USDA Natural Resources Conservation Service

Ecological site F120BY007IN
Deep Well Drained Sandstone-Shale Uplands

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

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 120B–Kentucky and Indiana Sandstone and Shale Hills and Valleys, Northwestern Part

120B-Kentucky and Indiana Sandstone and Shale Hills and Valleys, Northwestern Part is located in Indiana and covers about 3,040 sq.mi. This area is in the Highland Rim Section of the Interior Low Plateaus Province of the Interior Plains. Tributaries of the Ohio River dissect the uplands. The major streams and rivers have well defined valleys with broad flood plains and numerous stream terraces. 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 river bluffs. The dominant soil orders in this MLRA are Alfisols, Ultisols, and Inceptisols. The soils in the area have a mesic soil temperature regime, a udic or aquic soil moisture regime, and dominantly mixed mineralogy. They formed dominantly in less than 40 inches of loess and in residuum or colluvium derived from sandstone, shale, and siltstone. The soils range from moderately deep to very deep and from poorly drained to somewhat excessively drained and are loamy, silty, or clayey. Fragiudalfs (Apalona, Zanesville) and Hapludalfs (Wellston) are the dominant soils on ridgetops and upper slopes. Hapludults (Adyeville) and Dystrudepts (Tipsaw) are on side slopes, and Hapludults (Tulip) are on footslopes. Hapludalfs (Deuchars, Ebal, Kitterman) are on structural benches and scarps. Endoaquepts (Zipp), Epiaqualfs (McGary), and Hapludalfs (Shircliff, Markland) are formed in lacustrine sediments. Hapludults (Millstone), Hapludalfs (Elkinsville), Fragiudalfs (Sciotoville), and Epiaqualfs (Hatfield) are on terraces along the Ohio River. Hapludolls (Huntington), Eutrudepts (McAdoo, Lindside), and Endoaquepts (Newark)

are on flood plains along the major streams. Dystrudepts (Cuba, Steff), Eutrudepts (Gatchel, Haymond), Endoaquepts (Belknap, Stendal), and Fluvaquents (Birds, Bonnie) are on local flood plains.

Classification relationships

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

Ecological site concept

The Deep Well Drained Sandstone-Shale Uplands ecological site occurs in deep, well drained soils on hillsides and ridges. Representative soils include: Alford, Brussels, Hagerstown, Wellston, Wrays.

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.

State 1, Phase 1.1.
Forestland. Plant species dominants:
white oak (*Quercus alba*) –tulip tree (*Liriodendron tulipifera*) / flowering dogwood (*Cornus florida*) -sassafras (*Sassafras albidum*) / Virginia creeper (*Parthenocissus quinquefolia*) – agrimony (Agrimonia spp.)

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

State 3, Phase 3.1. Transitional Field State.
The transitional phase plant community composition will depend upon previous land uses – pasture type, management while in pasture (high quality pasture versus minimal managed grass-shrub –sapling community), and adjacent seed sources. State 3 listed below is assuming a transition from a fescue pasture. 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. Nearby available seed sources will greatly influence the makeup of this successional community.

Plant species dominants:
maple (Acer spp.) – ash (Fraxinus spp.) / berries (Rubus spp.) – sumac (Rhus spp.) / giant ironweed (*Vernonia gigantea*) - fescue (*Schedonorus arundinaceus*)

State 4 Old Pioneer Cropland (lower slopes)
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.

State: 5. Cropland (lower slopes)
Phase 5.1: 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 long-term, intensive management inputs.

Associated sites

F120BY006IN	**Deep Moderately Well Drained Sandstone-Shale Uplands** Deep, Moderately Well-Drained Sandstone-Shale Uplands
F120BY005IN	**Moderately Deep Sandstone-Shale Uplands** Moderately Deep Sandstone-Shale Uplands

Table 1. Dominant plant species

Tree	(1) *Quercus alba* (2) *Liriodendron tulipifera*
Shrub	(1) *Cornus florida* (2) *Sassafras albidum*
Herbaceous	(1) *Parthenocissus quinquefolia* (2) *Agrimonia*

Physiographic features

Sites are on hillsides and ridges throughout MLRA 120B.

This group will be further refined with field work to document community variations with regard to soil water depth, aspect, etc. Multiple ESDs may be developed from this initial PES grouping.

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Ridge
Runoff class	High to very high
Elevation	341–1,020 ft
Slope	6–50%
Water table depth	40–60 in
Aspect	Aspect is not a significant factor

Climatic features

Climate
The average annual precipitation in most of this area is 43 to 48 inches (1,090 to 1,220 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 53 to 56 degrees F (11 to 13 degrees C). The freeze-free period averages 205 days and ranges from 185 to 225 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 Handbook 296)

Table 3. Representative climatic features

Frost-free period (characteristic range)	155-170 days
Freeze-free period (characteristic range)	180-197 days
Precipitation total (characteristic range)	48 in
Frost-free period (actual range)	152-175 days
Freeze-free period (actual range)	177-203 days
Precipitation total (actual range)	47-48 in
Frost-free period (average)	163 days
Freeze-free period (average)	189 days
Precipitation total (average)	48 in

Climate stations used

- (1) TELL CITY [USC00128698], Hawesville, IN

- (2) SAINT MEINRAD [USC00127724], Ferdinand, IN
- (3) SHOALS 8 S [USC00128036], Shoals, IN

Influencing water features

These sites have no influencing water features.

