USDA Natural Resources Conservation Service

Ecological site F120BY011IN
Well Drained Terraces

Last updated: 10/01/2024
Accessed: 05/21/2025

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

South Central Interior Mesophytic Forest
CES 202.887

Possible Association:
Fagus grandifolia - Acer saccharum - Liriodendron tulipifera Unglaciated Forest.CEGL002411. NatureServe.org summary of the community:

"This beech - maple forest is found in unglaciated areas of the east-central United States. Stands occur on unglaciated terraces and mesic slopes of maturely dissected plateaus and submontane regions. The aspect is neutral on sandy alluvial terraces and is northern to eastern on slopes. Soils are moderately well-drained, moist, rich and deep (100+ cm). The vegetation is dominated by a closed-canopy forest with a well-developed tall-shrub layer. The forest canopy is dominated by *Fagus grandifolia* and *Acer saccharum*. Other canopy species 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. Community occurrences have been extensively logged, and the canopy openings favor regeneration of *Acer saccharum*."

On smaller riparian segments, the American Beech - Oak species - Red Maple - Black Walnut Forest CEGL005014 may be more applicable: "This beech - hardwoods floodplain forest community is found in the central United States and adjacent Canada. Stands occur on high terraces of small stream floodplains. Soils are well-drained and at least partially alluvial in origin, flooding only occasionally."

These sites may also gradient into upland communities such as *Fagus grandifolia - Acer saccharum - Liriodendron tulipifera* Unglaciated Forest CEGL002411. Field work is needed to accurately determine community composition for these sites.

Ecological site concept

The Well Drained Terraces ecological sites occur on alluvium, very thin loess over alluvium and even include lakebeds in MLRA 12B. Representative soils include: Elk, Elkinsville, Elkinsville Variant, Markland, Martinsville, Millstone.

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 restoration plan for these sites.

State 1, Phase 1.1:
Forestland. Plant species dominant:
American beech (*Fagus grandifolia*) - northern red oak (*Quercus rubra*) / spicebush (*Lindera benzoin*) - paw paw (*Asimina triloba*) / grape - Virginia creeper (*Parthenocissus quinquefolia*)

Fagus grandifolia - Acer saccharum - Liriodendron tulipifera Unglaciated Forest.CEGL002411. NatureServe.org summary of the community:
"This beech - maple forest is found in unglaciated areas of the east-central United States. Stands occur on unglaciated terraces and mesic slopes of maturely dissected plateaus and submontane regions. The aspect is neutral on sandy alluvial terraces and is northern to eastern on slopes. Soils are moderately well-drained, moist, rich and deep (100+ cm). The vegetation is dominated by a closed-canopy forest with a well-developed tall-shrub layer. The forest canopy is dominated by *Fagus grandifolia* and *Acer saccharum*. Other canopy species 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. Community occurrences have been extensively logged, and the canopy openings favor regeneration of *Acer saccharum*."

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

State: 3. Phase 3.1:
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.

Transitional (Abandoned Field)
Plant species dominant: maple (Acer spp.) – Tulip poplar (*Liriodendron tulipifera*) / berries (Rubus spp.)
/ giant ironweed (*Vernonia gigantea*) -fescue (*Schedonorus arundinaceus*)

State 4, Phase 4.1:
Abandoned Cropland
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 pioneers trees.

State 5, Phase 5.1:
Cropland. 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

F120BY013IN	**Moist Terraces** Moist Terraces

Similar sites

F120BY013IN	**Moist Terraces** Moist Terraces

Table 1. Dominant plant species

Tree	(1) *Fagus grandifolia* (2) *Quercus rubra*
Shrub	(1) *Lindera benzoin* (2) *Asimina triloba*
Herbaceous	(1) *Vitis* (2) *Parthenocissus quinquefolia*

Physiographic features

These soils are generally found on terraces and floodplain steps.

Table 2. Representative physiographic features

Landforms	(1) Terrace (2) Flood-plain step
Runoff class	Very low to very high
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	None to very rare
Ponding frequency	None
Elevation	104–311 m
Slope	0–50%
Water table depth	46–183 cm
Aspect	Aspect is not a significant factor

Climatic features

Influencing water features

There are generally no influencing water features although a few sites may incur very rare flooding.

Soil features

These sites are well drained and located mainly on terraces. Representative soils include: Elk, Elkinsville, Elkinsville Variant, Markland, Martinsville, Millstone.

It is anticipated that field inspections will result in this group being further divided based on water table depth and pH. Markland soils have a much higher pH that the other soils in this group and understory plant differences are likely.

