Ecological site F110XY028IL
Silty-Loamy Floodplain Forest

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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): 110X–Northern Illinois and Indiana Heavy Till Plain

The Northern Illinois and Indiana Heavy Till Plain (MLRA 110) encompasses the Northeastern Morainal, Grand Prairie, and Southern Lake Michigan Coastal landscapes (Schwegman et al. 1973, WDNR 2015). It spans three states – Illinois (79 percent), Indiana (10 percent), and Wisconsin (11 percent) – comprising about 7,535 square miles (Figure 1). The elevation is about 650 feet above sea level (ASL) and increases gradually from Lake Michigan south. Local relief varies from 10 to 25 feet. Silurian age fractured dolomite and limestone bedrock underlie the region. Glacial drift covers the surface area of the MLRA, and till, outwash, lacustrine deposits, loess or other silty material, and organic deposits are common (USDA-NRCS 2006).

The vegetation in the MLRA has undergone drastic changes over time. At the end of the last glacial episode – the Wisconsinan glaciation – the evolution of vegetation began with the development of tundra habitats, followed by a phase of spruce and fir forests, and eventually spruce-pine forests. Not until approximately 9,000 years ago did the climate undergo a warming trend which prompted the development of deciduous forests dominated by oak and hickory. As the climate continued to warm and dry, prairies began to develop approximately 8,300 years ago. Another shift in climate that resulted in an increase in moisture prompted the emergence of savanna-like habitats from 8,000 to 5,000 years before present (Taft et al. 2009). Forests maintained footholds on steep valley sides, morainal ridges, and wet floodplains. Fire, droughts, and grazing by native mammals helped to maintain the prairies and savannas until the arrival of European settlers, and the forests were maintained by droughts, wind, lightning, and occasional fire (Taft et al. 2009; NatureServe 2018).

Classification relationships

USFS Subregions: Southwestern Great Lakes Morainal (222K) and Central Till Plains and Grand Prairies (251D) Sections; Kenosha-Lake Michigan Plain and Moraines (222Kg), Valparaiso Moraine (Kj), and Eastern Grand Prairie (251Dd) Subsections (Cleland et al. 2007)

U.S. EPA Level IV Ecoregion: Kettle Moraines (53b), Illinois/Indiana Prairies (54a), and Valparaiso-Wheaton Morainal Complex (54f) (USEPA 2013)

National Vegetation Classification – Ecological Systems: North-Central Interior Floodplain (CES202.694) (NatureServe 2018)

National Vegetation Classification – Plant Associations: Quercus macrocarpa – Quercus bicolor – Carya laciniosa/Leersia spp. – Cinna spp. Floodplain Forest (CEGL002098) (Nature Serve 2018)

Biophysical Settings: Central Interior and Appalachian Floodplain (BpS 4914710) (LANDFIRE 2009)

Illinois Natural Areas Inventory: Mesic floodplain forest (White and Madany 1978)

Wisconsin Natural Communities: Floodplain forest (WDNR 2015)

Ecological site concept

Silty-Loamy Floodplain Forests are located within the green areas on the map (Figure 1). They occur on river valleys on floodplains. The soils are Mollisols and Entisols that are somewhat poorly to well drained and very deep, formed in alluvium.

The historic pre-European settlement vegetation on this ecological site was dominated by a dense, closed canopy of deciduous trees and an understory of flood-tolerant, hydrophytic herbaceous plants. Sugar maple (Acer saccharum Marshall) and bur oak (Quercus macrocarpa Michx.) are common tree species present on the site. Other co-dominant tree species include American basswood (Tilia americana L.), white oak (Quercus alba L.), and American elm (Ulmus americana L.) (White and Madany 1978). The shrub layer supports woody shrubs, such as pawpaw (Asimina triloba (L.) Dunal). The understory is comprised of species tolerant of occasional flood disturbances such as Canadian woodnettle (Laportea canadensis (L.) Weddell) and Virginia bluebells (Mertensia virginica (L.) Pers. Ex Link). Brief, seasonal flooding is the primary disturbance factor that maintains this site, while damage from storms and periodic pest outbreaks are secondary disturbances (LANDFIRE 2009).

Associated sites

R110XY027IL	**Ponded Floodplain Marsh** Very poorly to poorly drained alluvium and organic material that experiences flooding and ponding including Houghton, Millington, Sawmill, and Wallkill soils
R110XY029IL	**Wet Floodplain Sedge Meadow** Very poorly to poorly drained alluvium that experiences rare to frequent flooding including Ambraw, Comfrey, Millington, Sawmill, Sawmill variant, Titus, and Zook soils

Table 1. Dominant plant species

Tree	(1) *Acer saccharum* (2) *Quercus macrocarpa*
Shrub	(1) *Asimina triloba*
Herbaceous	(1) *Laportea canadensis* (2) *Mertensia virginica*

Physiographic features

Silty-Loamy Floodplain Forests occur on river valleys on floodplains. They are situated on elevations ranging from approximately 443 to 1499 feet ASL. The site experiences rare to occasional flooding.

