USDA Natural Resources Conservation Service

Ecological site F122XY019KY
Well Drained Shale Siltstone Uplands

Accessed: 05/11/2025

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

NatureServe
Scientific Name: Southern Interior Low Plateau Dry-Mesic Oak Forest
Unique Identifier: CES202.898

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 for detailed conservation planning or to develop a comprehensive and science-based restoration plan.

State 1, Phase 1.1: Plant species dominants:
Oaks (Quercus spp.)- hickory (Carya spp.) /flowering dogwood (*Cornus florida*) -blueberries (Vaccinium spp.) / roundleaf greenbrier (*Smilax rotundifolia*) – snakeroot (Sanicula spp.)

Plant communities on these sites are influenced by variations in soil depth, rock content, slope, pH, aspect, micro-topography, and available water. Sites are on sloping hillsides and ridges. Generally, north slopes and sites with deeper soils have a reference community of mixed oaks or oak-hickory components.

Dominant tree species include southern red oak (*Quercus falcata*), chestnut oak (Quercus prinus), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), *Carya ovata* (shagbark hickory), black oak (*Quercus velutina*), and scarlet oak (*Quercus coccinea*).

Additional species found on these sites may include blackgum (*Nyssa sylvatica*), winged elm (*Ulmus alata*), persimmon (*Diospyros virginiana*), sassafras (*Sassafras albidum*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), sourwood (*Oxydendrum arboreum*), mockernut (Carya tomentosa), flowering dogwood (*Cornus florida*), redbud (*Cercis canadensis*), and blackhaw (*Viburnum prunifolium*).

South-facing slopes and sites with shallower soils have plant communities that reflect the resulting reduction in available water. These communities likely include Virginia pine (*Pinus virginiana*). The floristic expression of these sites varies with the individual site characteristics that influence available water.

See Community Phase Data section for additional vegetation states.

Table 1. Dominant plant species

Tree	(1) *Quercus* (2) *Carya*
Shrub	(1) *Cornus florida* (2) *Vaccinium*
Herbaceous	(1) *Smilax* (2) *Sanicula*

Physiographic features

These sites are located on uplands: hills, knobs, and ridges.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Knob (3) Ridge
Flooding frequency	None
Ponding frequency	None
Elevation	400–1,400 ft
Slope	2–80%
Water table depth	60–80 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)	179 days
Freeze-free period (average)	201 days
Precipitation total (average)	55 in

