

Ecological site F115XA017IL

Sandy Floodplain

Last updated: 12/30/2024
Accessed: 04/06/2026

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), Epiqualfs (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

These PES sites are similar to other established ecological classifications. Field verification is required to confirm these associations.

1. Forest & Woodland

1.B.3.Na. Eastern North American-Great Plains Flooded & Swamp Forest

1.B.3.Na.1.a. Silver Maple - Eastern Cottonwood Floodplain Forest (A3710)

Elcode: CEG002018

Scientific Name: *Populus deltoides* - *Salix nigra* - *Acer saccharinum* Floodplain Forest

Common (Translated Scientific) Name: Eastern Cottonwood - Black Willow - Silver Maple

Floodplain Forest

Ecological site concept

The historic vegetation on Sandy Floodplain ecological sites is dominated by broadleaf deciduous trees and water-tolerant shrubs. These sites are along stream channels and frequently influenced by flooding. Soils are excessively drained, frequently flooded, and have a low available water capacity. The plant community is in various stages of successional development depending on the severity and frequency of the natural flooding regime.

Community composition depends on the frequency and severity of flooding events. Common species include eastern cottonwood (*Populus deltoides*), silver maple (*Acer saccharinum*), black willow (*Salix nigra*), sandbar willow (*Salix interior*), sedges (*Carex* spp.), lovegrass (*Eragrostis* spp.), rice cutgrass (*Leersia oryzoides*), beggarticks (*Bidens* spp.), mucronate sprangletop (*Leptochloa panicea*), and asters (*Asteraceae* spp.).

Tree diversity will be limited depending on the dynamics of flooding and the associated deposition and scouring of sediments. Thick stands of cottonwood saplings and willow are often found on newly formed sand bars. More stable areas that are not impacted for many years by severe flooding, will have larger trees and more diversity of species. Vegetation communities on these sites will vary depending on the frequency and severity of disturbances.

Associated sites

F115XA005IL	Bedrock Backslope Loamy Floodplain. these sites are on floodplains and are well drained.
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Table 1. Dominant plant species

Tree	(1) <i>Acer saccharinum</i> (2) <i>Populus deltoides</i>
Shrub	(1) <i>Salix nigra</i> (2) <i>Salix interior</i>
Herbaceous	(1) <i>Carex</i>

Physiographic features

These sites are located on floodplains on sandy sites that are excessively drained and frequently flooded. Elevation of these sites are generally between 341' to 699' and slopes vary from 0-4%. Runoff class is negligible, and flooding is frequent.

Table 2. Representative physiographic features

Landforms	(1) Valley > Flood plain
Runoff class	Negligible
Flooding frequency	Frequent
Ponding frequency	None
Elevation	104–213 m
Slope	0–4%
Water table depth	183 cm
Aspect	Aspect is not a significant factor

Climatic features

Precipitation in LRU 115XA generally ranges between 40 to 48 inches. 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 ranges from 192-199 days and the representative frost-free period ranges from 171-179.

The following information is based on data taken from weather stations as provided in EDIT.

Table 3. Representative climatic features

Frost-free period (characteristic range)	171-179 days
Freeze-free period (characteristic range)	192-199 days
Precipitation total (characteristic range)	1,118-1,194 mm
Frost-free period (actual range)	166-180 days
Freeze-free period (actual range)	190-204 days
Precipitation total (actual range)	1,016-1,219 mm
Frost-free period (average)	175 days
Freeze-free period (average)	196 days
Precipitation total (average)	1,143 mm