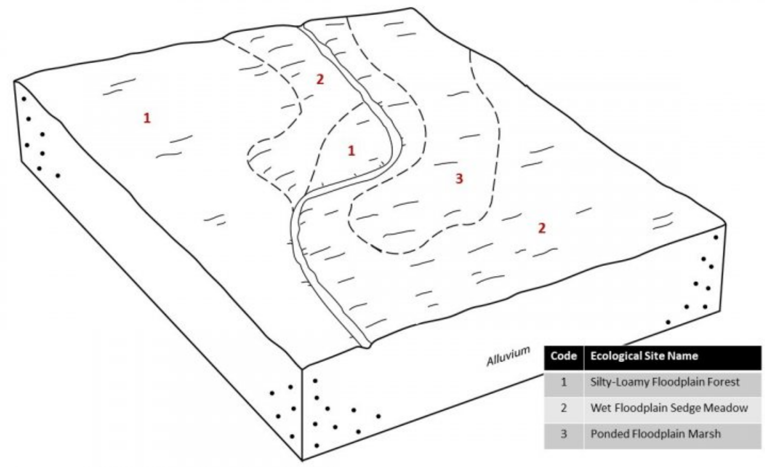


Figure 1. Representative block diagram of Silty-Loamy Floodplain Forest and associated ecological sites.

Figure 2.

Table 2. Representative physiographic features

Slope shape across	(1) Linear
Slope shape up-down	(1) Linear
Landforms	(1) River valley > Flood plain
Runoff class	Negligible
Flooding duration	Brief (2 to 7 days)
Flooding frequency	Rare to occasional
Elevation	443–1,499 ft
Slope	0–2%
Water table depth	18–80 in
Aspect	Aspect is not a significant factor

Climatic features

The Northern Illinois and Indiana Heavy Till Plain falls into the hot-summer humid continental climate (Dfa) and warm-summer humid continental climate (Dfb) Köppen-Geiger climate classifications (Peel et al. 2007). The two main factors that drive the climate of the MLRA are latitude and weather systems. Latitude, and the subsequent reflection of solar input, determines air temperatures and seasonal variations. Solar energy varies across the seasons, with summer receiving three to four times as much energy as opposed to winter. Weather systems (air masses and cyclonic storms) are responsible for daily fluctuations of weather conditions. High-pressure systems are responsible for settled weather patterns where sun and clear skies dominate. In fall, winter, and spring, the polar jet stream is responsible for the creation and movement of low-pressure systems. The clouds, winds, and precipitation associated with a low-pressure system regularly follow high-pressure systems every few days (Angel n.d.).

The soil temperature regime of MLRA 110 is classified as mesic, where the mean annual soil temperature is between 46 and 59°F (USDA-NRCS 2006). Temperature and precipitation occur along a north-south gradient, where temperature and precipitation increase the further south one travels. The average freeze-free period of this ecological site is about 187 days, while the frost-free period is about 150 days (Table 2). The majority of the precipitation occurs as rainfall in the form of convective thunderstorms during the growing season. Average annual precipitation is 37 inches, which includes rainfall plus the water equivalent from snowfall (Table 3). The average annual low and high temperatures are 39.7 and 59.5°F, respectively.

Table 3. Representative climatic features

Frost-free period (characteristic range)	141-159 days
Freeze-free period (characteristic range)	183-192 days

Precipitation total (characteristic range)	36-38 in
Frost-free period (actual range)	136-164 days
Freeze-free period (actual range)	175-194 days
Precipitation total (actual range)	36-38 in
Frost-free period (average)	150 days
Freeze-free period (average)	187 days
Precipitation total (average)	37 in

