USDA Natural Resources Conservation Service

Ecological site F122XY018KY
Poorly Drained Alluvium

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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” (Talbott 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). Udults 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

POSSIBLE Associations:
Quercus michauxii - Quercus shumardii - Liquidambar styraciflua / *Arundinaria gigantea* Forest
Translated Name: Swamp Chestnut Oak - Shumard Oak - Sweetgum / Giant Cane Forest
Common Name: Swamp Chestnut Oak - Sweetgum Mesic Floodplain Forest
Unique Identifier: CEGL002099
Classification Approach: International Vegetation Classification (IVC)

Ecological site concept

This PES describes plant communities likely to be found on these soils but does not encompass the entire complexity or diversity potential of these sites. Future field work is required to delineate and develop a full ecological site description (ESD) which can be utilized for conservation and planning purposes.

Only two tree species can be selected for entry into the database as dominants; however, multiple tree species may be dominant on these sites.

State 1, Phase 1.1:
pin oak (*Quercus palustris*) - swamp white oak (*Quercus bicolor*) / common buttonbush (*Cephalanthus occidentalis*) / sedges (Carex spp.) - giant cane (*Arundinaria gigantea*)

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

State: 3 – Transitional (Abandoned) Field
Phases 3.1: maples (Acer spp.) –green ash (*Fraxinus pennsylvanica*) / roses (Rosa spp.) – berries (Rubus spp.) / fescue (*Schedonorus arundinaceus*)
Tree species regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, available water, adjacent plant communities, seed sources, post-disturbance management inputs, and presence or absence of continued site disturbances.
State 4: Phase 4.1. Abandoned Croplands
Plant species dominant: henbit deadnettle (*Lamium amplexicaule*) – mouse-eared chickweed (Cerastium L.). Abandonment of cropland would result in weed species taking over the site followed by grasses, shrubs and pioneers trees.

Phase 5.1: Plant species dominants: Zea spp. – Glycine spp.
Plants on these sites will be dependent upon seeding and management. Due to the drainage issues of these soils, most sites have been tiled or ditched to facilitate crop production.

Table 1. Dominant plant species

Tree	(1) *Quercus* (2) *Liquidambar styraciflua*
Shrub	(1) *Cephalanthus occidentalis*
Herbaceous	(1) *Carex* (2) *Arundinaria gigantea*

Physiographic features

These sites are located in floodplains and are very poorly drained to poorly drained.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding duration	Very brief (4 to 48 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	Rare to occasional
Elevation	300–800 ft
Slope	0–3%
Water table depth	0–10 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)	180 days
Freeze-free period (average)	205 days
Precipitation total (average)	56 in