Soil features

These sites are deep sandstone-shale hillsides. Representative soils include: Alford, Brussels, Hagerstown, Wellston, Wrays.

Table 4. Representative soil features

Parent material	(1) Colluvium–shale (2) Loess–sandstone (3) Residuum–siltstone
Surface texture	(1) Silt loam
Family particle size	(1) Fine-silty
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderately slow
Soil depth	40–72 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	3–8 in
Soil reaction (1:1 water) (0-40in)	4.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	2–13%
Subsurface fragment volume >3" (Depth not specified)	0–62%

Ecological dynamics

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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. Nearby available seed sources will greatly influence the makeup of this successional community.

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State and transition model

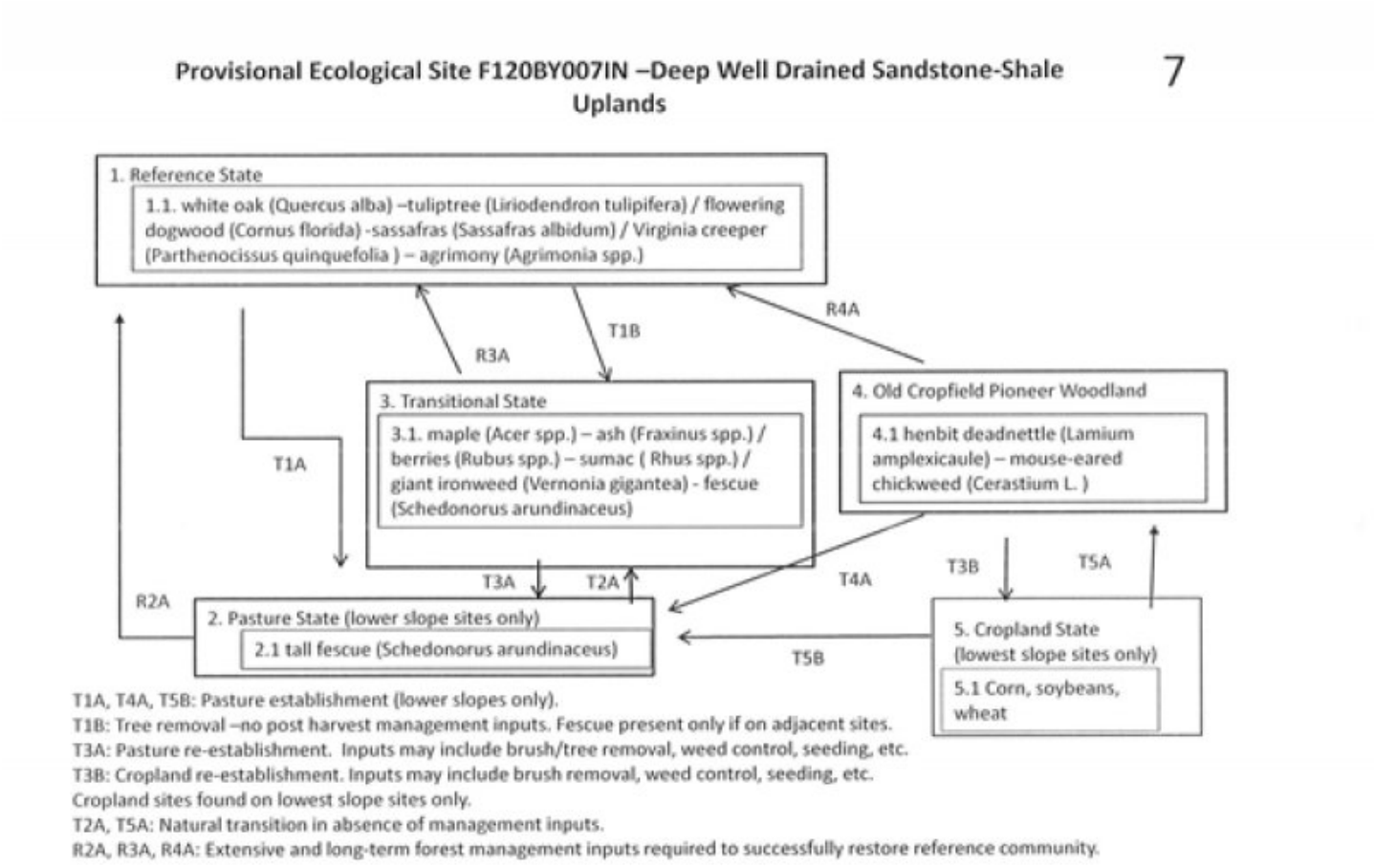

Figure 8. MLRA 120B, Group 7

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

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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).

USDA-NRCS [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. (https://www.nrcs.usda.gov/Internet/FSE_DOCUMENTS/nrcs142p2_051845.pdf).

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	05/10/2025
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):

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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:**