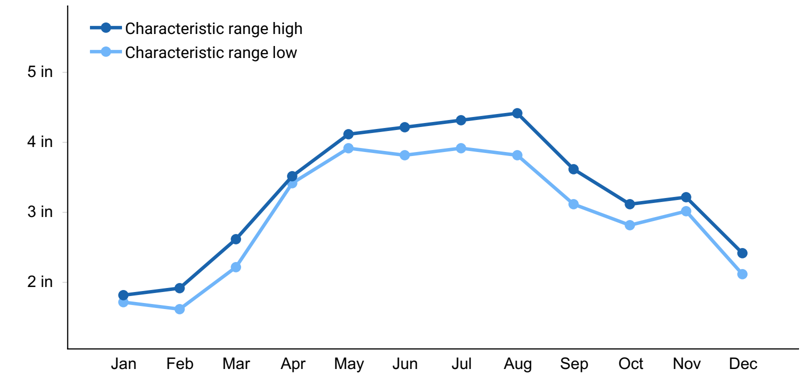


Figure 3. Monthly precipitation range

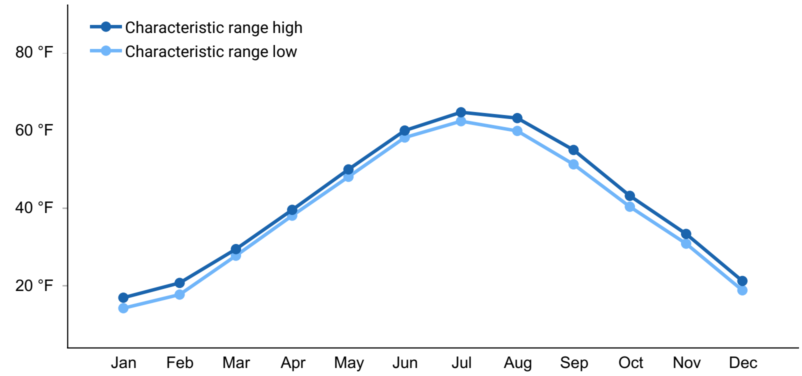


Figure 4. Monthly minimum temperature range

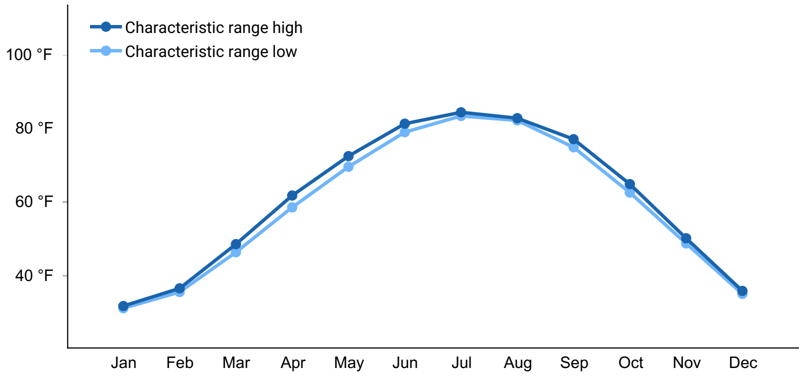


Figure 5. Monthly maximum temperature range

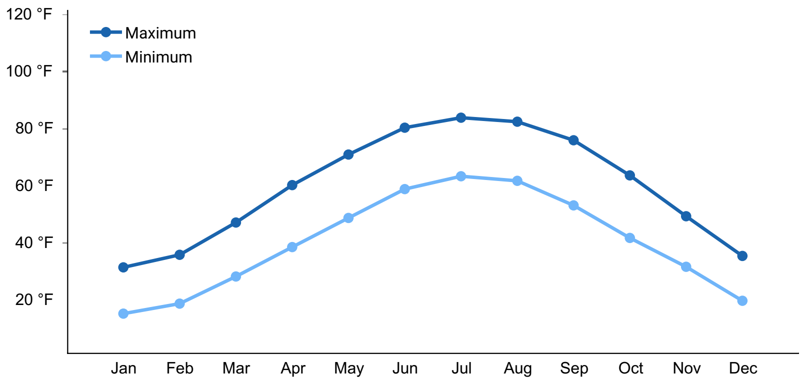


Figure 6. Monthly average minimum and maximum temperature

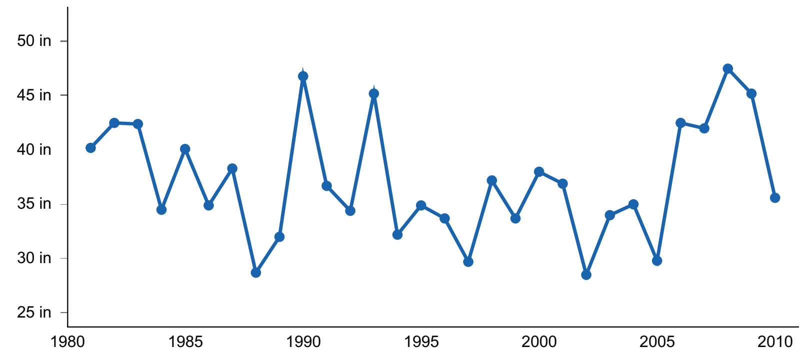


Figure 7. Annual precipitation pattern

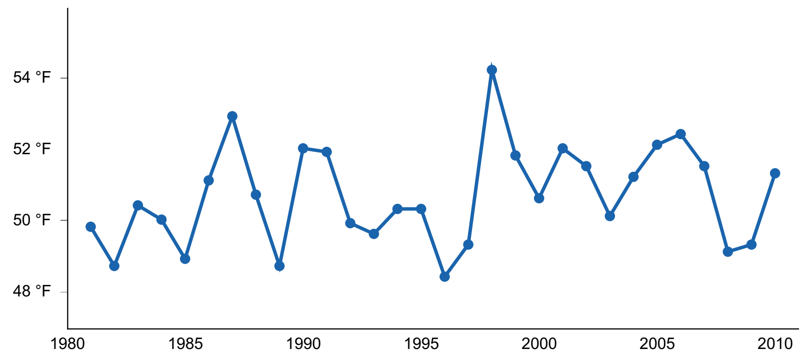


Figure 8. Annual average temperature pattern

Climate stations used

- (1) WATSEKA 2 NW [USC00119021], Watseka, IL
- (2) OTTAWA 5SW [USC00116526], Ottawa, IL
- (3) JOLIET BRANDON RD DAM [USC00114530], Joliet, IL
- (4) GLENVIEW NAS [USW00014855], Glenview, IL
- (5) HALES CORNERS-WHITNALL [USC00473391], Greendale, WI

