USDA Natural Resources Conservation Service

Ecological site F120CY010IN
Low Mesic Slopes

Last updated: 10/01/2024
Accessed: 05/13/2025

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

120C—Kentucky and Indiana Sandstone and Shale Hills and Valleys, Northeastern Part
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
American Beech - Sugar Maple - Tuliptree Unglaciated Forest
Beech - Maple Unglaciated Forest CEGL002411

Ecological site concept

The Low Mesic Slopes ecological site occurs on moderately drained to somewhat pporly drained lower slope. Representative soils include: Rarden. Additional mapunits may be added to this group pending field investigations.

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 information from the following sources:
Purdue University data for 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:
1.1. American beech (*Fagus grandifolia*) – sugar maple (*Acer saccharum*) / northern spicebush (*Lindera benzoin*) / bedstraws (Galium spp.) - springbeauty (*Claytonia virginica*)

These lower slope sites will have diversity in the overstory, shrub layer and especially the herbaceous layer due to the protected environment and available water. Other trees on these sites may include *Liriodendron tulipifera*, *Acer rubrum*, *Acer saccharum*, *Fraxinus americana*, *Tilia americana*, *Ulmus americana*, *Quercus alba*, *Quercus rubra*, *Carya glabra*, and *Carya cordiformis*. Shrubs commonly found in this community are spicebush (*Lindera benzoin*) and in some areas, paw paw (*Asimina triloba*). Flowering dogwood (*Cornus florida*) may be in the understory.

Herbaceous species are diverse, featuring many spring wildflowers, and during the summer form a dense cover. They include *Adiantum pedatum*, *Arisaema triphyllum*, various species of sedges (Carex spp.), bedstraws (Galium spp.) and toothworts (Dentaria spp.), white snakeroot (*Ageratina altissima*), avens, mayapple (*Podophyllum peltatum*), snakeroots (Sanicula spp.), common blue violet (*Viola sororia*), and Christmas fern (*Polystichum acrostichoides*).
Pasture:

Areas that have been converted to pasture and are usually planted with tall fescue or a combination of cool-season grasses.
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.) / tall fescue (*Schedonorus arundinaceus*.

Cropland was not included in this initial state and transition model.

Associated sites

F120CY006IN	**Deep Moderately Well Drained Siltstone-Shale Uplands** Deep Moderately Well Drained Siltstone-Shale Uplands

Similar sites

F120CY006IN	**Deep Moderately Well Drained Siltstone-Shale Uplands** Deep Moderately Well Drained Siltstone-Shale Uplands

Table 1. Dominant plant species

Tree	(1) *Fagus grandifolia* (2) *Acer saccharum*
Shrub	(1) *Lindera benzoin*
Herbaceous	(1) *Galium* (2) *Claytonia virginica*

Physiographic features

These sites are found on lower slopes on hillsides.

Table 2. Representative physiographic features

Landforms	(1) Hill
Runoff class	Low to very high
Elevation	107–305 m
Slope	6–22%
Water table depth	30–69 cm
Aspect	Aspect is not a significant factor

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 (characteristic range)	169 days
Freeze-free period (characteristic range)	195 days
Precipitation total (characteristic range)	1,194 mm
Frost-free period (actual range)	169 days
Freeze-free period (actual range)	195 days
Precipitation total (actual range)	1,194 mm
Frost-free period (average)	169 days
Freeze-free period (average)	195 days
Precipitation total (average)	1,194 mm

