Ecological site F120CY006IN
Deep Moderately Well Drained Siltstone-Shale Uplands

Accessed: 04/20/2024

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): 120C–Kentucky and Indiana Sandstone and Shale Hills and Valleys, Northeastern Part

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This area is entirely in Indiana and makes up about 1,050 square miles (2,725 square kilometers). Physiography: This area is in the Highland Rim Section of the Interior Low Plateaus Province of the Interior Plains. Both large and small tributaries of the Ohio River and the East Fork of the White River dissect the nearly level to very steep uplands in the area. The major streams and rivers have well defined valleys with broad flood plains and numerous stream terraces. The flood plains along the smaller streams are narrow. Summits are narrow and are nearly level to gently sloping. Geology: The geologic materials in this area are of Early and Middle Pennsylvanian and Late Mississippian age. The rocks consist mainly of flat-lying, interbedded sandstone, shale, coal, and siltstone with minor areas of limestone. Bedrock outcrops are common on the bluffs along the Ohio River and its major tributaries. The surficial geologic materials consist mainly of a layer of loess, typically less than 3.5 feet (1 meter) thick, on the less eroded parts of the landscape and stratified sediments of Pleistocene age along the Ohio River and its tributaries. Unconsolidated alluvium is deposited in the river valleys.
Soils: The dominant soil orders in this MLRA are Alfisols, Ultisols, and Inceptisols. The soils in the area have a mesic soil temperature regime, an udic or aquic soil moisture regime, and dominantly mixed mineralogy. They formed dominantly in loess and in residuum derived from siltstone and shale. They range from moderately deep to very deep and from somewhat poorly drained to well drained and are loamy, silty, or clayey. Fragiudults (Spickert and Tilsit series) and Hapludults (Wrays series) are the dominant soils on ridgetops and the upper parts of hills and knobs. Halpudalfs (Kurtz series), Hapludults (Gilwood and Gnawbone series), and Dystrudepts (Brownstown series) are on moderately sloping to very steep side slopes. Hapludalfs (Coolville, Rarden, Stonehead, and Wellrock series) are on the gently sloping to moderately steep lower parts of side slopes. Hapludalfs (Elkinsville series), Fragiudalfs (Pekin series), and Fragiaqualfs (Bartle series) are on stream terraces. Dystrudepts (Beanblossom, Cuba, and Steff series) and Endoaquepts (Stendal series) are on flood plains.

Classification relationships

Fagus grandifolia - *Acer saccharum* - *Liriodendron tulipifera* Unglaciated Forest
CEGL002411

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 native plant restoration plan for these sites.

The hypotheses below were developed utilizing Purdue University data from the Hoosier National Forest (Andriy Vladimirovich Zhalnin and George R. Parker, 2007, Delineation and spatial analysis of ecological classification units

for the Hoosier National Forest in Southern Indiana), NatureServe.org Explorer, VegBank.org, Plant Communities of the Midwest –Indiana Subset, and Indiana DNR.

Forest:

Aspect, topography, and soil depth will influence the gradient of communities on single mapunits. The herb dominance may show variation depending on aspect.

1.1. American beech (*Fagus grandifolia*) - sugar maple (*Acer saccharum*) /spicebush (*Lindera benzoin*)/black snakeroot (*Sanicula canadensis*) - sedges (Carex spp.)

Plant Communities of the Midwest (Indiana subset) describes these communities:
These sites will have diversity in the overstory, shrub layer and especially the herbaceous layer due to available water. Other trees on these sites may include *Liriodendron tulipifera*, *Liquidambar styraciflua*, *Fraxinus americana*, *Quercus rubra*, *Carya glabra*, and *Carya cordiformis*. Shrubs commonly found in this community are *Asimina triloba* and *Lindera benzoin*. Herbaceous species are diverse, forming a dense cover. They include *Adiantum pedatum*, *Arisaema triphyllum*, *Asarum canadense*, *Carex blanda*, *Dicentra canadensis*, *Dioscorea quaternata*, *Galium circaezans*, *Menispermum canadense*, *Phegopteris hexagonoptera*, *Polystichum acrostichoides*, and *Sanguinaria canadensis*. The large size of dominant canopy species (over 30 m tall), herbaceous diversity, and accumulated litter emphasize the high degree of mesophytism (TNC 1995a).

Purdue (Hoosier NF) found multiple species of Sanicula on sites associated with tulip trees, beech, and maples.

Pasture:
State 2, Phase 2.1. Plant species dominants: *Schedonorus arundinaceus* (tall fescue). Species present are dependent upon seeding and management.

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

State 3, Phase 3.1. maples (Acer spp.) / berries (Rubus spp.) – sumac (Rhus spp.) / tall fescue (*Schedonorus arundinaceus*)

Cropland states were included in the state and transition model for the lower sloping sites only.