Influencing water features

Silty-Loamy Floodplain Forests are classified as a RIVERINE: Occasionally Flooded; forested wetland under the Hydrogeomorphic (HGM) classification system (Smith et al. 1995; USDA-NRCS 2008) and as a Palustrine, Forested, Broad-leaved Deciduous, Temporarily Flooded wetland under the National Wetlands Inventory (FGDC 2013). Overbank flow from the channel and subsurface hydraulic connections are the main sources of water for this ecological site (Smith et al. 1995). Infiltration is moderate or very slow (Hydrologic Groups B and D) for undrained soils, and surface runoff is negligible to very high.

Wetland description

Primary wetland hydrology indicators for an intact Silty-Loamy Floodplain Forest may include: A1 Surface water, B1 Water marks, B2 Sediment deposits, B3 Drift deposits, and B9 Water-stained leaves. Secondary wetland hydrology indicators may include: D5 FAC-neutral test (USACE 2010).

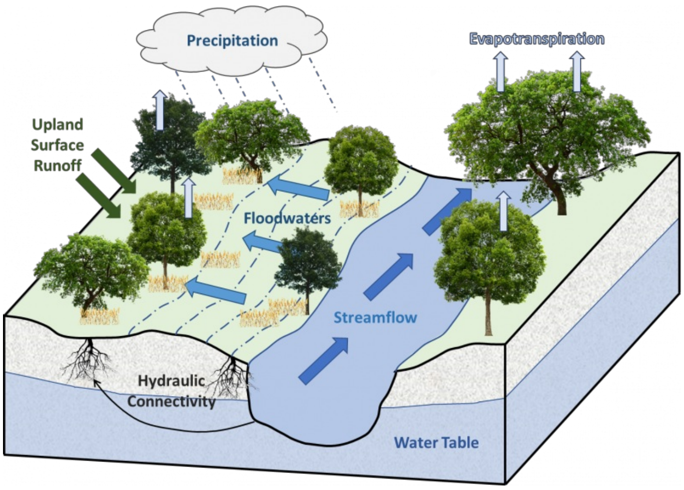


Figure 9. Hydrologic cycling in Silty-Loamy Floodplain Forest ecological site.

Soil features

Soils of Silty-Loamy Floodplain Forests are in the Mollisols and Entisols orders, further classified as Aquic Cumulic Hapludolls, Cumulic Hapludolls, Fluvaquentic Hapludolls, and Typic Udifluvents with very slow to moderate infiltration and negligible to high runoff potential. The soil series associated with this site includes Allison, Dorchester, Du Page, Lawson, Lawson variant, Ross, and Tice. The parent material is alluvium, and the soils are somewhat poorly to well drained and very deep. Soil pH classes are moderately acid to moderately alkaline. No rooting restrictions are noted for the soils of this ecological site.

Some soil map units in this ecological site, if not drained, may meet the definition of hydric soils and are listed as meeting criteria 4 of the hydric soils list (77 FR 12234).

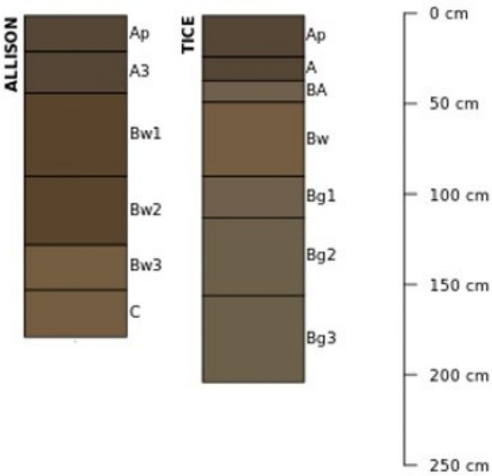


Figure 10. Profile sketches of soil series associated with Silty-Loamy Floodplain Forest.