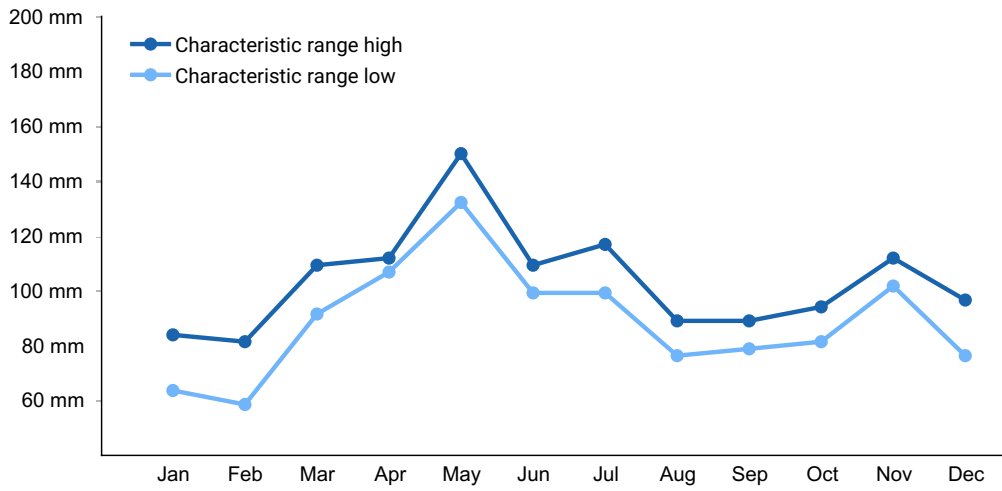


Figure 1. Monthly precipitation range

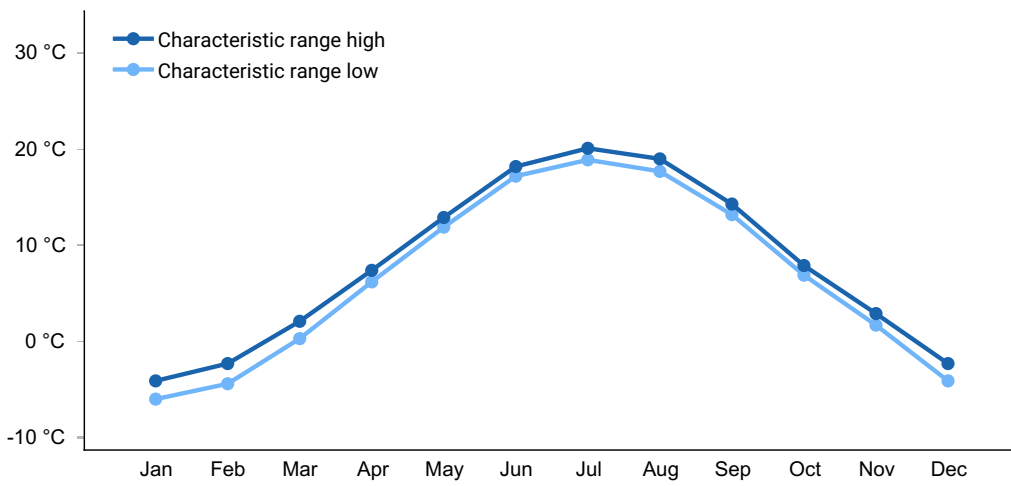


Figure 2. Monthly minimum temperature range

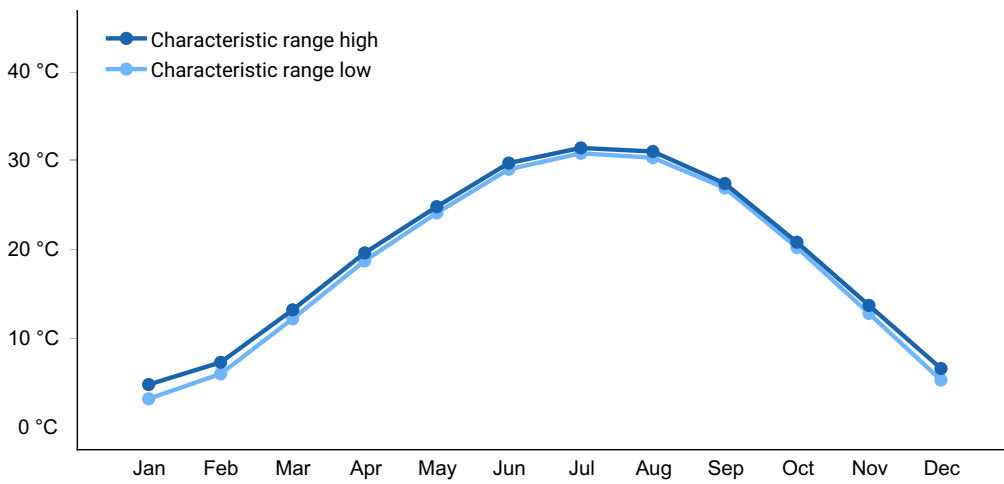


Figure 3. Monthly maximum temperature range

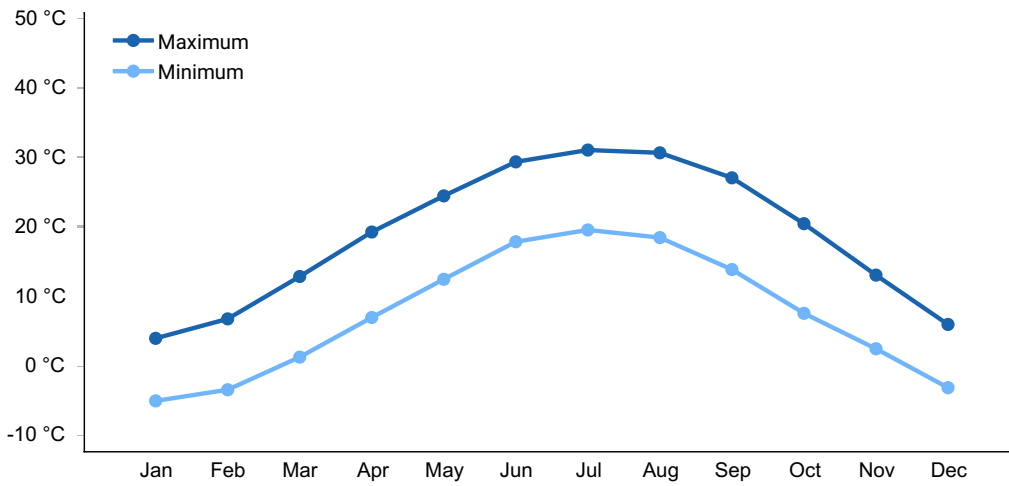


Figure 4. Monthly average minimum and maximum temperature

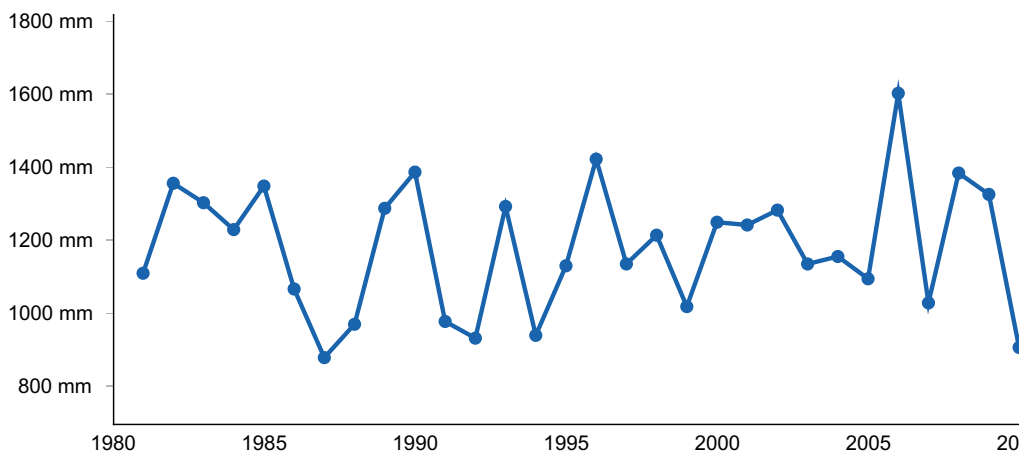


Figure 5. Annual precipitation pattern

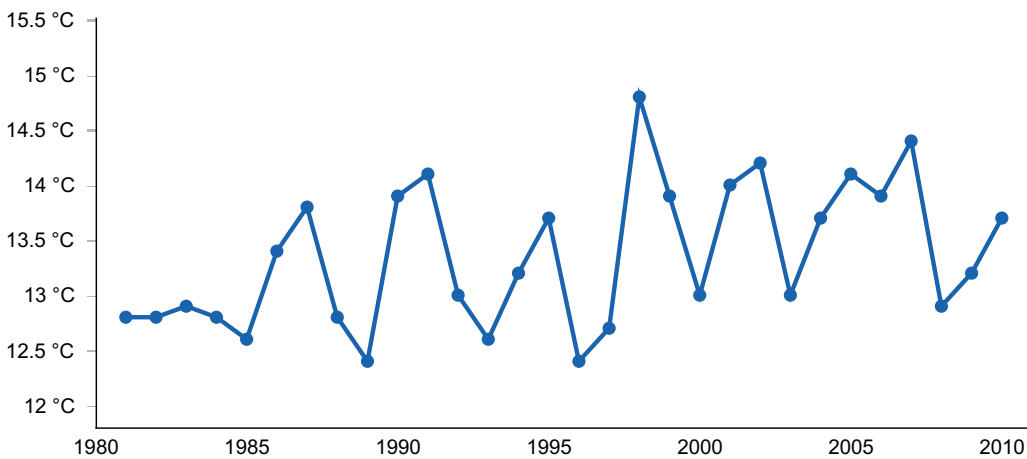


Figure 6. Annual average temperature pattern

Climate stations used

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

- (5) EVANSVILLE REGIONAL AP [USW00093817], Evansville, IN

Influencing water features

