, Gladdice, and Hampshire series) and the undulating to hilly areas of the “Inner Basin” (Talbot and Bradyville series). The most agriculturally productive soils are the very deep, well drained, clayey or loamy soils that formed in alluvium and/or loess over alluvium or limestone residuum in nearly level to undulating areas (Armour, Cumberland, Harpeth, Lomond, and Maury series). The less extensive soils generally are moderately well drained to somewhat poorly drained and formed in loamy or clayey alluvium and/or residuum (Byler, Capshaw, Colbert, and Tupelo series). This MLRA has a significant acreage of Mollisols. Shallow or moderately deep, well drained, clayey Udolls (Ashwood and Barfield series) formed in limestone residuum dominantly in rolling to steep areas. Very shallow, well drained, clayey Rendolls (Gladeville series) formed in limestone residuum dominantly in undulating to rolling areas of the “Inner Basin.” Very deep, well drained or moderately well drained Udolls (Arrington, Egam, Lynnville, and Staser series) and somewhat poorly drained or poorly drained Aquolls (Agee, Godwin, and Lanton series) formed in loamy or clayey alluvium derived from limestone on flood plains. Most of the remaining soils on flood plains are moderately well drained or well drained Udepts (Lindell and Ocana series). Udupts are of small extent in this area. Most are very deep, well drained, and loamy and formed in gravelly colluvium or colluvium and the underlying residuum on steep hillsides (Dellrose soils). Rock outcrops are common on uplands.

#### **BIOLOGICAL RESOURCES:**

This area supports mixed oak forest vegetation. White oak, black oak, northern red oak, and some scarlet oak are the dominant tree species. Shagbark hickory, bitternut hickory, pignut hickory, and mockernut hickory also occur. Oak, blackgum, flowering dogwood, sassafras, Virginia pine, pitch pine, and shortleaf pine grow mostly on ridgetops.

(Excerpt from United States Department of Agriculture, Natural Resources Conservation Service. 2006. 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.)

### **Classification relationships**

Scientific Name: South-Central Interior Small Stream and Riparian  
Unique Identifier: CES202.706

Scientific Name: South-Central Interior Large Floodplain  
Unique Identifier: CES202.705

## Ecological site concept

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 does not encompass the entire complexity or diversity of these sites. Field studies would be required to develop a comprehensive and science-based restoration plan and for detailed conservation planning purposes.

State 1,

Phase 1.1: Forestland.

Plant species dominant: white oak (*Quercus alba*) – American beech (*Fagus grandifolia*) / common serviceberry (*Amelanchier arborea*) - spicebush (*Lindera benzoin*) / American strawberry bush (*Euonymus americanus*) - Christmas fern (*Polystichum acrostichoides*)

State 2, Phase 2.1: Pastureland.

Plant species dominant:

*Schedonorus arundinaceus* (tall fescue). Species present are dependent upon seeding and management.

State: 3. Phase 3.1: Transitional (Abandoned Field)

Plant species dominant: maple (*Acer* spp.) – tulip poplar (*Liriodendron tulipifera*) / berries (*Rubus* spp.) / fescue (*Schedonorus arundinaceus*)

This phase is best described as an old field habitat with a mixture of native and introduced grasses and a variety of native and non-native herbs, forbs, seedlings, and saplings.

State 4, Phase 4.1: Abandoned cropland

Plant species dominant: henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (*Cerastium* L.)

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

Restoration of states 2-5 to the reference community would require intensive management inputs. Transitioning pasture or cropland to a reference condition would require long-term timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

**Table 1. Dominant plant species**

|            |   |
|------------|---|
| Tree       | (1) <i>Quercus alba</i><br>(2) <i>Fagus grandifolia</i>                 |
| Shrub      | (1) <i>Amelanchier arborea</i><br>(2) <i>Lindera benzoin</i>            |
| Herbaceous | (1) <i>Euonymus americanus</i><br>(2) <i>Polystichum acrostichoides</i> |

## Physiographic features

These sites are located in headwaters of streams.