Table 4. Representative soil features

Parent material	(1) Alluvium
Family particle size	(1) Fine-silty (2) Fine-loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow to moderately slow

Depth to restrictive layer	80 in
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	6–9 in
Calcium carbonate equivalent (Depth not specified)	0–40%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	5.6–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–7%
Subsurface fragment volume >3" (Depth not specified)	1–2%

Ecological dynamics

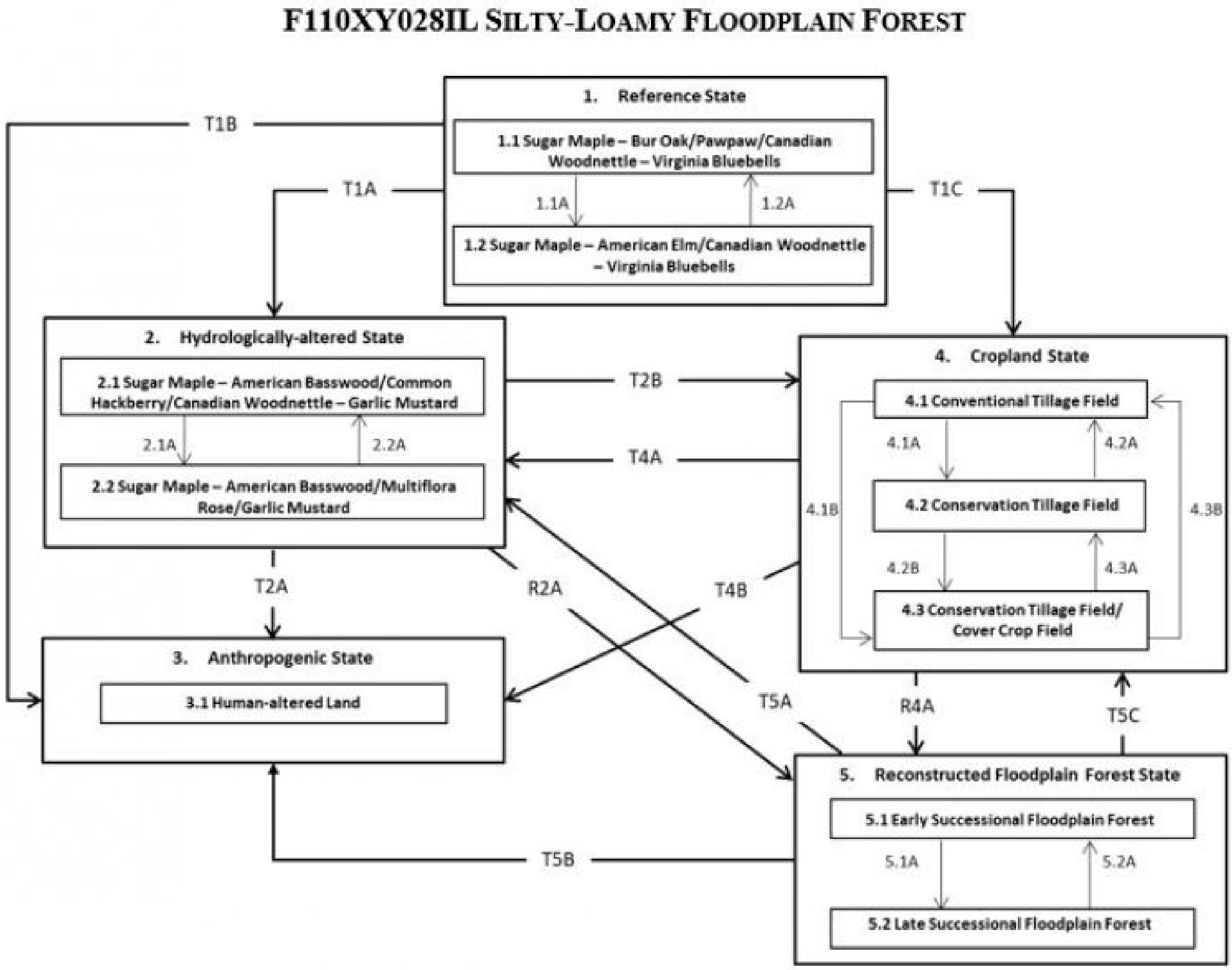
The information in this Ecological Site Description, including the state-and-transition model (STM), was developed based on historical data, current field data, professional experience, and a review of the scientific literature. As a result, all possible scenarios or plant species may not be included. Key indicator plant species, disturbances, and ecological processes are described to inform land management decisions.

The MLRA lies within the tallgrass prairie ecosystem of the Midwest, but a variety of environmental and edaphic factors resulted in landscape that historically supported prairies, savannas, forests, and various wetlands. Silty-Loamy Floodplain Forests form an aspect of this vegetative continuum. This ecological site occurs on floodplains on somewhat poorly to well drained soils. Species characteristic of this ecological site consist of upland and hydrophytic woody and herbaceous vegetation.

Rare to occasional flooding is the dominant disturbance factor in Silty-Loamy Floodplain Forests, and storm damage and pests are secondary disturbances. Seasonal flooding occurs every two to twenty years, and flooding can persist for up to seven days at a time. Damage to trees from wind storms can vary from minor, patchy effects of individual trees to stand effects that temporarily affect community structure and species richness and diversity (Irland 2000; Peterson 2000). Trees are susceptible to a variety of pests (e.g., insects, fungi, cankers, wilts), therefore periodic insect and disease outbreaks play an important role in local canopy structure.