Sandy Floodplain ecological sites are frequently flooded. These sites are impacted by the dynamics of flooding regularly.

Soil features

These sites are very deep, excessively drained, with rapid permeability. They are formed in sandy alluvium. Available water capacity (AWC) is low (2"). The taxonomic subgroup is typic Udipsamments and soil name is Psamments.

Table 4. Representative soil features

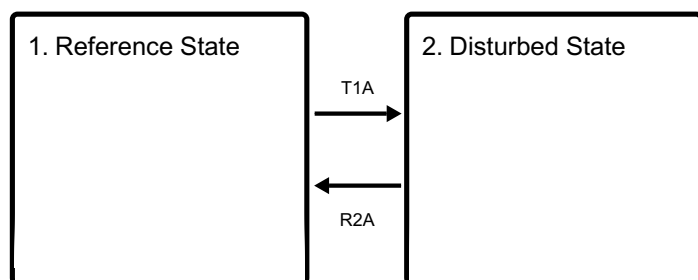
Parent material	(1) Alluvium
Surface texture	(1) Sandy loam (2) Very fine sand
Drainage class	Excessively drained
Permeability class	Rapid
Depth to restrictive layer	152–203 cm
Soil depth	152–203 cm
Surface fragment cover ≤3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	5.08–7.62 cm
Calcium carbonate equivalent (Depth not specified)	10–30%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	7.4–8.4
Subsurface fragment volume ≤3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Sandy Floodplain ecological sites are located within the floodplain on sandy alluvial sites that are frequently impacted by flooding. The historic natural flooding regime impacted the species composition, canopy density, and community structure on these sites. Extended periods without severe flooding will allow tree species such as eastern cottonwood and silver maple to establish along with black willow and sandbar willows. Tree species diversity is limited on these sites due to the continual dynamics of flooding and the deposition and scouring of sediments.