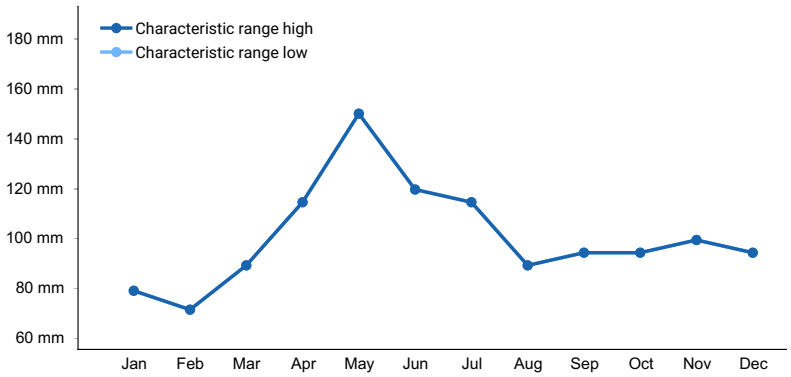

Figure 1. Monthly precipitation range

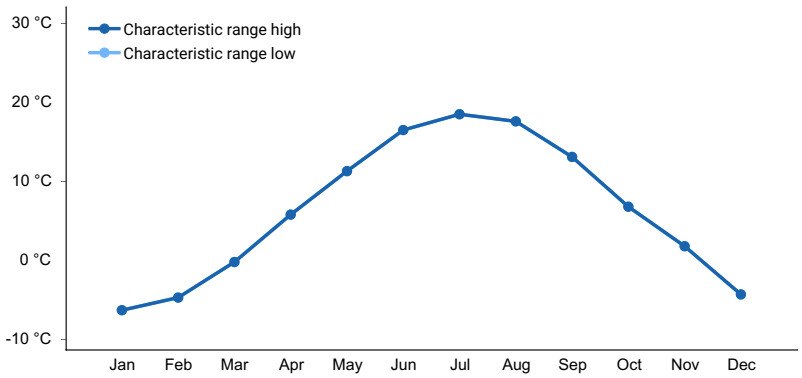

Figure 2. Monthly minimum temperature range

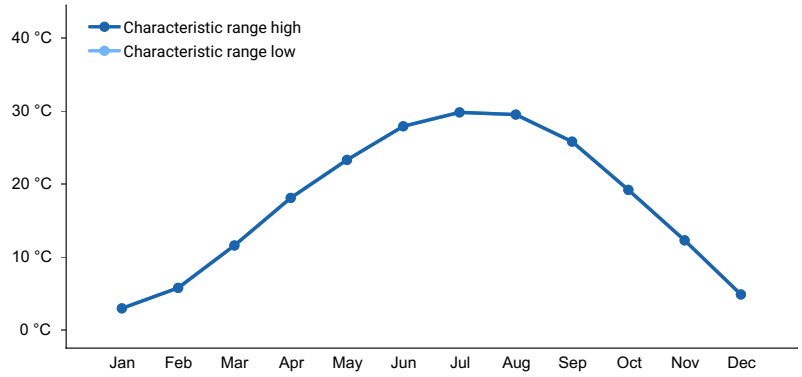

Figure 3. Monthly maximum temperature range

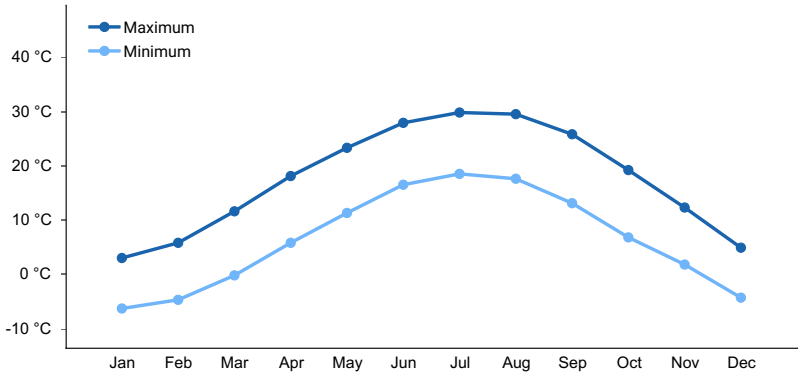

Figure 4. Monthly average minimum and maximum temperature

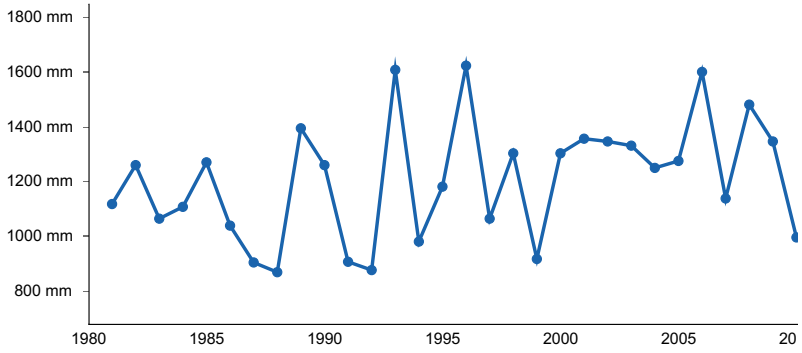

Figure 5. Annual precipitation pattern

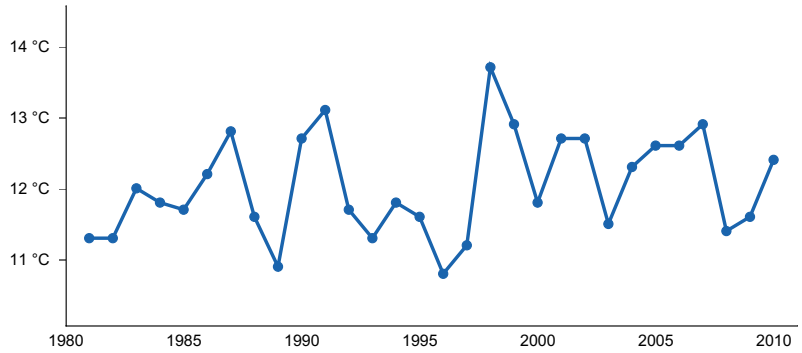

Figure 6. Annual average temperature pattern

Climate stations used

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

Influencing water features

These sites have no influencing water features.

Soil features

Representative soils include: Rarden.These soils are on hills. Permeability is slow. Slope ranges from 2 to 50 percent.

Table 4. Representative soil features

Parent material	(1) Residuum–acid shale (2) Loess–shale and siltstone
Surface texture	(1) Silt loam (2) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Moderately well drained
Permeability class	Slow
Soil depth	76–102 cm
Surface fragment cover <=3"	0–1%
Surface fragment cover >3"	0–1%
Available water capacity (0-101.6cm)	10.16–12.7 cm
Soil reaction (1:1 water) (0-101.6cm)	3.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	0–1%
Subsurface fragment volume >3" (Depth not specified)	0–60%

Ecological dynamics

120C/ Project 10/ LOW MESIC SLOPES
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State and transition model