Today, many Silty-Loamy Floodplain Forests have been reduced as a result of conversion to agricultural or other human-modified lands. Remnant sites have been degraded due to significant changes to the natural hydrologic regime and diminished water quality in the watershed. A return to the historic plant community may not be possible due to significant hydrologic and water quality changes in the watershed, but long-term conservation agriculture or habitat reconstruction efforts can help to restore some natural diversity and ecological function. The state-and-transition model that follows provides a detailed description of each state, community phase, pathway, and transition. This model is based on available experimental research, field observations, literature reviews, professional consensus, and interpretations.

State and transition model



Code	Process
1.1A, 1.3A	Natural succession as a result of no disturbances
1.2A	Flood, storm or other stochastic disturbance
T1A, T4A, T5A	Changes to natural hydroperiod and/or land abandonment
2.1A	Increasing frequency of disturbances
2.2A	Decreasing frequency of disturbances
T1B, T2A, T4B, T5B	Vegetation removal and human alterations/transportation of soils
T1C, T2B, T5C	Agricultural conversion via tillage, seeding, and non-selective herbicide
4.1A	Less tillage, residue management
4.1B	Less tillage, residue management, and implementation of cover cropping
4.2B	Implementation of cover cropping
4.2A, 4.3B	Intensive tillage, remove residue, and reinitiate monoculture row cropping
4.3A	Remove cover cropping
R2A, R4A	Site preparation, tree planting, repair hydrology, and non-native species control
5.1A	Timber stand improvement practices implemented
5.2A	Setback from extreme weather event or improper timing of management actions

State 1
Reference State

The reference plant community is categorized as a floodplain forest community, dominated by woody and herbaceous vegetation tolerant of periodic flooding. The two community phases within the reference state are dependent on a regular flood regime. The amount and duration of flooding alters species composition, cover, and extent. Periodic pest outbreaks and windstorms have more localized impacts in the reference phases, but do contribute to overall species composition, diversity, cover, and productivity.

Community 1.1
Sugar Maple - Bur Oak/Pawpaw/Canadian Woodnettle - Virginia Bluebells

Sites in this reference community phase are a closed canopy forest (80 to 100 percent cover), defined by a mixture of trees. Sugar maple, bur oak, American elm, white oak, and American basswood are common trees on the site (White and Madany 1978). Trees are large (21 to 33-inch DBH) and range in height from 30 to over 80 feet tall (LANDFIRE 2009). Canadian woodnettle and Virginia bluebells are dominant species of the herbaceous layer, but other species can include Canadian wildginger (*Asarum canadense* L.), cutleaf toothwort (*Cardamine concatenata* (Michx.) Sw.), and white fawnlily (*Erythronium albidum* Nutt.). Shrubs, such as pawpaw, may be present where light conditions allow. Rare to occasional flooding every 2 to 20 years will maintain this phase, but an extended period of no disturbances will shift the community to phase 1.2.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- bur oak (*Quercus macrocarpa*), tree
- pawpaw (*Asimina triloba*), shrub
- Canadian woodnettle (*Laportea canadensis*), other herbaceous
- Virginia bluebells (*Mertensia virginica*), other herbaceous

Community 1.2
Sugar Maple - American Elm/Canadian Woodnettle - Virginia Bluebells

This reference community phase represents plant community succession. Mature trees are still present, but the canopy dominance shifts as the shade-intolerant species become less prominent. Shrubs are greatly reduced from the fully closed canopy, but the herbaceous layer is maintained. A major flood, atmospheric or other stochastic disturbance event will site to shift back to phase 1.1.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- American elm (*Ulmus americana*), tree
- Canadian woodnettle (*Laportea canadensis*), other herbaceous
- Virginia bluebells (*Mertensia virginica*), other herbaceous

Pathway 1.1A
Community 1.1 to 1.2

Natural succession as a result of no disturbances.

Pathway 1.2A
Community 1.2 to 1.1

Flood, storm, or other stochastic disturbance event.

State 2
Hydrologically-Altered State

Agricultural tile drainage, stream channelization, and levee construction in hydrologically connected waters have drastically changed the natural hydrologic regime of Silty-Loamy Floodplain Forests. In addition, increased amounts of precipitation and intensity have amplified flooding events (Pryor et al. 2014). This has resulted in a type conversion from the species-rich forest to a ruderal floodplain forest state. In addition, exotic species have encroached and continuously spread, reducing native diversity and ecosystem stability.

