

Ecological site F115XA002IL

Silty Backslope

Last updated: 12/30/2024
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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): 115X–Central Mississippi Valley Wooded Slopes

This MLRA is characterized by deeply dissected, loess-covered hills bordering well defined valleys of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers and their tributaries. It is used to produce cash crops and livestock. About one-third of the area is forested, mostly on the steeper slopes. This area is in Illinois (50 percent), Missouri (36 percent), Indiana (13 percent), and Iowa (1 percent) in two separate areas. It makes up about 25,084 square miles (64,967 square kilometers). Most of this area is in the Till Plains section and the Dissected Till Plains section of the Central Lowland province of the Interior Plains. The Springfield-Salem plateaus section of the Ozarks Plateaus province of the Interior Highlands occurs along the Missouri River and the Mississippi River south of the confluence with the Missouri River. The nearly level to very steep uplands are dissected by both large and small tributaries of the Illinois, Mississippi, Missouri, Ohio, and Wabash Rivers. The Ohio River flows along the southernmost boundary of this area in Indiana. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to undulating. Karst topography is common in some parts along the Missouri and Mississippi Rivers and their tributaries. Well-developed karst areas have hundreds of sinkholes, caves, springs, and losing streams. In the St. Louis area, many of the karst features have been obliterated by urban development. Elevation ranges from 90 feet (20 meters) on the southernmost flood plains to 1,030 feet (320 meters) on the highest ridges. Local relief is mainly 10 to 50 feet (3 to 15 meters) but can be 50 to 150 feet (15 to 45 meters) in the steep, deeply dissected hills bordering rivers and streams. The bluffs along the major rivers are generally 200 to 350 feet (60 to 105 meters) above the valley floor. The uplands in this MLRA are covered almost entirely with Peoria Loess. The loess can be more than 7 feet (2 meters) thick on stable summits. On the steeper slopes, it is thin or does not occur. In Illinois, the loess is underlain mostly by Illinoian-age till that commonly contains a paleosol. Pre-Illinoian-age till is in parts of this MLRA in Iowa and Missouri and to a minor extent in the western part of Illinois. Wisconsin-age outwash, alluvial deposits, and sandy eolian material are on some of the stream terraces and on dunes along the major tributaries. The loess and glacial deposits are underlain by several bedrock systems. Pennsylvanian and Mississippian bedrock are the most extensive. To a lesser extent are Silurian, Devonian, Cretaceous, and Ordovician bedrock. Karst areas have formed where limestone is near the surface, mostly in the southern part of the MLRA along the Mississippi River and some of its major tributaries. Bedrock outcrops are common on the bluffs along the Mississippi, Ohio, and Wabash Rivers and their major tributaries and at the base of some steep slopes along minor streams and drainageways. The annual precipitation ranges from 35 to 49 inches (880 to 1,250 millimeters) with a mean of 41 inches (1,050 millimeters). The annual temperature ranges from 48 to 58 degrees F (8.6 to 14.3 degrees C) with a mean of 54 degrees F (12.3 degrees C). The freeze-free period ranges from 150 to 220 days with a mean of 195 days. Soils The dominant soil orders are Alfisols and, to a lesser extent, Entisols and Mollisols. The soils in the area have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed or smectitic mineralogy. They are shallow to very deep, excessively drained to poorly drained, and loamy, silty, or clayey. The soils on uplands in this area support natural hardwoods. Oak, hickory, and sugar maple are the dominant species. Big bluestem, little bluestem, and scattered oak and eastern redcedar grow on some sites. The soils on flood plains support mixed forest vegetation, mainly American elm, eastern cottonwood, river birch, green ash, silver maple, sweetgum, American sycamore, pin oak, pecan, and willow. Sedge and grass meadows and scattered trees are on some low-lying sites. (United States Department of Agriculture, Natural Resources Conservation Service, 2022)