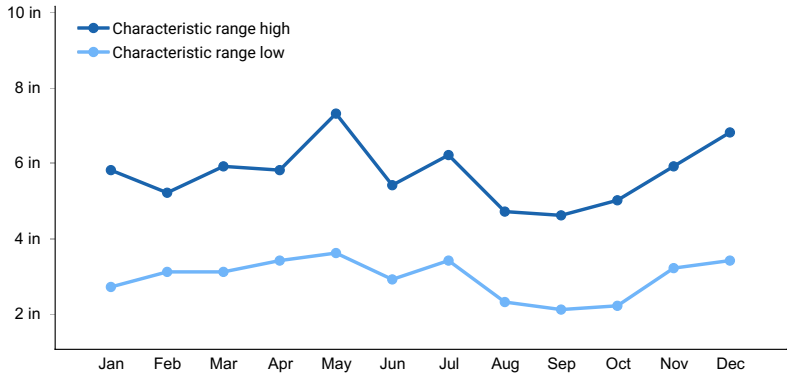

Figure 1. Monthly precipitation range

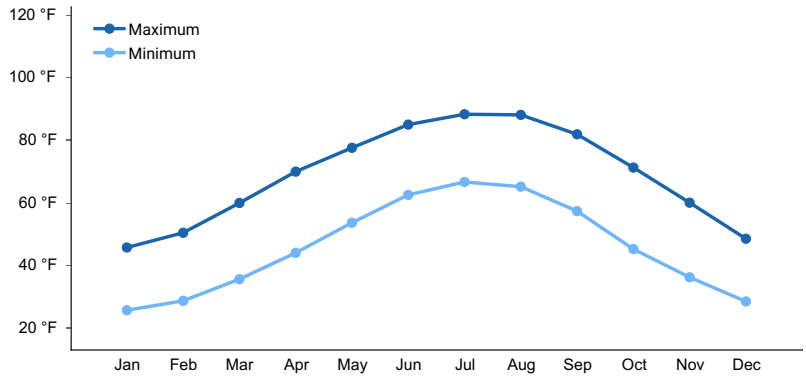

Figure 2. Monthly average minimum and maximum temperature

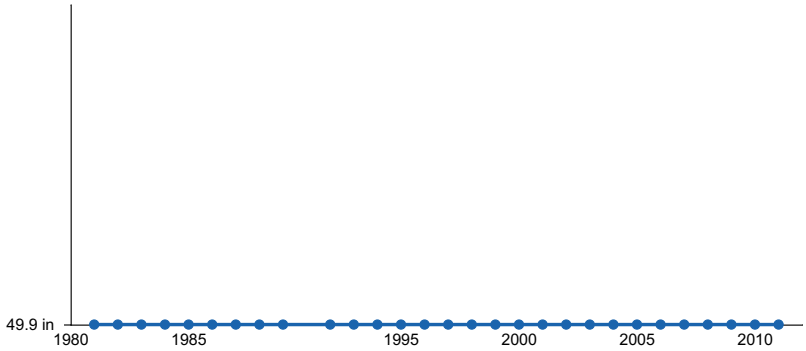

Figure 3. Annual precipitation pattern

Climate stations used

- (1) CLARKSVILLE WWTP [USC00401790], Clarksville, TN
- (2) ELIZABETHTOWN WP CS [USC00152512], Elizabethtown, KY
- (3) COOKEVILLE [USC00402009], Cookeville, TN
- (4) WAYNESBORO [USC00409502], Waynesboro, TN

Influencing water features

These sites have periodic flooding, high water tables and high levels of available moisture.

Soil features

These soils are located in floodplains and are very poorly to poorly drained.

Table 4. Representative soil features

Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Poorly drained to very poorly drained
Permeability class	Slow to moderate
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	7–11 in
Calcium carbonate equivalent (0-40in)	0%

Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.5–8
Subsurface fragment volume <=3" (Depth not specified)	0–9%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

18-Poorly Drained (Wet) Alluvium

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 extensively field verified. Therefore, 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 of these sites. Field studies are required for detailed conservation planning or to develop a comprehensive and science-based native plant restoration plan for these sites.

Initial soil mapunits in this project include: Dunning, Melvin

Forest Vegetation as listed in Official Soil Series Description:
Dunning: Native forest is water-tolerant hardwoods such as red maple, sycamore, gums, boxelder, willow, pin oak, water oak, swamp white oak, and cottonwood, interspersed with glades of cane, grass, and sedge.
Melvin: Native vegetation consists of water-tolerant hardwoods, chiefly water oak, pin oak, and swamp white oak, American sycamore, black willow, alder, sweet and blackgums, red maple, box elder, and cottonwood. Some areas were in canebrakes.

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.

This PES grouping includes soils generally found along streams and in low lying areas adjacent to water bodies. Soils are classified as very poorly and poorly drained soils. The natural vegetation of these sites will vary in relationship to the setting, patterns of drainage, disturbances, and previous vegetation communities. Most of these sites within MLRA 122 are now being utilized for agricultural purposes and have been ditched or tiled.

State 1. (Reference):

State 1, Phase 1.1:
Plant species dominants: pin oak (*Quercus palustris*) - swamp white oak (*Quercus bicolor*) / common buttonbush (*Cephalanthus occidentalis*) / sedges (Carex spp.) - giant cane (*Arundinaria gigantea*)

Wetland oaks were likely part of the historic reference community for these sites but most have been logged out. The existing communities today are dominated by sycamore, cottonwood, boxelder, silver maple, elms, and green ash. Maples, ashes, elm, boxelder, and other shade-tolerant, fast-growing hardwoods will dominant post-disturbance without management. The flooding regime characteristic of individual soil mapunits will greatly influence the forest community as well and soil mapunits currently in this group may be further split based on future field evaluations.

Understory species include paw paw, spicebush, and dogwoods. The herbaceous layers are variable depending on substrate, flooding frequency, flooding duration, drainage, and topography. Additional field work is required to refine

this grouping of soils and may result in multiple ecological site descriptions being developed.

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

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 – Transitional (Abandoned) Field
State 3, Phases 3.1: maples (Acer spp.) –green ash (*Fraxinus pennsylvanica*) / roses (Rosa spp.) – berries (Rubus spp.) / fescue (*Schedonorus arundinaceus*)

Tree species regeneration on these sites will depend on the severity and duration of disturbance, soil characteristics, available water, adjacent plant communities, seed sources, post-disturbance management inputs, and presence or absence of continued site disturbances. Pioneer tree species that are common in MLRA 122 on wet sites include sycamore, cottonwood, green ash, silver maple, boxelder, red maple, and willows.

