Ecological site F115XA018IL
Wet Clayey Floodplain

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 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 LRU 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, also known as 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. 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) 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

Ecological site concept

This forest community type is found in LRU115XA on low, wet floodplains and backswamps. Soils are poorly drained to very poorly drained and formed in clayey and fine-silty alluvium. Sites have a seasonally high-water table and occasional to frequent flooding. The reference community is a deciduous floodplain forest with a mixed species canopy. However, species composition will be a continuum from wet forest to more open marshland based on flooding frequency and severity. Some sites may flood so frequently that tree density is reduced, and the site is characterized by emergent herbaceous vegetation adapted to flooded and saturated conditions. Frequently ponded and/or flooded sites will have less trees and an array of bulrushes, sedges, cutgrasses, cattails, and loosestrifes. The duration, frequency, and depth of flooding are the primary disturbance factors that maintain a continuum of vegetative community characteristics on Wet Clayey Floodplain ecological sites. (LANDFIRE 2009). Tree species include pin oak (Quercus palustris), silver maple (Acer saccharinum), green ash (Fraxinus pensylvanica), American elm (Ulmus americana), sycamore (Platanus occidentalis), cottonwood (Populus deltoides), hackberry (Celtis spp.), and red maple (Acer rubrum). Pin oak (Quercus palustris), swamp chestnut oak (Quercus michauxii) and sweetgum (Liquidambar styraciflua) are dominant in some areas. Shrub and vine composition and density will be controlled by flooding severity and frequency and often includes possumhaw (Ilex decidua), hawthorn (Crataegus spp.), and swamp rose (Rosa palustris). The forest understory will contain a variety of grasses, bulrushes, cutgrasses, sedges, and forbs influenced by flooding regime. Common species include sweet woodreed (Cinna arundinacea), eastern woodland sedge (Carex blanda), eastern star sedge (Carex rosea), riverbank wildrye (Elymus riparius), Virginia wildrye (Elymus virginicus), bulbous bittercress (Cardamine bulbosa), Pennsylvania sedge (Cardamine pensylvanica), false nettle (Boehmeria cylindrica), Virginia bugleweed (Lycopus virginicus), fowl mannagrass (Glyceria striata), clearweed (Pilea pumila), and star sedge (Carex intumescens). Ground flora on frequently, long-term flooded sites may be rather sparse with a moderate level of species diversity. Today, the historic natural flooding regime has been modified on most streams and rivers. Dams, levees, extensive tiling and ditching throughout the watershed, and agricultural, urban and industrial water use have altered the flooding dynamics and natural hydrology of these riparian systems. Disturbed sites with altered flood regimes can exhibit a variety of trees. NRCS has recorded numerous tree species on these sites including pin oak, tulip poplar, white oak, swamp white oak, sweetgum, ash, American sycamore, eastern cottonwood, northern red oak, and red maple. Flooding and ponding frequency will determine the species composition and create a continuum of community characteristics on these sites.

Associated sites

F115XA012IL	**Clayey Floodplain** Clayey Floodplain. These floodplain sites are better drained than the Wet Clayey Floodplain and exhibit more mesic species.
F115XA013IL	**Silty Floodplain** Silty Floodplain. These sites are moderately well drained or well drained and on floodplains and have more mesic species.

Similar sites

F115XA015IL	**Loamy Floodplain** Wet Silty Floodplain. These floodplain sites share some similar tree species but are formed in silty alluvium and are somewhat poorly drained instead of poorly or very poorly drained.

Table 1. Dominant plant species

Tree	(1) *Quercus palustris*
Shrub	(1) *Ilex decidua* (2) *Crataegus*
Herbaceous	(1) *Carex*

Physiographic features

These sites are located on floodplains, backswamps, and floodplain steps. Elevation of these sites are generally between 328’ to 820’. Parent material kind and origin is clayey alluvium. Water table depth ranges from 9” to the surface. These ecological sites flood occasionally to frequently and ponding ranges from none to frequent.

Table 2. Representative physiographic features

Landforms	(1) Valley > Flood plain
Runoff class	Negligible to low
Flooding frequency	Occasional to frequent
Ponding frequency	None to frequent
Elevation	100 – 250 m
Slope	0 %
Water table depth	0 – 20 cm
Aspect	Aspect is not a significant factor

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. The representative freeze-free period averages ranges from 192-199 days and the representative frost-free period is 171-179.

The following information is based on data taken from weather stations within MLRA 115X as calculated in EDIT.

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

Influencing water features

Wet Clayey Floodplain sites are influenced by flooding and ponding. Flooding is occasional to frequent, and ponding ranges from none to frequent. Many sites have a seasonal highwater table present at a depth of 0”-9” below the surface.

Soil features

These soils are deep to very deep, poorly drained to very poorly drained, and formed in clayey alluvium. Soil series associated with this site include Darwin, Wabash, and Wilhite. Wet Clayey Floodplain sites are occasionally to frequently flooded and located on floodplains and backswamps.

Table 4. Representative soil features

Parent material	(1) Alluvium
Surface texture	(1) Silty clay (2) Silty clay loam
Drainage class	Very poorly drained to poorly drained

Permeability class	Very slow to slow
Depth to restrictive layer	150 – 200 cm
Soil depth	150 – 200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (Depth not specified)	12.7 – 17.78 cm
Calcium carbonate equivalent (Depth not specified)	0 – 20 %
Electrical conductivity (Depth not specified)	Not specified
Sodium adsorption ratio (Depth not specified)	Not specified
Soil reaction (1:1 water) (Depth not specified)	5.1 – 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 occur on low lying floodplains and the reference community is a broadleaf deciduous floodplain forest with a high degree of canopy diversity. Historically, floodplains were a highly dynamic system with frequent flooding that influenced the vegetative composition of these sites. Wet Clayey Floodplain forests occupy a transitional area between the river or stream and the better drained and higher elevation floodplain step and terrace forests. Common species include pin oak (Quercus palustris), silver maple (Acer saccharinum), green ash (Fraxinus pensylvanica), common hackberry (Celtis occidentalis), American elm (Ulmus americana), sycamore (Platanus occidentalis), cottonwood (Populus deltoides), and red maple (Acer rubrum). Swamp chestnut oak (Quercus michauxii) and sweetgum (Liquidambar styraciflua) may be dominant in some sites.

Many rivers and streams today reflect long-term, substantial alterations to the once natural dynamics that controlled these riparian systems. Dams, levees, tiling, ditching, development, agricultural water use/runoff and urban water use/runoff have often modified the once natural flooding regime of these sites. Communities that are immediately adjacent to the water bodies and still subject to frequent flooding will have a vegetative community that is early-successional. However, some sites now have a reduction in flooding frequency that allows for a more stable forest community. Trees recorded by NRCS on these sites include green ash, pin oak, swamp white oak, cottonwood, and sweetgum.

The majority of these sites have been converted to agriculture – either cropland or hayland production. Bank erosion and negative water quality impacts are common when intensive cropping is conducted without watershed buffers. Invasive non-native vegetation is another serious concern in many remaining wooded areas as loosestrife, phragmites, reed canarygrass, euonymus, and other non-native plants have been introduced and are increasing without management controls.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

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

Table 6. Community 2.1 plant community composition

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

Table 7. Community 3.1 plant community composition

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

Table 8. Community 4.1 plant community composition

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

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.

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://ncsslabdatamart.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: CEGL002427) (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

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:

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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:**