LRU notes

Most of this LRU (Land Resource Unit) is in the glaciated Till Plains Section of the Central Lowland Province of the Interior Plains. The southeast corner is in the Highland Rim Section (locally known as the Shawnee Hills Section) of the Interior Low Plateaus Province of the Interior Plains. The nearly level to very steep uplands in this MLRA are dissected by both large and small tributaries of the Wabash and Ohio Rivers. Well defined valleys with broad flood plains and numerous stream terraces are along the major streams and rivers. The flood plains along the smaller streams are narrow. Broad summits are nearly level to gently sloping. This area is covered almost entirely with Wisconsin loess. The loess can be more than 7 feet (2 meters) thick on stable summits. On the steeper slopes, it is thin or does not occur. The loess throughout the area is underlain dominantly by glacial till. Wisconsin outwash, alluvial deposits, and sandy eolian

material are on some of the stream terraces and on dunes along the major tributaries in the area. The loess and glacial drift are underlain by Pennsylvanian-age bedrock. Bedrock outcrops are common in the walls of the valleys along the Wabash and Ohio Rivers and at the base of some steep slopes along minor streams and drainageways. The dominant soil orders in this LRU are Alfisols, Entisols, Inceptisols, and Mollisols. The soils in the area have a mesic soil temperature regime, a udic or aquic soil moisture regime, and dominantly mixed or smectitic mineralogy. The soils are very deep, poorly drained to excessively drained, and loamy, silty, or clayey. Nearly level Endoaqualfs (Iva series) and Argiaquolls (Ragsdale series) formed in loess on broad upland summits and flats. Nearly level to steep Hapludalfs (Alford, Iona, Muren, Stoy, and Sylvan series) and Fragiudalfs (Hosmer series) formed in loess on uplands. Hapludalfs (Alvin, Bloomfield, and Princeton series) and Argiudolls (Ade series) formed in sandy eolian material in areas of dunes on uplands and stream terraces. Steep and very steep Hapludalfs (Hickory series) formed in Illinoian till along the major streams and dissected upland drainageways. Hapludalfs (Wellston series) formed in siltstone or sandstone residuum on strongly sloping to steep side slopes underlain by bedrock. The soils in the major stream valleys include Hapludolls (Carmi series), Argiudolls (Elston series), and Hapludalfs (Skelton series), all of which formed in outwash on nearly level to moderately sloping stream terraces and outwash plains. Endoaquolls (Montgomery series), Endoaquepts (Zipp series), Epiaqualfs (McGary series), and Hapludalfs (Shircliff and Markland series) formed in clayey lacustrine sediments on nearly level to strongly sloping lacustrine terraces or lake plains. Endoaquepts (Evansville series), Endoaquolls (Patton series), and Hapludalfs (Henshaw and Uniontown series) formed in silty sediments on terraces and lake plains. LRU notes (excerpts from Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. USDA Handbook 296, 2006)

Classification relationships

Major Land Resource Area (MLRA) (USDA-NRCS, 2022): 115X–Central Mississippi Valley Wooded Slopes U.S. Forest Service Ecoregions (Cleland et al. 2007): Domain: Humid Temperate Domain Division: Hot Continental Division Province: Eastern Broadleaf Forest (Continental) Province Code: 222 Section Code: 222G, 222D These PES sites are similar to other established ecological classifications. Field verification is needed to confirm the association. International Vegetation Classification Hierarchy Class: 1. Forest & Woodland Subclass: 1.B. Temperate & Boreal Forest & Woodland Formation: 1.B.2. Cool Temperate Forest & Woodland Division: 1.B.2.Na. Eastern North American Forest & Woodland Macrogroup: M012. Central Midwest Oak Forest, Woodland & Savanna Group: G649. North-Central Oak - Hickory Forest & Woodland Alliance: A3323. Quercus alba - Quercus rubra - Carya spp. North-Central Forest Alliance Associated Ecological Sites