Community 2.1
Sugar Maple - American Basswood/Common Hackberry/Canadian Woodnettle - Garlic Mustard

This community phase represents a transition in plant community composition as a result of an altered hydrologic regime. Sugar maple and American basswood become the dominant tree canopy species. Common hackberry, honeylocust (*Gleditsia triacanthos* L.), and boxelder (*Acer negundo* L.) are dominant subcanopy species. The herbaceous layer is nearly continuous but lacking in diversity. Canadian woodnettle remains a common native species, and garlic mustard (*Alliaria petiolata* (M. Bieb.) Cavara & Grande) can be a frequently encountered non-native species.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- American basswood (*Tilia americana*), tree
- common hackberry (*Celtis occidentalis*), shrub
- Canadian woodnettle (*Laportea canadensis*), other herbaceous
- garlic mustard (*Alliaria petiolata*), other herbaceous

Community 2.2
Sugar Maple - American Basswood/Multiflora Rose/Garlic Mustard

This community phase represents persisting changes to the natural hydrology of the watershed. The overstory canopy continues to shift as the common hackberry component matures, co-dominating with sugar maple and American basswood. Non-native invasive shrubs – such as multiflora rose (*Rosa multiflora* Thunb.) and Tartarian honeysuckle (*Lonicera tatarica* L.) – become prominent. The understory may continue to be invaded by more non-native species as a result of the frequent disturbances.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- American basswood (*Tilia americana*), tree
- multiflora rose (*Rosa multiflora*), shrub
- garlic mustard (*Alliaria petiolata*), other herbaceous

Pathway 2.1A
Community 2.1 to 2.2

Increasing frequency of disturbances.

Pathway 2.2A
Community 2.2 to 2.1

Decreasing frequency of disturbances.

State 3
Anthropogenic State

The anthropogenic state occurs when the reference state is cleared and developed by human use and inhabitation, such as for commercial and housing developments, landfills, parks, golf courses, cemeteries, earthen spoils, etc. The native vegetation has been removed and soils have either been altered in place (e.g. cemeteries) or transported from one location to another (e.g. housing developments). Most of the soils in this state have 50 to 100 cm of overburden on top of the natural soil. This natural material can be determined by observing a buried surface horizon or the unaltered subsoil, till, or lacustrine parent materials. This state is generally considered permanent.

Community 3.1
Human-altered land

Sites in this community phase have had the native plant community removed and soils heavily re-worked in support of human development projects.

State 4
Cropland State

The continuous use of tillage, row-crop planting, and chemicals (i.e., herbicides, fertilizers, etc.) has effectively eliminated the reference community and many of its natural ecological functions in favor of crop production. Corn and soybeans are the dominant crops for the site, and common wheat (*Triticum aestivum* L.) and alfalfa (*Medicago sativa* L.) may be rotated periodically. These areas are likely to remain in crop production for the foreseeable future.

Community 4.1
Conventional Tillage Field

Sites in this community phase typically consist of monoculture row-cropping maintained by conventional tillage practices. They are cropped in either continuous corn or corn-soybean rotations. The frequent use of deep tillage, low crop diversity, and bare soil conditions during the non-growing season negatively impacts soil health. Under these practices, soil aggregation is reduced or destroyed, soil organic matter is reduced, erosion and runoff are increased, and infiltration is decreased, which can ultimately lead to undesirable changes in the hydrology of the watershed (Tomer et al. 2005).

Community 4.2
Conservation Tillage Field

This community phase is characterized by rotational crop production that utilizes various conservation tillage methods to promote soil health and reduce erosion. Conservation tillage methods include strip-till, ridge-till, vertical-till, or no-till planting systems. Strip-till keeps seedbed preparation to narrow bands less than one-third the width of the row where crop residue and soil consolidation are left undisturbed in-between seedbed areas. Strip-till planting may be completed in the fall and nutrient application either occurs simultaneously or at the time of planting. Ridge-till uses specialized equipment to create ridges in the seedbed and vegetative residue is left on the surface in between the ridges. Weeds are controlled with herbicides and/or cultivation, seedbed ridges are rebuilt during cultivation, and soils are left undisturbed from harvest to planting. Vertical-till systems employ machinery that lightly tills the soil and cuts up crop residue, mixing some of the residue into the top few inches of the soil while leaving a large portion on the surface. No-till management is the most conservative, disturbing soils only at the time of planting and fertilizer application. Compared to conventional tillage systems, conservation tillage methods can improve soil ecosystem function by reducing soil erosion, increasing organic matter and water availability, improving water quality, and reducing soil compaction.

Community 4.3
Conservation Tillage Field/Alternative Crop Field

This community phase applies conservation tillage methods as described above as well as adds cover crop practices. Cover crops typically include nitrogen-fixing species (e.g., legumes), small grains (e.g., rye, wheat, oats), or forage covers (e.g., turnips, radishes, rapeseed). The addition of cover crops not only adds plant diversity but also promotes soil health by reducing soil erosion, limiting nitrogen leaching, suppressing weeds, increasing soil organic matter, and improving the overall soil ecosystem. In the case of small grain cover crops, surface cover and water infiltration are increased, while forage covers can be used to graze livestock or support local wildlife. Of the three community phases for this state, this phase promotes the greatest soil sustainability and improves ecological functioning within a cropland system.

Pathway 4.1A
Community 4.1 to 4.2

Tillage operations are greatly reduced, crop rotation occurs on a regular interval, and crop residue remains on the soil surface.

Pathway 4.1B
Community 4.1 to 4.3

Tillage operations are greatly reduced or eliminated, crop rotation occurs on a regular interval, crop residue remains on the soil surface, and cover crops are planted following crop harvest.