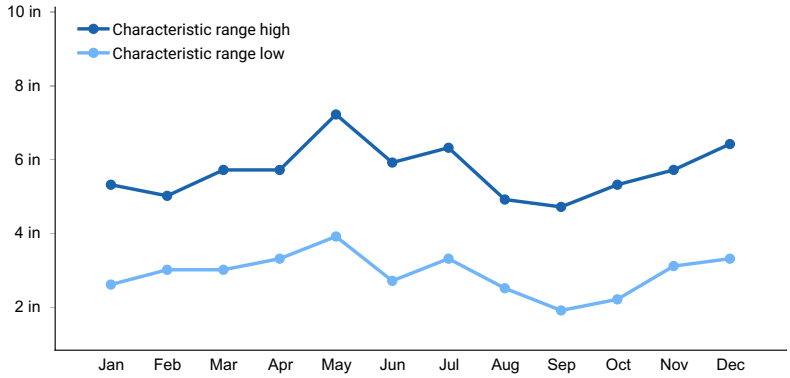

Figure 1. Monthly precipitation range

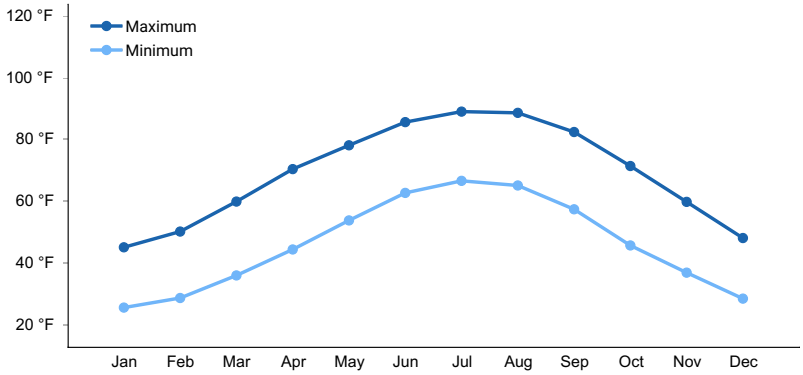

Figure 2. Monthly average minimum and maximum temperature

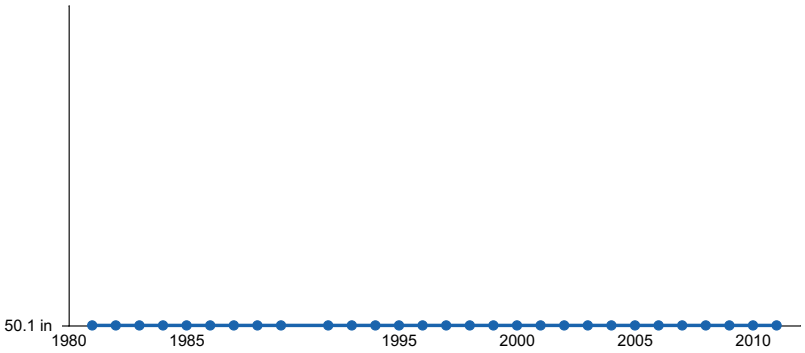

Figure 3. Annual precipitation pattern

Climate stations used

- (1) ELIZABETHTOWN WP CS [USC00152512], Elizabethtown, KY
- (2) HOPKINSVILLE [USC00153994], Hopkinsville, KY
- (3) WAYNESBORO [USC00409502], Waynesboro, TN
- (4) GLASGOW [USC00153246], Glasgow, KY

Influencing water features

There are no influencing water features on these sites.

Soil features

These sites are on upland hills. Soils are moderately deep, well drained, and have shale, siltstone, and/or sandstone as parent material.

Table 4. Representative soil features

Surface texture	(1) Channery loam (2) Flaggy silt loam (3) Gravelly
Family particle size	(1) Loamy
Drainage class	Well drained
Permeability class	Moderate to moderately rapid
Soil depth	20–40 in
Surface fragment cover <=3"	0–2%
Surface fragment cover >3"	0–2%
Available water capacity (0-40in)	3–6 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)	4.5–6.5
Subsurface fragment volume <=3" (Depth not specified)	0–30%

Subsurface fragment volume >3" (Depth not specified)	0–25%

Ecological dynamics

Provisional Ecological Site (PES): F122XY019KY
Well Drained Shale Siltstone Uplands

A provisional ecological site (PES) is a conceptual grouping of soil map units within a Major Land Resource Area (MLRA) based on similar soil characteristics. This PES has not been extensively field verified and is a hypothetical description of a site based on available existing information. Data sources such as LANDFIRE, NatureServe Explorer, county soil surveys and NRCS databases have been used.

These initial provisional ecological sites will be refined into more precise groups during the process of developing an approved ecological site description (ESD). ESD development incorporates actual ecological field monitoring and research.

Ecological Dynamics
This PES encompasses an oak-hickory forest community on soils underlain by predominately non-limestone substrates. The range of variation in plant composition on these sites vary mainly micro-topography, depth variations, available water, and aspect.

Actual field work is required to develop a full ecological site description (ESD), a field-based state and transition model, and accurate plant community phases to support future conservation planning.

State 1. (Reference):
State 1, Phase 1.1: Plant species dominants:
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Plant communities on these sites are influenced by variations in soil depth, rock content, slope, pH, aspect, micro-topography, and available water. Sites are on sloping hillsides and ridges. Generally, north slopes and sites with deeper soils have a reference community of mixed oaks or oak-hickory components. Dominant tree species include southern red oak (*Quercus falcata*), chestnut oak (Quercus prinus), white oak (*Quercus alba*), pignut hickory (*Carya glabra*), *Carya ovata* (shagbark hickory), black oak (*Quercus velutina*), and scarlet oak (*Quercus coccinea*). Additional species found on these sites may include blackgum (*Nyssa sylvatica*), winged elm (*Ulmus alata*), persimmon (*Diospyros virginiana*), sassafras (*Sassafras albidum*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), American beech (*Fagus grandifolia*), sourwood (*Oxydendrum arboreum*), mockernut (Carya tomentosa), flowering dogwood (*Cornus florida*), redbud (*Cercis canadensis*), and blackhaw (*Viburnum prunifolium*). South-facing slopes and sites with shallower soils have plant communities that reflect the resulting reduction in available water. These communities likely include Virginia pine (*Pinus virginiana*). The floristic expression of these sites varies with the individual site characteristics that influence available water.

Shrubs and woody vines on these sites may include:
Lowbush blueberry (*Vaccinium pallidum*)
Deerberry (*Vaccinium stamineum*)
Black huckleberry (*Gaylussacia baccata*)
Greenbriers (*Smilax rotundifolia* or round-leaf greenbrier most commonly)
Poison ivy (Rhus radicans)
Virginia creeper (*Parthenocissus quinquefolia*)
Grape (Vitis spp.)

Typical herbs may include:
Poverty grass (*Danthonia spicata*)
Bedstraw (Galium spp.)
Panicgrass (Panicum spp.)
Hawkweed (Hieraceum venosum)
False dandelion (*Krigia biflora*)

Sedges (*Carex digitalis*, Carex umbellate, Carex wildenovii and others)

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

A pasture phase for this provisional ecological community is feasible only on lower sloping sites. Many sloping shale sites are too steep for this state and should only be managed as woodlands. Plant species within pasture phases depend on seeding, management, and concurrent land uses. As with all sites, soil characteristics and management inputs will influence production levels.

Transitioning this state to a reference condition would likely require extensive and long-term timber stand improvement practices including control of non-native vegetation and management for desired oak or hickory species.

State: 3. Transitional Field
State 3, Phase 3.1: Plant species dominants:

3.1 maple (Acer spp.) -sassafras (*Sassafras albidum*) / berries (Rubus spp.) – sumac (Rhus spp.) – broomsedge bluestem (*Andropogon virginicus*) -fescue (*Schedonorus arundinaceus*)

After a field is abandoned, it is first occupied by a ruderal plant community until shrubs and trees become established.

Common old field species in MLRA 122 include:
Common yarrow (*Achillea millefolium*)
Broomsedge or broomsedge bluestem (*Andropogon virginicus*)
Indianhemp or hemp dogbane (*Apocynum cannabinum* L.)
common milkweed (*Asclepias syriaca* L.)
Eastern daisy fleabane (*Erigeron annuus*)
trumpet creeper (*Campsis radicans* (L.) Seem. Ex Bureau)
field thistle (*Cirsium discolor* (Muhl. ex Willd.) Spreng.)
Canadian horse weed (Erigeron Canadensis, SYN= *Conyza canadensis* (L.) Cronquist var. canadensis)
Canada lettuce (Lactuca Canadensis)
Lespedeza spp. Both native and non-native species may be present including hairy lespedeza (*Lespedeza hirta* (L.) Hornem. and sericea lespedeza (Lespedeza cuneate)
purple passionflower (*Passiflora incarnata* L.)
common cinquefoil (*Potentilla simplex*)
buttercups (Ranunculus spp.)
winged sumac (Rhus copallina)
blackberry (Rubus spp.). Species may include: *Rubus occidentalis* L., *Rubus allegheniensis* Porter, *Rubus alumnus* L.H. Bailey, *Rubus flagellaris* Willd., etc.
common yellow woodsorrel, (*Oxalis stricta*)
greenbrier species including saw greenbrier (*Smilax bona-nox* L.), cat greenbrier (*Smilax glauca*), and the brisley greenbrier (*Smilax tamnoides*).
Carolina horsenettle (*Solanum carolinense* L.)
asters (Symphyotrichum spp.)
giant ironweed (*Vernonia gigantea* (Walter) Trel.)
cocklebur (Xanthium L.)

Non-native vegetation may include:
annual ragweed (*Ambrosia artemisiifolia* L.)
chicory (*Cichorium intybus* L.)
poison hemlock (*Conium maculatum*)
Canadian thistle (*Cirsium arvense* (L.) Scop.)
Queen Anne’s lace (*Daucus carota* L.)
multi-flora rose (*Rosa multiflora* Thunb.)
curly dock (*Rumex crispus*)

common Mullein (*Verbascum thapsus* L.)

Seedlings and saplings of Quercus spp., Carya spp., Acer spp, (especially red maple, sugar maple, and boxelder) Pinus spp. (commonly Virginia pine), *Sassafras albidum*, *Robinia pseudoacacia* (black locust), and *Celtis occidentalis* (hackberry) would be common.