Ecological site concept

The historic pre-European settlement vegetation or reference plant community was an oak-hickory forest. These sites are generally on sites with slopes over 18 – 70%. The reference ecological site includes multiple codominant species including white oak (*Quercus alba*), black oak (*Quercus velutina*), red hickory (*Carya ovalis*), shagbark hickory (*Carya ovata*), scarlet oak (*Quercus coccinea*), and/or pignut hickory (*Carya glabra*). Post oak (*Q. stellata*) and chestnut oak (*Q. montana*) may be present on the driest sites. Other trees on site may include black cherry (*Prunus serotina*), sassafras (*Sassafras albidum*), and red maple (*Acer rubrum*). The shrub layer is quite variable depending on slope, aspect, and soil characteristics. Species may include greenbrier (*Smilax* spp.), flowering dogwood (*Cornus florida*), and sassafras (*Sassafras albidum*). The herbaceous layer is usually sparse and varies according to slope and aspect. Common species include shining bedstraw (*Galium concinnum*), licorice bedstraw (*Galium circaezans*), panicle leaf ticktrefoil (*Desmodium paniculatum*) and other native forbs and grasses. Historically, natural disturbances such as fire, grazing and wind damage impacted the maintenance and regeneration of these sites. Today, a long-term lack of fire will increase the density of fire-intolerant species such as tulip poplar (*Liriodendron tulipifera*), red maple (*Acer rubrum*), sugar maple (*Acer saccharum*), white ash (*Fraxinus americana*) and basswood (*Tilia americana*).

Associated sites

F115XA001IL	Silty Upland Silty Upland. These sites are on loess uplands but are on sites with less than 18% slope.
F115XA003IL	Wet Silty Upland Wet Silty Upland. These sites are located on loess uplands bur are somewhat poorly to poorly drained.

Similar sites

F115XA001IL	Silty Upland These sites are also on loess uplands, are moderately well drained to well drained, but are on sites with less than 18% slope.
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Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Carya ovata</i>
Shrub	(1) <i>Smilax rotundifolia</i>
Herbaceous	(1) <i>Galium circaezans</i> (2) <i>Desmodium paniculatum</i>

Physiographic features

These sites are located on various landforms including hillslopes, loess bluffs, and loess hills. The hill position is backslope. Elevation of these sites are between 328' to 1348'. Parent material kind and origin is loess. Runoff class is high. These ecological sites do not flood or pond.

Table 2. Representative physiographic features

Landforms	(1) Hills > Hillside (2) Hills > Bluff
Runoff class	Medium to high
Elevation	100 – 410 m
Slope	20 – 70 %
Water table depth	120 – 180 cm
Aspect	W, NW, N, NE, E, SE, S, SW

Climatic features

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.

Table 3 Representative climatic features

Frost-free period (characteristic range)	170-180 days
Freeze-free period (characteristic range)	190-200 days
Precipitation total (characteristic range)	1,120-1,190 mm
Frost-free period (actual range)	170-180 days

Freeze-free period (actual range)	190-200 days
Precipitation total (actual range)	1,020-1,220 mm
Frost-free period (average)	180 days
Freeze-free period (average)	200 days
Precipitation total (average)	1,140 mm

- (1) MT VERNON [USC00126001], Uniontown, IN
- (2) EVANSVILLE REGIONAL AP [USW00093817], Evansville, IN
- (3) PRINCETON 1 W [USC00127125], Princeton, IN
- (4) VINCENNES 5 NE [USC00129113], Vincennes, IN
- (5) TERRE HAUTE CAA AP [USW00093823], Terre Haute, IN

Influencing water features

Silty Backslope sites are not influenced by wetland or riparian water features. Precipitation is the main source of water for these sites, and permeability is moderately slow to slow. Due to slopes, surface runoff water flows to downslope ecological sites.