Pathway 4.2A
Community 4.2 to 4.1

Intensive tillage is utilized, and monoculture row-cropping is established.

Pathway 4.2B
Community 4.2 to 4.3

Cover crops are implemented to minimize soil erosion.

Pathway 4.3B
Community 4.3 to 4.1

Intensive tillage is utilized, cover crop practices are abandoned, monoculture row-cropping is established, and crop rotation is reduced or eliminated.

Pathway 4.3A
Community 4.3 to 4.2

Cover crop practices are abandoned.

State 5
Reconstructed Floodplain Forest State

The combination of natural and anthropogenic disturbances occurring today has resulted in numerous ecosystem health issues, and restoration back to the historic reference state may not be possible. Many natural forest communities are being stressed by non-native diseases and pests, habitat fragmentation, permanent changes in hydrologic regimes, and overabundant deer populations on top of naturally occurring disturbances (severe weather and native pests) (IFDC 2018). However, these habitats provide multiple ecosystem services including carbon sequestration; clean air and water; soil conservation; biodiversity support; wildlife habitat; as well as a variety of cultural activities (e.g., hiking, hunting) (Millennium Ecosystem Assessment 2005; IFDC 2018). Therefore, conservation of floodplain forests should still be pursued. Habitat reconstructions are an important tool for repairing natural ecological functioning and providing habitat protection for numerous species of Silty-Loamy Floodplain Forests. Therefore, ecological restoration should aim to aid the recovery of degraded, damaged, or destroyed ecosystems. A successful restoration will have the ability to structurally and functionally sustain itself, demonstrate resilience to the ranges of stress and disturbance, and create and maintain positive biotic and abiotic interactions (SER 2002). The reconstructed floodplain forest state is the result of a long-term commitment involving a multi-step, adaptive management process.

Community 5.1
Early Successional Reconstructed Forest

This community phase represents the early community assembly from forest reconstruction. It is highly dependent on the current condition of the site based on past and current land management actions, invasive species, and proximity to land populated with non-native pests and diseases. Therefore, no two sites will have the same early successional composition. Technical forestry assistance should be sought to develop suitable conservation management plans.

Community 5.2
Late Successional Reconstructed Forest

Appropriately timed management practices (e.g. forest stand improvement, continuing integrated pest management) applied to the early successional community phase can help increase the stand maturity, pushing the site into a late successional community phase over time. A late successional reconstructed forest will have an uneven-aged, closed canopy, and a well-developed understory.

Pathway 5.1A
Community 5.1 to 5.2

Application of stand improvement practices in line with a developed management plan.

Pathway 5.2A
Community 5.2 to 5.1

Reconstruction experiences a setback from extreme weather event or improper timing of management actions.

Transition T1A
State 1 to 2

Altered hydrology throughout the watershed transitions the site to the hydrologically-altered state (2).

Transition T1B
State 1 to 3

Vegetation removal and human alterations/transportation of soils transitions the site to the anthropogenic state (3).

Transition T1C
State 1 to 4

Woody species removal, tillage, seeding of agricultural crops, and non-selective herbicide transition the site to the cropland state (4).

Transition T2A
State 2 to 3

Vegetation removal and human alterations/transportation of soils transitions the site to the anthropogenic state (3).

Transition T2B
State 2 to 4

Woody species removal, tillage, seeding of agricultural crops, and non-selective herbicide transition the site to the cropland state (4).

Restoration pathway R2A
State 2 to 5

Site preparation, tree planting, timber stand improvement, non-native species control, and water control structures installed to improve and regulate hydrology transition this site to the reconstructed floodplain forest state (5).

Transition T4A
State 4 to 2

Land abandonment transitions the site to the hydrologically-altered state (2).

Transition T4B
State 4 to 3

Vegetation removal and human alterations/transportation of soils transitions the site to the anthropogenic state (3).

Restoration pathway R4A
State 4 to 5

Site preparation, tree planting, timber stand improvement, non-native species control, and water control structures installed to improve and regulate hydrology transition this site to the reconstructed floodplain forest state (5).

Transition T5A
State 5 to 2

Removal of water control structures and unmanaged invasive species populations transition this site to the hydrologically-altered state (2).

Transition T5B
State 5 to 3

Vegetation removal and human alterations/transportation of soils transitions the site to the anthropogenic state (3).

Transition T5C
State 5 to 4

Tree removal, tillage, seeding of agricultural crops, and non-selective herbicide transition this site to the cropland state (4).

Additional community tables

Inventory data references

No field plots were available for this site. A review of the scientific literature and professional experience were used to approximate the plant communities for this provisional ecological site. Information for the state-and-transition model was obtained from the same sources. All community phases are considered provisional based on these plots and the sources identified in this ecological site description.

• Vegetation described in the reference state was derived from unpublished cluster analyses performed by Illinois Natural Heritage Survey staff in 2012 for a draft Mesic Floodplain Forest ecological site description.

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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	05/11/2025
Approved by	Chris Tecklenburg

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:**