Table 3. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Loam (2) Silt loam (3) Silty clay loam
Family particle size	(1) Fine-loamy
Drainage class	Moderately well drained to well drained
Permeability class	Slow to moderately slow
Soil depth	183 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Soil reaction (1:1 water) (0-101.6cm)	4.5–7.5
Subsurface fragment volume <=3" (Depth not specified)	0–3%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

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State and transition model

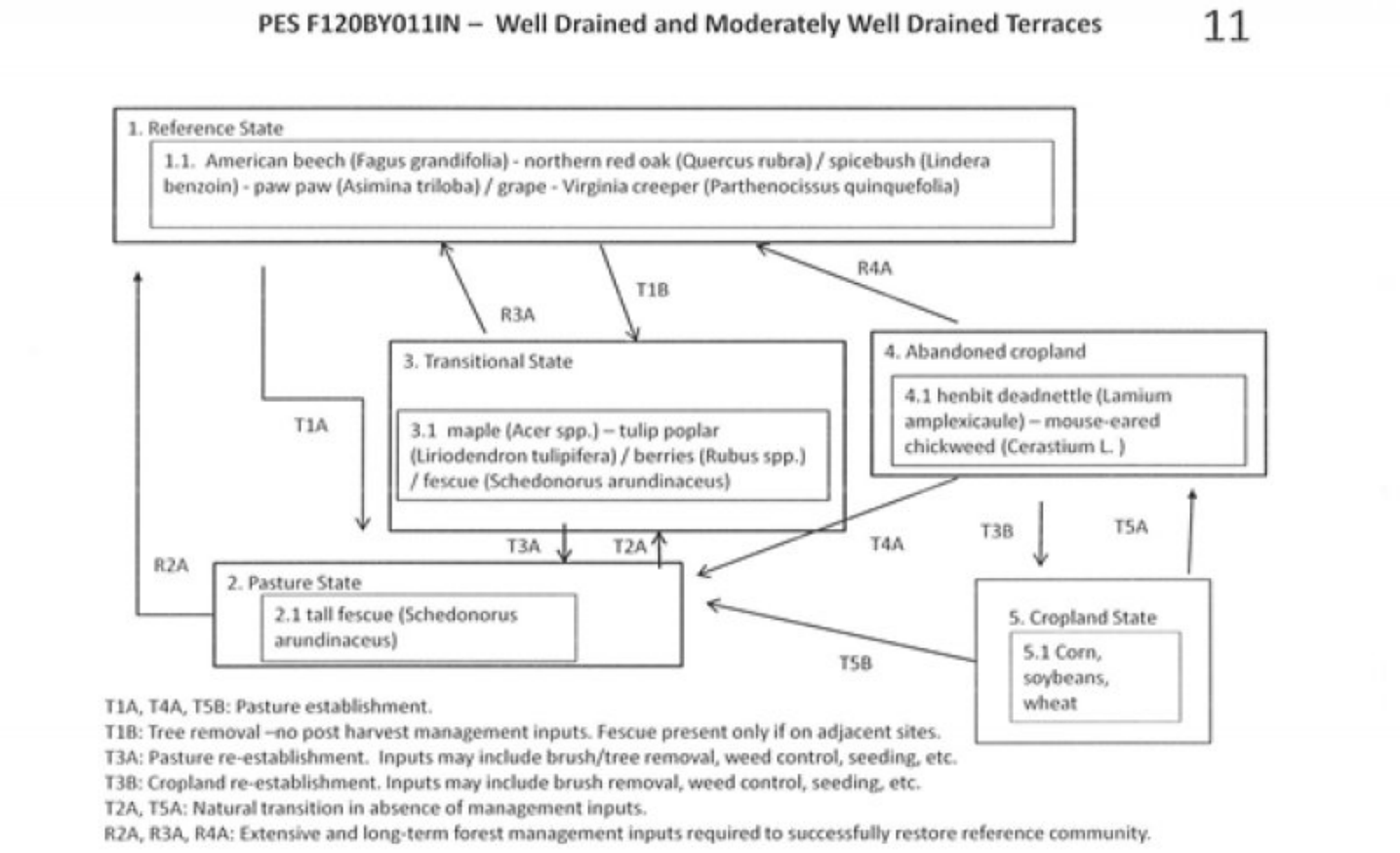

Figure 2. MLRA 120B, Group 11

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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NatureServe 2020. NatureServe Explorer: An Online Encyclopedia of Life [web application]. NatureServe, Arlington, VA. (http://explorer.natureserve.org)
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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	05/21/2025
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):

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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:**