Soil features

These soils are deep, well-drained, have moderately slow permeability, and are formed in loess. Soil series associated with this site include Alford and Sylvan. All soils in this group are well-drained and have a sodium adsorption ratio of zero. Ph levels range between 4.5 to 8.4, and available water capacity (AWC) generally varies between 7-8 inches. Soils of this ecological site are classified as fine-silty, mesic Alfisols. (NASIS, 2020)

OSD Taxonomic Classes:

Alford: Fine-silty, mixed, superactive, mesic Ultic Hapludalfs

Sylvan: Fine-silty, mixed, superactive, mesic Typic Hapludalfs

Table 4. Representative soil features

Parent material	(1) Loess
Surface texture	(1) Silt loam
Drainage class	Well drained
Permeability class	Slow to moderately slow
Soil depth	150 – 200 cm
Surface fragment cover <=3"	Not specified

Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	17.78 – 20.32 cm
Calcium carbonate equivalent (Depth not specified)	0 – 30 %
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	4.5 – 8.4
Subsurface fragment volume ≤3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

Ecological dynamics

These ecological sites are located on well drained loess uplands throughout LRU 115XA. Historic reference sites were a mature oak-hickory forest with a high level of diversity in the shrub and herbaceous understory. Canopy species included chestnut oak, red hickory, white oak, shagbark hickory, southern red oak, scarlet oak, and black oak. Sub-canopy trees included flowering dogwood, wild black cherry, sassafras, hophornbeam, and red maple.

Density and composition of understory species would be noticeably influenced by slope and aspect. Common species on these sites would include Virginia creeper (*Parthenocissus quinquefolia*), pointedleaf ticktrefoil (*Desmodium glutinosum*), clustered blacksnakeroot (*Sanicula odorata*), spotted geranium (*Geranium maculatum*), American hogpeanut (*Amphicarpaea bracteata*), and shining bedstraw (*Galium concinnum*).

Natural impacts such as drought, wind damage, ice storms, and wildfires influenced these communities over centuries. Periodic fire was one of the disturbances that helped to maintain the oak dominance. Often these fires were of low-severity and helped to clear the litter from the forest floor, reduced shrub, and encourage oak regeneration. Lightning was the usual ignition source; although native Americans did use fire to reduce understory brush, increase forage, and improve hunting. Long-term periods of drought did occur and would have influenced the fire severity thereby altering species composition, shrub density, plant mortality, and tree growth rates.

Cleared sites are often grazed; however, management is limited by slope. Landowners should be aware of potential overgrazing impacts such as soil erosion, soil compaction, water quality impacts, and noxious weeds. Invasive non-native vegetation is a serious concern in many remaining wooded areas as bush honeysuckle, euonymus, Japanese honeysuckle, privet, and other non-native plants have been introduced and are increasing without management controls.

Long-term fire suppression has resulted in many sites transitioning to an oak-maple-hickory forest with a dense understory of sugar maple, red maple, and white ash saplings. In Indiana, tulip poplar has become co-dominant on some sites. Without management inputs such as prescribed fire or timber stand improvement work, oak regeneration is often limited and species composition on these sites will continue to transition toward shade-tolerant, fast-growing tree species.

State and transition model

Figure 7. Silty Backslope STM

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.2 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 7. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 8. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Inventory data references

A Provisional Ecological Site Description (PESD) describes ecological potential and ecosystem dynamics of land areas and their potential management. Ecological sites are linked to soil survey map unit components, which allows for mapping of ecological sites. A PESD with a provisional status represents the lowest tier of documentation that is releasable to the public. No field level data have been collected as part of this PESD. It is expected that a PESD will continue to be refined through field verification and field sampling. Reference and alternative state concepts, including the state-and-transition model and vegetative communities are not yet well-documented and will require field sampling for verification. This document is provisional.

Other references

Brinson, M. M. 1993. A hydrogeomorphic classification for wetlands. Technical Report WRP-DE-4, U.S. Army Corps of Engineers, Engineer Waterways Experiment Station, Vicksburg, MS.