Restoration to the reference site (State 1) would require substantial and long-term inputs including planting, timber stand improvement practices, and weed control. Hydrological changes to the site would have to be assessed and restored.

State 4: Phase 4.1. Abandoned Croplands

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

Abandonment of cropland would result in many weed species taking over the site. Initially, annual weeds would be predominate followed by grasses, shrubs and finally, pioneers trees.

It would require years of management, plantings, and weed control to establish successional communities that could transition to a reference community. Due to the drainage issues on these soils, many have been tiled or ditched extensively to facilitate crop production, so hydrological restoration would also be required.

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 of these soils, most sites have been tiled or ditched to facilitate crop production.

Restoration of these sites would require a return to the natural hydrologic state and extensive, long-term restoration efforts.

State and transition model

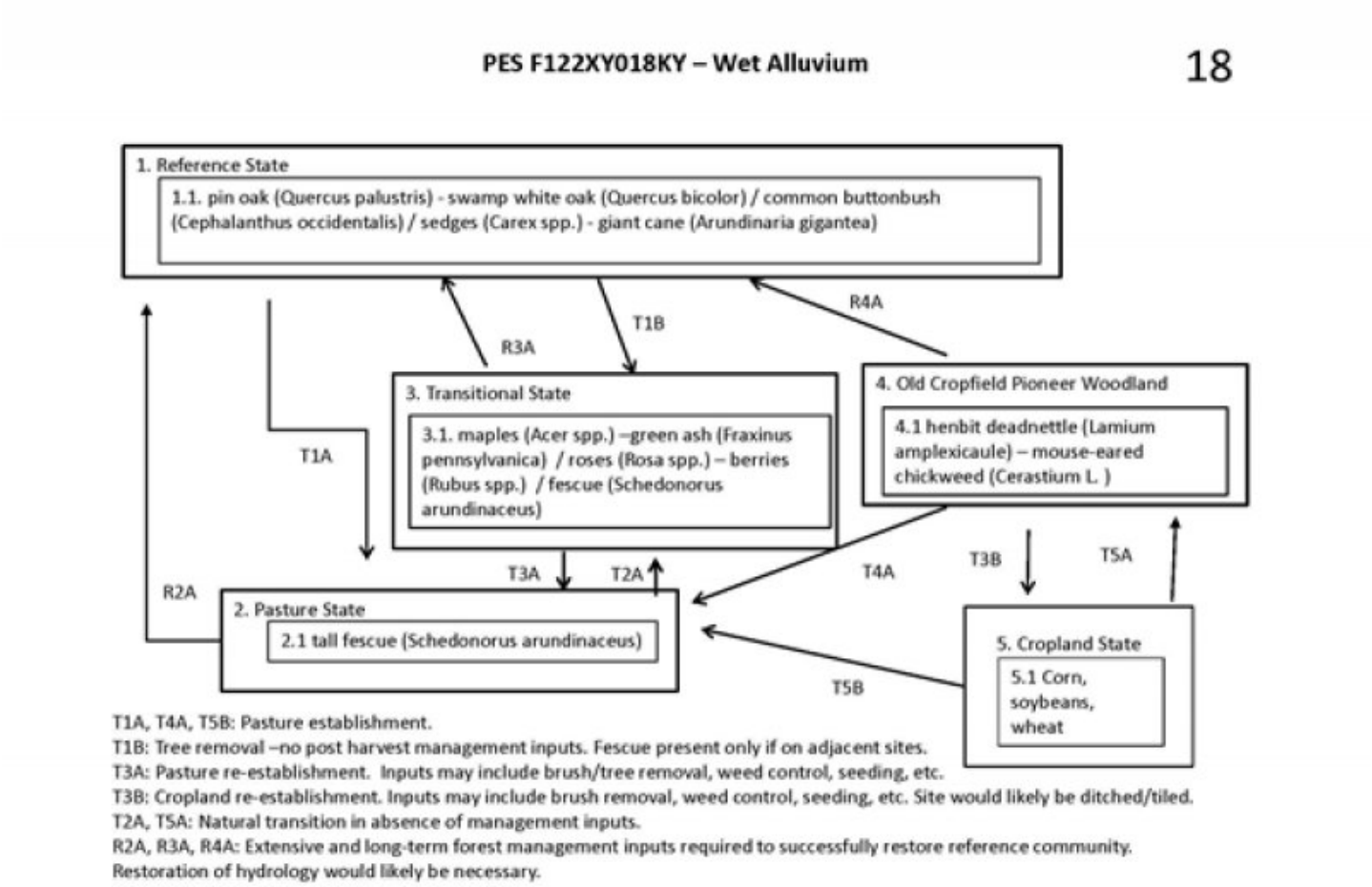

Figure 5. Group 18

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:**

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):**

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:**