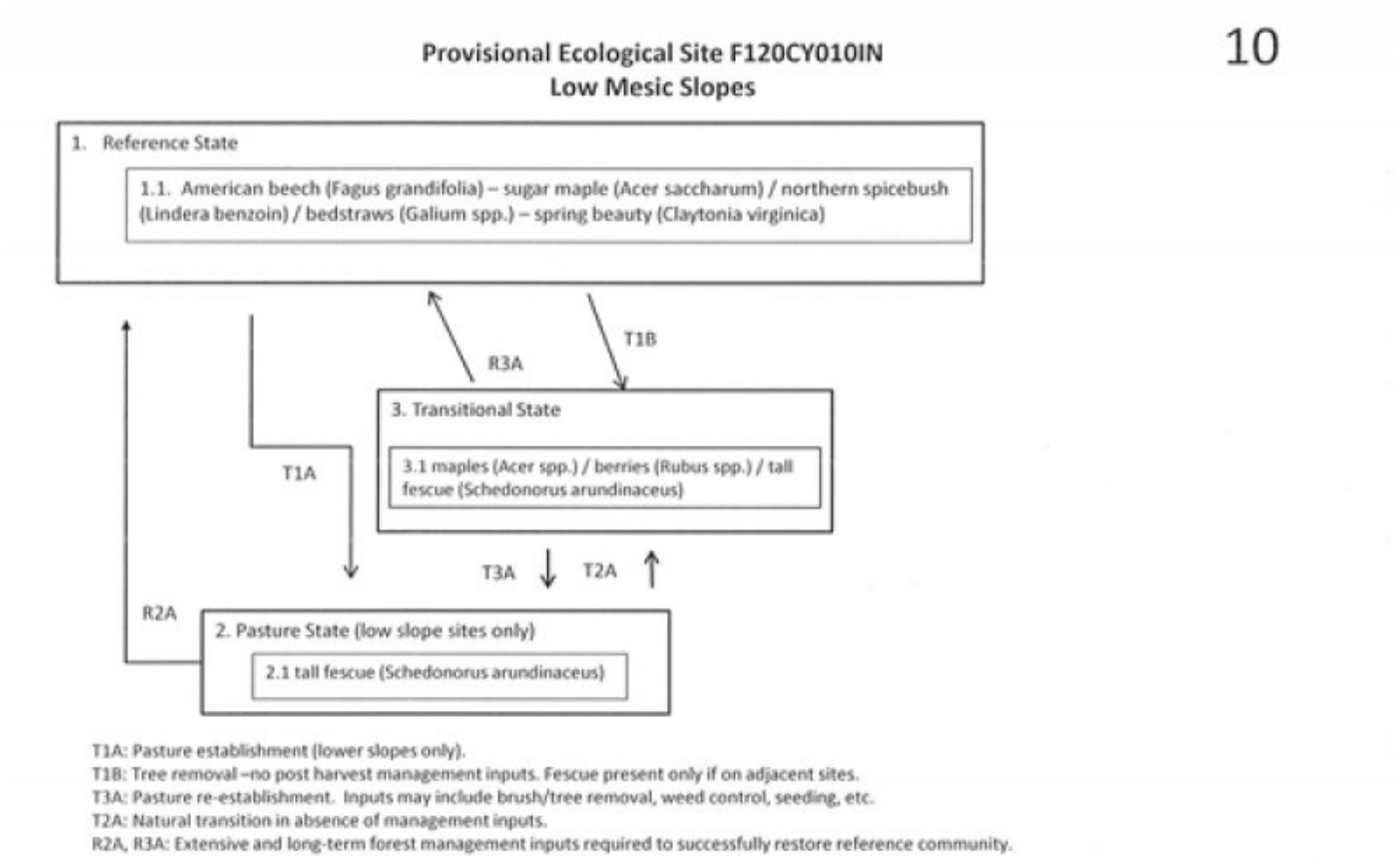

Figure 7. 120C, Group 10

Inventory data references

Site Development and Testing Plan
Future work is needed, as described in a future project plan, to validate the information presented in this provisional ecological site description. Future work includes field sampling, data collection and analysis by qualified vegetation ecologists and soil scientists. As warranted, annual reviews of the project plan can be conducted by the Ecological Site Technical Team. A final field review, peer review, quality control, and quality assurance reviews of the ESD are necessary to approve a final document.

Other references

Cleland, D.T., J.A. Freeouf, J.E. Keys, G.J. Nowacki, C.A. Carpenter, and W.H.McNab. 2007. Ecological Subregions: Sections and Subsections for the conterminous United States. [Map. presentation scale 1:3,500,000, colored; A.M. Sloan, cartographer] Gen. Tech. Report WO-76D. U.S. Department of Agriculture, Forest Service, Washington, DC. (https://www.fs.fed.us/research/publications/misc/73326-wo-gtr-76d-cleland2007.pdf)

Comer, P., D. Faber-Langendoen, R. Evans, S. Gawler, C. Josse, G. Kittel, S. Menard, M. Pyne, M. Reid, K. Schulz, and K. Snow. 2003. Ecological Systems of the United States: A Working Classification of US Terrestrial Systems. NatureServe, Arlington, VA. (https://www.natureserve.org/sites/default/files/pcom_2003_ecol_systems_us.pdf).

NatureServe 2020. NatureServe Explorer: An Online Encyclopedia of Life [web application]. NatureServe, Arlington, VA. (http://explorer.natureserve.org)
Soil Survey Staff-USDA-NRCS [United States Department of Agriculture, Natural Resources Conservation Service]

2016. National Soils Information Service (NASIS Data Model Version 7.3.4) Lincoln, NE. (https://www.nrcs.usda.gov/wps/portal/nrcs/detailfull/soils/survey/tools/?cid=nrcs142p2_053552).

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USNVC [United States National Vegetation Classification]. 2019. United States National Vegetation Classification Database, V2.03. Federal Geographic Data Committee, Vegetation Subcommittee, Washington DC. (http://usnvc.org).

Approval

Greg Schmidt, 10/01/2024

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	05/13/2025
Approved by	Greg Schmidt
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:**