Braun, E. Lucy. 2001. Deciduous forests of eastern North America. Caldwell, N.J.: Blackburn Press.

Cleland, D. T., J. A. Freeouf, J. E. Keys, G. J. Nowacki, C. Carpenter, and W. H. McNab. 2007. Ecological Subregions: Sections and Subsections of the Coterminous United States. USDA Forest Service, General Technical Report WO-76. Washington, DC. 92 pp.

Comer P. J., Faber-Langendoen D, Evans R, Gawler S. C, Josse C, Kittel G, Menard S, Pyne M, Reid M, Schulz K, Snow K, and Teague J. 2003. Ecological Systems of the United States: A Working Classification of U.S. Terrestrial Systems. NatureServe, Arlington, Virginia.

Cowardin, L.M., V. Carter, F. C. Golet, and E.T. LaRoe. 1979. Classification of wetlands and deep water habitats of the United States. U.S. Dept. of Interior, Fish & Wildlife Service, Office of Biological Services, Washington DC. FWS/OBS-79/31. 142 pp.

Homoya, M. A., Abrell, D. B., Aldrich, J. R., & Post, T. W. (1985). The Natural Regions of Indiana. Indiana Academy of Science, 94, 245-269

Jackson, Marion T. 1997. The Natural heritage of Indiana. Bloomington: Indiana University Press, published in association with the Indiana Department of Natural Resources and the Indiana Academy of Science.

LANDFIRE (Landfire National Vegetation Dynamics Database). 2009. Landfire National Vegetation Dynamics Models. Landfire Project, USDA Forest Service, U.S. Department of Interior. (<http://www.LANDFIRE.gov/index.php>: accessed 2020).

Mohlenbrock, R. H. and D. M. Ladd. 1978. Distribution of Illinois Vascular Plants. Southern Illinois Univ. Press, Carbondale and Edwardsville, Ill. 282 pp.

Mohlenbrock, R. H. 2003. Vascular Flora of Illinois, 3rd edition. Carbondale, Illinois: Southern Illinois University Press. 736 pp.

National Cooperative Soil Survey (NCSS). National Cooperative Soil Characterization Database. Available online: <https://ncsslabsdatamart.sc.egov.usda.gov/>. Accessed: 2020.

NatureServe. 2018. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.1. NatureServe, Arlington, Virginia. Available <http://explorer.natureserve.org>. (Association Detail Report: CEG002427) (Accessed: 2020)

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Web Soil Survey (SSS NRCS WSS). Available online at the following link: <https://websoilsurvey.sc.egov.usda.gov/>. Accessed 2020.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Official Soil Series Descriptions (SSS NRCS OSD). Available online. Accessed 2020. <https://soilseries.sc.egov.usda.gov/osdname.aspx>

United States Department of Agriculture, Natural Resources Conservation Service (USDA – NRCS). 2006. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. USDA Handbook 296. 682 pp.

United States Department of Agriculture, Natural Resources Conservation Service.
2022. Land resource regions and major land resource areas of the United States, the Caribbean, and the Pacific Basin. U.S. Department of Agriculture, Agriculture Handbook 296.

USDA, NRCS. 2018. The PLANTS Database (<http://plants.usda.gov>, 1 March 2018). National Plant Data Team, Greensboro, NC 27401-4901 USA.

Voigt, J. W., and R. H. Mohlenbrock. 1964. Plant communities of southern Illinois. Southern Illinois University Press, Carbondale. 202 pp.

Whitaker, John O., Charles J. Amlaner, Marion T. Jackson, George R. Parker, and Peter Evans Scott. 2012. Habitats and ecological communities of Indiana presettlement to present. Bloomington: Indiana University Press.

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Approval

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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	09/15/2026
Approved by	
Approval date	

Composition (Indicators 10 and 12) based on	Annual Production
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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:
