

Ecological site F108XD902IA Sandy/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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 108X-Illinois and Iowa Deep Loess and Drift

The Illinois and Iowa Deep Loess and Drift, Western Part MLRA covers parts of both Iowa and Missouri, and is known locally as part of the Southern Iowa Drift Plain. A silty loess deposit of varied thickness from 5 to 20 feet covers a series of glacial advances known collectively as pre-Illinoisan till. This till, deposited more than half a million years ago, was subjected to multiple instances of extreme erosion, as well as periods of subdued erosion and intense weathering. The loess thickness is deepest in the western part and generally thins eastward. In some areas, the loess has been removed entirely exposing the older weathered till called a "paleosol". These highly weathered soils are high in clay and slow down the downward movement of water through the profile causing it to move laterally instead of vertically. Wet areas, or "side-hill seeps" commonly form where these paleosols become exposed along hillsides (Prior, 1991).

The dominant soil orders in this MLRA are Mollisols and Alfisols and to a lesser extent Entisols and Inceptisols. Most of the soils are Udolls or Udalfs. Aquolls are on the flatter interfluves. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They generally are very deep, well drained to poorly drained, and silty, loamy, or clayey. These soils on uplands include somewhat poorly drained, nearly level Argiudolls (Macksburg series); moderately well drained, gently sloping to strongly sloping Argiudolls (Sharpsburg series); poorly drained, nearly level Argiaquolls (Winterset series); and well drained strongly sloping to steep Hapludalfs (Gara, Lindley, Ladoga, Armstrong, series) (USDA-NRCS Handbook 296). The western part of the Illinois and Iowa Deep Loess and Drift is a segment of three other MLRAs within the Central Feed Grains and Livestock Region. The other areas are: the West-Central part (108C), the East-Central part (108B) and the Eastern part (108A).

Classification relationships

Major Land Resource Area (MLRA): Illinois and Iowa Deep Loess and Drift, Western Part (108D)

USFS Subregions: Central Dissected Till Plains Section (251C); Loess Hills (251Cb) and Central Dissected Till and Loess Plain (251Cc) Subsections (Cleland et al, 2007)

Relationship to Other Established Classifications:

NatureServe Classification: Ecological System: North-Central Interior Floodplain (9338); Ecological Association: Central Green Ash - Elm - Hackberry Forest (NatureServe, 2013)

Landfire Biophysical Setting: Central Interior and Appalachian Floodplain Systems (4314710) (Landfire, 2009)

Ecological site concept

Sandy/Loamy Floodplains are within the red areas on the map (Figure 1). These sites formed alluvial parent material and can be found on floodplains in river valleys. Typically these sites are located intermingled with Loamy Floodplain and Wet Floodplain ecological sites. Soils are typically Entisols, characterized by thin variable surfaces containing a wide range of organic matter due to the repeated deposits as a result of flooding. Plant communities consist of mostly trees, forbs, grasses and few sedges.

Associated sites

F108XD901IA	Loamy Floodplain Forest Loam Floodplain Forest. Fine-silty and coarse-loamy soil including Nodaway, Landes, Kennebec and Huntsville series.
R108XD904IA	Wet Floodplain Prairie Wet Floodplain Prairie. Fine, fine-silty and fine-loamy soils including Ackmore, Amana, Aquents, Carlow, Colo, Fluvaquents, Lawson, Mt. Sterling, Spillville, Vesser, Wabash, Zook and Coland series

Similar sites

F108XD901IA	Loamy Floodplain Forest
	Loam Floodplain Forest. Fine-silty and coarse-loamy soil including Nodaway, Landes, Kennebec and
	Huntsville series.

Table 1. Dominant plant species

Tree	(1) Celtis occidentalis(2) Aesculus glabra
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

Sandy/Loamy Floodplains are of medium extent, and can be found on floodplains in river valleys along streams and rivers in MLRA 108D. These sites are within a dissected till plain landscape. Slopes are generally less than 2 percent.