Abandoned Cropland (lower slopes only):
State 4 Phase 4.1. 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 pioneers trees.

Cropland: State: 5. Phase 5.1. Dependent upon seeding and management. Most common crops are corn and soybeans.

Table 1. Dominant plant species

Tree	(1) *Fagus grandifolia* (2) *Acer saccharum*
Shrub	(1) *Lindera benzoin*
Herbaceous	(1) *Sanicula canadensis* (2) *Carex*

Physiographic features

These sites are found on uplands on hills and benches.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Structural bench
Flooding frequency	None
Ponding frequency	None
Elevation	350–1,000 ft
Slope	2–50%
Water table depth	20–40 in

Climatic features

Climate: The average annual precipitation in most of this area is 41 to 47 inches (1,040 to 1,195 millimeters). About 60 percent of the precipitation falls during the freeze-free period. Most of the rainfall occurs as high-intensity, convective thunderstorms in summer. Snowfall is common in winter. The average annual temperature is 52 to 56 degrees F (11 to 14 degrees C). The freeze-free period averages 205 days and ranges from 190 to 220 days. The longer freeze-free periods occur along the Ohio River. (Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. United States Department of Agriculture. Natural Resources Conservation Service. United States Department of Agriculture Handbook 296. Issued 2006.)

Table 3. Representative climatic features

Frost-free period (average)	175 days
Freeze-free period (average)	205 days
Precipitation total (average)	47 in

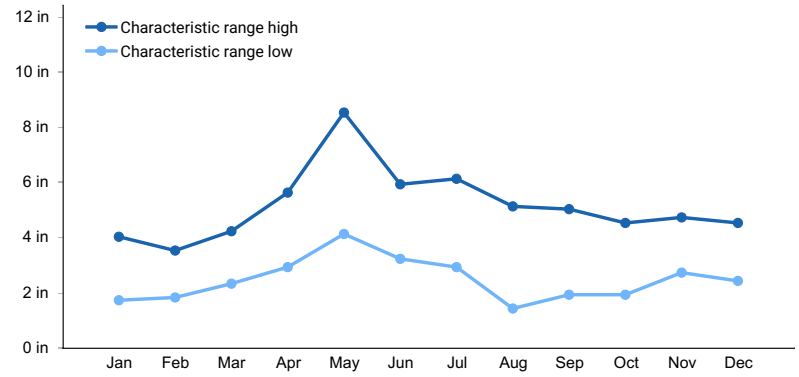

Figure 1. Monthly precipitation range

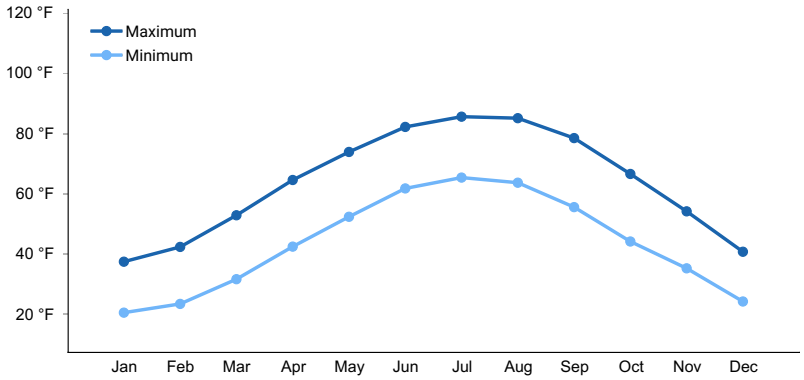

Figure 2. Monthly average minimum and maximum temperature

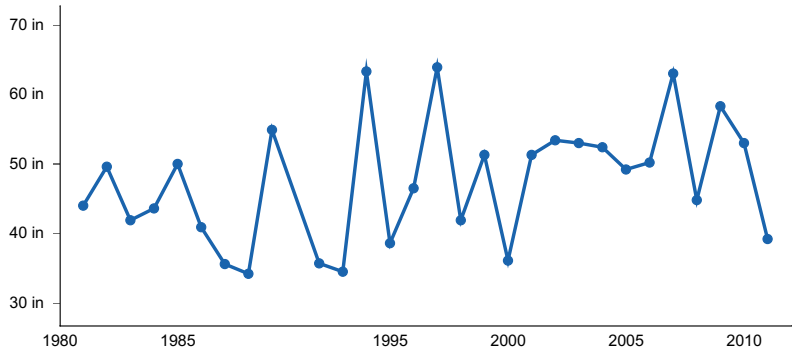

Figure 3. Annual precipitation pattern

Climate stations used

- (1) BLOOMINGTON IN UNIV [USC00120784], Bloomington, IN

Influencing water features

There are no influencing water features.