**Table 2. Representative physiographic features**

|                    |   |
|--------------------|---|
| Landforms          | (1) Alluvial fan<br>(2) Flood plain<br>(3) Flood-plain step |
| Flooding duration  | Very brief (4 to 48 hours) to brief (2 to 7 days)           |
| Flooding frequency | None to frequent  |

|                   |              |
|-------------------|--------------|
| Ponding frequency | None         |
| Elevation         | 350–1,000 ft |
| Slope             | 0–6%         |
| Water table depth | 30–80 in     |

## Climatic features

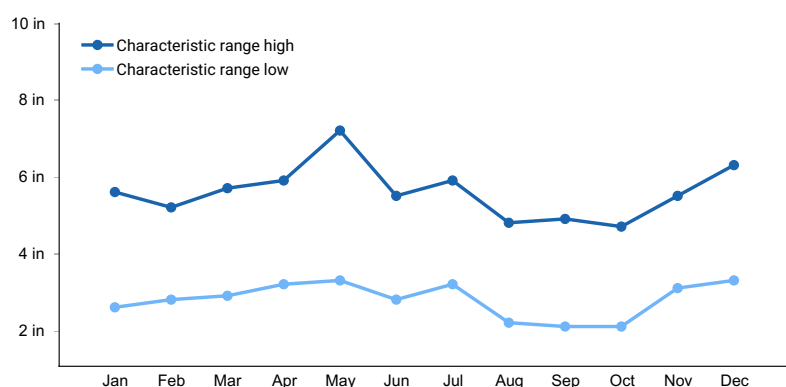
### Climate

The average annual precipitation in this area is 43 to 63 inches (1,090 to 1,600 millimeters), increasing to the south. The maximum precipitation occurs in winter and early in spring, and the minimum occurs in fall. Most of the rainfall occurs as high-intensity, convective thunderstorms. Snowfall may occur in winter. The average annual temperature is 52 to 60 degrees F (11 to 16 degrees C), increasing to the south. The freeze-free period averages 210 days and ranges from 185 to 235 days. The longer freeze-free periods occur in the more southerly parts of the area.

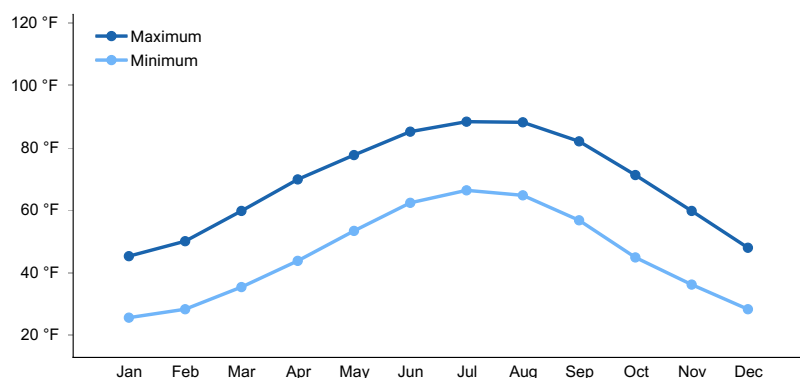
(Excerpt from United States Department of Agriculture, Natural Resources Conservation Service. 2006. Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture Handbook 296.)

**Table 3. Representative climatic features**

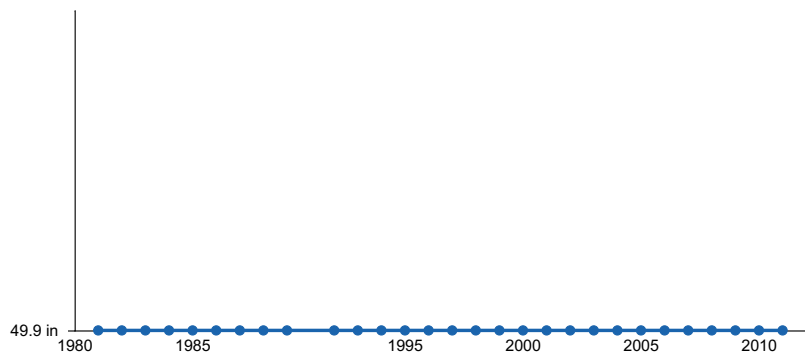
|                               |          |
|-------------------------------|----------|
| Frost-free period (average)   | 175 days |
| Freeze-free period (average)  | 197 days |
| Precipitation total (average) | 55 in    |



**Figure 1. Monthly precipitation range**



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



**Figure 3. Annual precipitation pattern**

## Climate stations used

- (1) GREENSBURG [USC00153430], Greensburg, KY
- (2) CLARKSVILLE WWTP [USC00401790], Clarksville, TN
- (3) SALEM [USC00127755], Salem, IN
- (4) WAYNESBORO [USC00409502], Waynesboro, TN
- (5) COOKEVILLE [USC00402009], Cookeville, TN

## Influencing water features

Mapunits in this group may be occasionally to frequently flooded for a short duration.