Transitioning this state to a reference condition will require timber stand improvement practices to control non-native vegetation and manage for higher quality oak or hickory species.

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 perennial weeds, perennial 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.

State 5: Phase 5.1. Cropland
Dependent upon seeding and management. Most common crops are corn and soybeans.
Long term restoration and timber stand improvement activities would be required to return this state to a reference community.

State and transition model

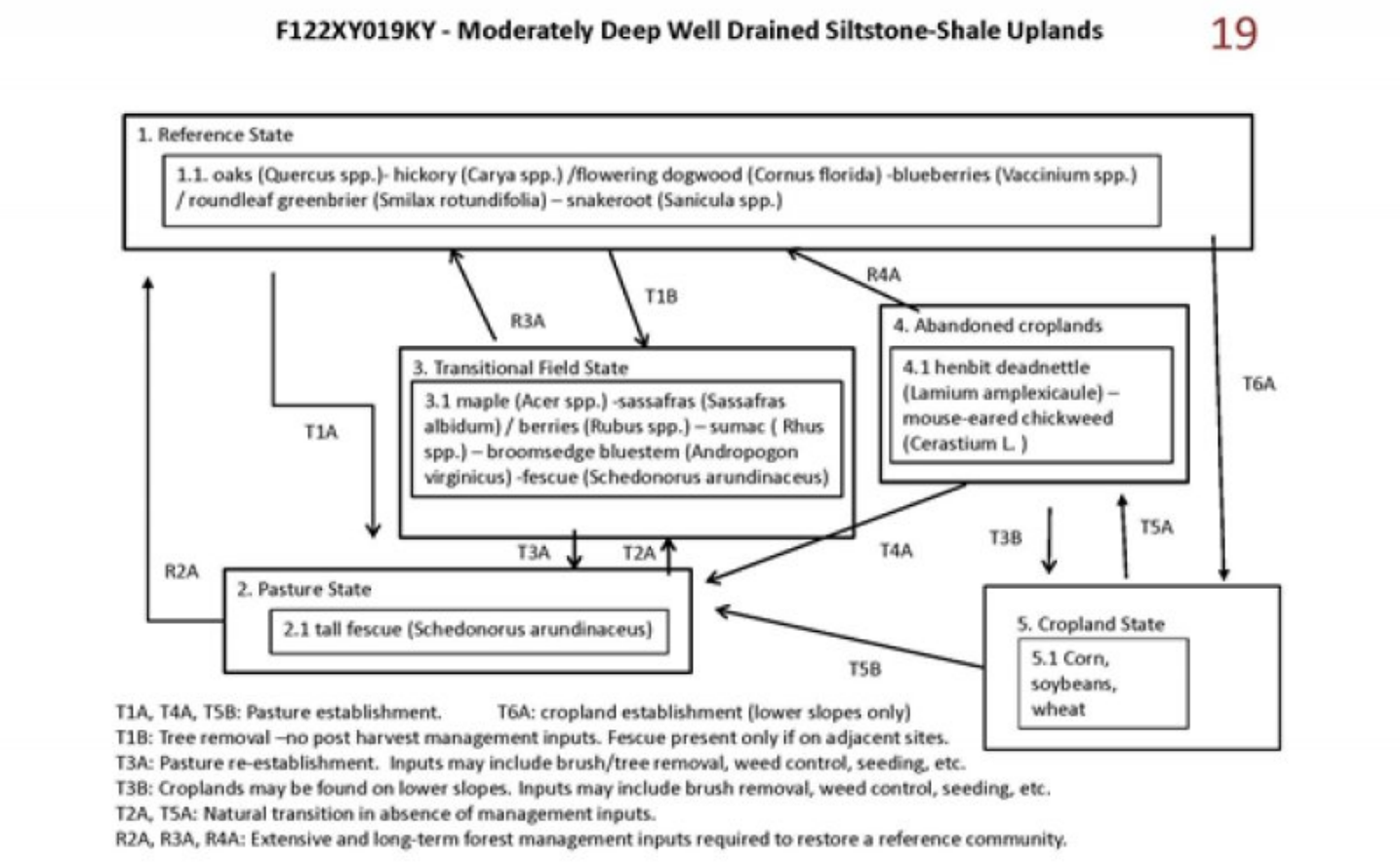

Figure 5. group 19

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:**

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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:**