Soil features

These soils are deep and very deep and moderately well drained.

Table 4. Representative soil features

Parent material	(1) Loess–siltstone (2) Residuum–shale (3) Colluvium–shale and siltstone
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Moderately well drained
Soil depth	40–80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4.9–6.9 in
Soil reaction (1:1 water) (0-40in)	4.3–5.9
Subsurface fragment volume <=3" (Depth not specified)	0–5%
Subsurface fragment volume >3" (Depth not specified)	0–30%

Ecological dynamics

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State and transition model

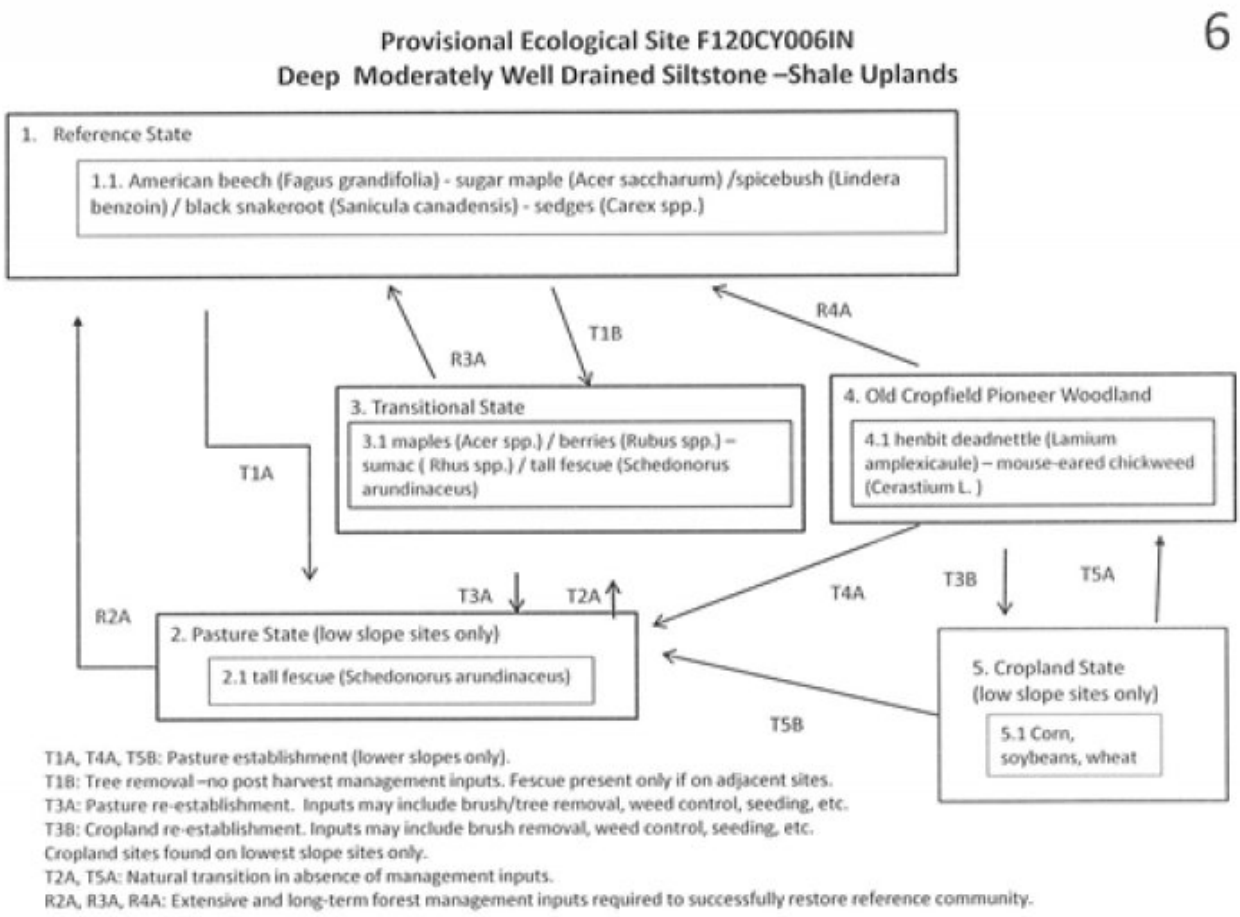

Figure 5. 120C, Group 6

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Wildland Fire Management RD&A: https://www.frames.gov/partner-sites/wfmrda-ffe/home/

Web Soil Survey, USDA-NRCS: http://websoilsurvey.nrcs.usda.gov/app/

Woodland Wildflowers of Illinois: http://www.illinoiswildflowers.info/woodland/woodland_index.htm

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:

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17. **Perennial plant reproductive capability:**