State and transition model

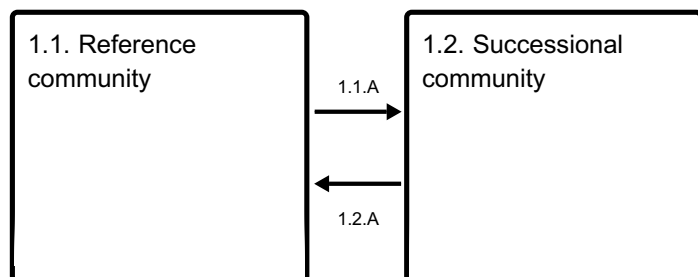
Ecosystem states



T1A - Large scale disturbance

R2A - Weed control, hydrological restoration

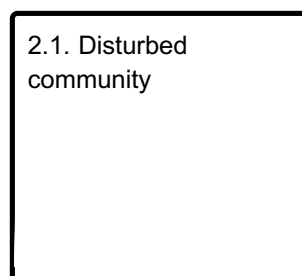
State 1 submodel, plant communities



1.1.A - Severe flooding

1.2.A - Plant community succession

State 2 submodel, plant communities



State 1 Reference State

Two communities are in State 1. The first community is characterized by trees such as eastern cottonwood and silver maple. Tree species have established on site in the absence of severe flooding disturbance. Large scale flood events will move Community 1.1 toward Community 1.2. Community 1.2. is post-disturbance and dominated by shrubs – predominately willows. Natural succession will continue with shrubs increasing and trees. These sites will exhibit a mosaic of early to late successional floodplain forest communities depending on the disturbance regime.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- silver maple (*Acer saccharinum*), tree
- sandbar willow (*Salix interior*), shrub
- black willow (*Salix nigra*), shrub
- sedge (*Carex*), grass
- beggarticks (*Bidens*), other herbaceous

Community 1.1

Reference community

This community is characterized by trees such as eastern cottonwood and silver maple. Tree species have established on site in the absence of large-scale flooding disturbance.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- silver maple (*Acer saccharinum*), tree
- sandbar willow (*Salix interior*), shrub
- black willow (*Salix nigra*), shrub
- sedge (*Carex*), grass
- beggarticks (*Bidens*), other herbaceous

Community 1.2

Successional community

Community 1.2. is post-disturbance, successional, and dominated by shrubs – predominately willows (*Salix* spp.). Natural succession will continue with shrubs increasing and trees becoming established during periods of reduced flooding.

Dominant plant species

- sandbar willow (*Salix interior*), shrub
- black willow (*Salix nigra*), shrub

Pathway 1.1.A

Community 1.1 to 1.2

Large scale flooding moves the community to an early succession stage.

Pathway 1.2.A

Community 1.2 to 1.1

Natural succession will continue with shrubs increasing and trees becoming established during periods of reduced flooding.

State 2

Disturbed State

Today most of these sites have been impacted by human disturbance including clearing, grazing, and hydrological modifications. Remaining wooded areas are generally a narrow band along a stream corridor. Although sites may be small in acreage, they provide critical habitat for wildlife and water quality protection. These wooded areas capture stream sediment and aid in maintaining stable stream banks. Trees present on a site, will depending on the type, length and severity of human disturbance and natural flooding regimes. Sites that have had a long-term absence of flooding will have larger trees and more tree species diversity. Early successional sites will be dominated by cottonwood, maple, and willow. As with upland sites, these floodplain zones are highly vulnerable to invasive species and management support is often necessary to keep native species dominant.

Dominant plant species

- maple (*Acer*), tree
- eastern cottonwood (*Populus deltoides*), tree
- willow (*Salix*), shrub

Community 2.1

Disturbed community

This is a disturbed, successional community that includes a variety of fast-growing trees such as maples. Other species may include maple, and poplar. Shrub and understory species will depend on the type, severity and length of disturbances, available seed sources, and management inputs, if present.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- maple (*Acer*), tree
- sandbar willow (*Salix interior*), shrub
- black willow (*Salix nigra*), shrub

Transition T1A

State 1 to 2

Severe disturbances, such as clearing or selective harvesting, will transition this site to State 2.

Restoration pathway R2A

State 2 to 1

Restoration may include weed control, brush control, and restoration of hydrology.

Additional community tables

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.

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Contributors

Anita Arends, Ecological Site Specialist, USDA-NRCS, Illinois
Ralph Tucker, Soil Survey Office Leader, USDA-NRCS, Missouri
Dena Anderson, Resource Soil Scientist, USDA-NRCS, Indiana
Zack Weber, Soil Scientist, USDA-NRCS, Illinois

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	04/06/2026
Approved by	Suzanne Mayne-Kinney
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:**
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17. **Perennial plant reproductive capability:**
-