## Soil features

These soils are loamy, formed in alluvium, and generally well drained.

**Table 4. Representative soil features**

|  |   |
|--|---|
| Surface texture  | (1) Gravelly loam<br>(2) Silt loam<br>(3) Fine sandy loam |
| Family particle size                                     | (1) Loamy   |
| Drainage class   | Well drained to somewhat excessively drained              |
| Permeability class                                       | Moderate to moderately rapid                              |
| Soil depth   | 40–80 in  |
| Surface fragment cover <=3"                              | 0%  |
| Surface fragment cover >3"                               | 0%  |
| Available water capacity<br>(0-40in)                     | 5–7 in  |
| Calcium carbonate equivalent<br>(0-40in)                 | 0–1%  |
| Electrical conductivity<br>(0-40in)                      | 0 mmhos/cm  |
| Sodium adsorption ratio<br>(0-40in)                      | 0   |
| Soil reaction (1:1 water)<br>(0-40in)                    | 4.5–7   |
| Subsurface fragment volume <=3"<br>(Depth not specified) | 0–47%   |

|   |       |
|---|-------|
| Subsurface fragment volume >3"<br>(Depth not specified) | 0–10% |
|---|-------|

## Ecological dynamics

14-Loamy Alluvial Headwaters  
MLRA 122

Communities described in this provisional document reflect plant communities that are likely to be found on these soils and have not been extensively 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 does not encompass the entire complexity or diversity of these sites. Additional field studies are needed prior to restoration and/or detailed conservation planning.

Soil series and/or mapunits may be removed or added pending field inspections.

Forest Vegetation as listed in Official Soil Series Description:

Chagrin: Native vegetation is hardwood forest which consists chiefly of beech, hickory, sugar maple, ash, and sycamore.

Kintner: Native vegetation is mixed, deciduous hardwood forest.

Pope: Native vegetation is mixed, deciduous hardwood forests of mainly tulip poplar, white oak, river birch, sycamore, beech and hickory.

Sensabaugh: The native vegetation is mixed hardwood forest.

Skidmore: Native forests have oaks, yellow-poplar, sycamore, birch, beech, and hickory as the dominant species.

Depending on previous management and past and present disturbances, these sites will have a mix of oak-hardwood species. Trees on site as found in NASIS include white oak, northern red oak, sugar maple, tulip poplar, white ash, American beech, American elm, red maple, flowering dogwood, and pines.

Only two tree species can be selected for entry into the database as dominants; however, multiple tree species may be dominant on these sites and it will vary depending on aspect, soil depth, seed sources, management, and disturbance history.

State 1,

Phase 1.1: Forestland.

Plant species dominant: white oak (*Quercus alba*) – American beech (*Fagus grandifolia*) / common serviceberry (*Amelanchier arborea*) - spicebush (*Lindera benzoin*) / American strawberry bush (*Euonymus americanus*) - Christmas fern (*Polystichum acrostichoides*)

State 2, Phase 2.1: Pastureland.

Plant species dominant:

*Schedonorus arundinaceus* (tall fescue). Species present are dependent upon seeding and management.

Pasture plant species are dependent on seeding, weed control, concurrent land uses, on-going levels of disturbance, and landowner goals. Individual site and soil characteristics, along with management activities, will influence production levels.

Many species of grass, both warm and cool season, are available and suitable for these sites. Common forage species include tall fescue, orchard grass, Kentucky bluegrass, Johnson grass, timothy, and various species of clover.

Management of pasture sites should follow conservation planning standards and protocols which include watershed protection, soil health, and adequate forage species.

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

State: 3. Phase 3.1: Transitional (Abandoned Field)

Plant species dominant: maple (*Acer* spp.) – tulip poplar (*Liriodendron tulipifera*) / berries (*Rubus* spp.) / fescue (*Schedonorus arundinaceus*)

This phase is best described as an old field habitat with a mixture of native and introduced grasses and a variety of native and non-native herbs, forbs, seedlings, and saplings. 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.

State 4, Phase 4.1: Abandoned cropland

Plant species dominant: henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (*Cerastium* L.)

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

Restoration of states 2-5 to the reference community would require intensive management inputs. Transitioning pasture or cropland to a reference condition would require long-term timber stand improvement practices to control non-native vegetation and manage for desired hardwood species.

## State and transition model

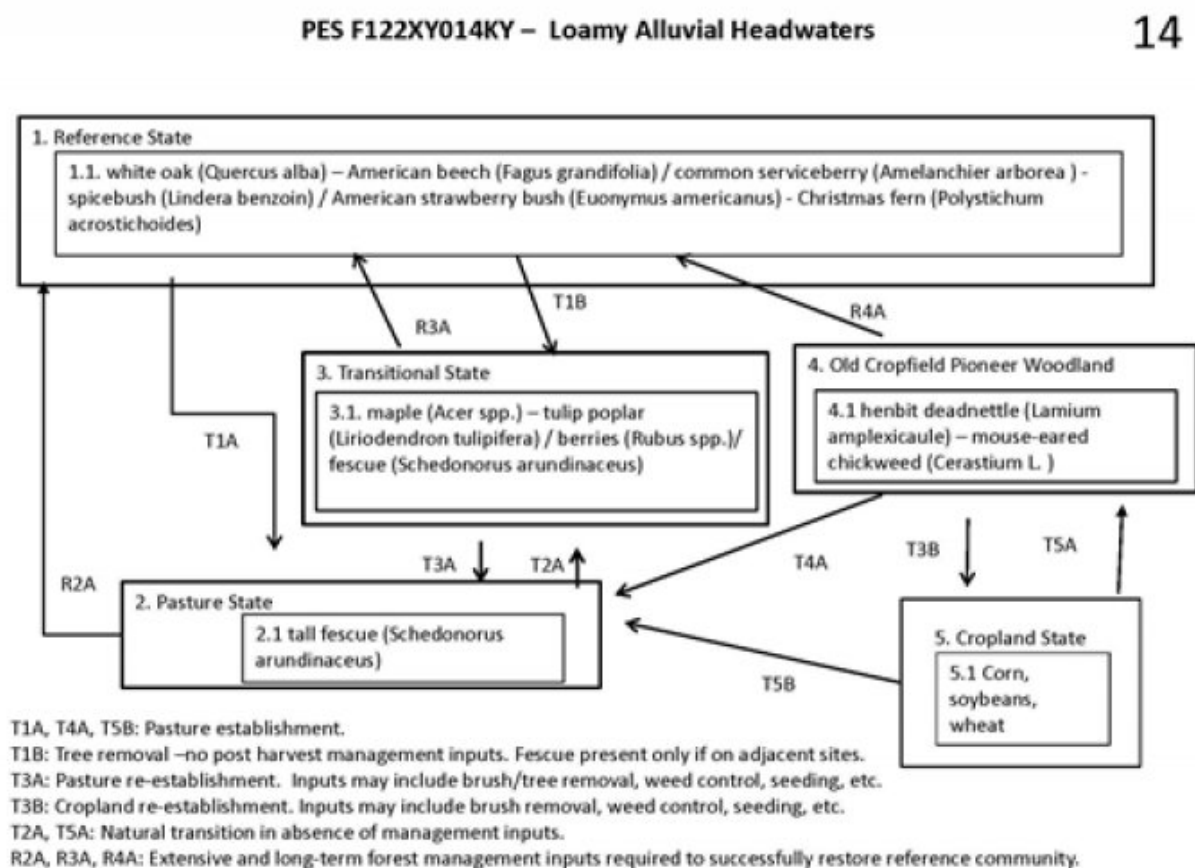


Figure 5. Group14

## 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):**

- 
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):**

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

- 
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:**

- 
17. **Perennial plant reproductive capability:**
-