Landforms	(1) Till plain
Runoff class	Low
Flooding frequency	None
Ponding frequency	None
Elevation	500–1,400 ft
Slope	0–2%
Water table depth	36–78 in
Aspect	Aspect is not a significant factor

Table 2. Representative physiographic features

Climatic features

The soil temperature regime of MLRA 108D is classified as "mesic" where the mean annual soil temperature is between 46 and 59°F (Soil Survey Staff, 2014). The average freeze-free period of this ecological site is about 172 days, while the frost-free period is about 148 days. Average annual precipitation is 32 inches, which includes rainfall plus the water equivalent from snowfall. The average annual low and high temperatures are 39 and 60°F, respectively.

Table 3. Representative climatic features

Frost-free period (characteristic range)	134-141 days
Freeze-free period (characteristic range)	157-170 days
Precipitation total (characteristic range)	35-36 in
Frost-free period (actual range)	133-141 days
Freeze-free period (actual range)	157-173 days
Precipitation total (actual range)	35-36 in
Frost-free period (average)	138 days
Freeze-free period (average)	164 days
Precipitation total (average)	36 in

Climate stations used

- (1) INDIANOLA 2W [USC00134063], Indianola, IA
- (2) GREENFIELD [USC00133438], Greenfield, IA
- (3) WINTERSET 1N [USC00139132], Winterset, IA
- (4) CLARINDA [USC00131533], Clarinda, IA

Influencing water features

Soils are moderately well to excessively well-drained and permeability is moderate to very rapid. The site contains hydrologic groups A and B (Hydrologic Soil Group, 2016). Land capability class is 3w, 3s, 4s, and 5w (Land Capability Classification, 2016). Depth to endosaturation ranges from 3 to more than 6 feet.

Soil features

These soils have no major rooting restriction. The soils were formed under forest vegetation, and have dark, organic-rich surface horizons. Parent material is alluvium. The soils have sand, loamy sand, or stratified silt loam surface horizons. Subsoils are sand, loamy sand or stratified silt loam. Soil series associated with this site include Perks.

Table 4. Representative soil features

Parent material	(1) Alluvium	
Surface texture	(1) Sand(2) Loamy sand(3) Silt loam	
Drainage class	Moderately well drained to excessively drained	
Permeability class	Moderate to very rapid	
Soil depth	80 in	
Surface fragment cover <=3"	0%	
Surface fragment cover >3"	0%	
Available water capacity (Depth not specified)	1.6–13.8 in	
Calcium carbonate equivalent (Depth not specified)	0%	
Soil reaction (1:1 water) (Depth not specified)	6.5–6.7	

Subsurface fragment volume <=3" (Depth not specified)	0%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Reference plant community is categorized as a hackberry floodplain forest and includes trees, forbs, and grasses. Species composition typically includes *Celtis occidentalis*, *Aesculus glabra*, *Carya cordiformis*, *Laportea canadensis*, Sanicula gregaria, *Asarum canadense*, and *Pilea pumila* (Rosburg, 2015).

Flooding, scouring, and deposition are the major disturbances influencing the dynamics at this site. Changes in channel course causing stream bank erosion, scouring from floodwaters and also deposition as sediment loads are released where floodwaters are moving more slowly, contributes to an extremely variable natural community (Rutel, 2008).

As this region was settled, these areas were altered to better suit agricultural needs. Grazing, and crop production are common in these areas today.

State and transition model

F108DY902IA Sandy / Loamy Floodplain Forest



As a hackberry floodplain, this state has a reference plant community which is categorized as floodplain forest and includes trees, forbs grasses and sedges.

Dominant plant species

- common hackberry (Celtis occidentalis), tree
- silver maple (Acer saccharinum), tree
- Ohio buckeye (Aesculus glabra), tree

Community 1.1 Common hackberry - Ohio buckeye - bitternut hickory

Mixed hardwood forest.

Community 1.2 Common hackberry - silver maple / Canadian clearweed

Pathway P1.1A Community 1.1 to 1.2

Long term succession and sediment accumulation (10-30 years) can cause this state to shift into state 1.2.

Pathway P1.2A Community 1.2 to 1.1

Catastrophic floods and blow-down can cause a shift back towards the 1.1 reference community.

State 2 MANAGED FOREST STATE

Where this state remains, it has often been subjected to very selective timber harvests. While these forested areas may resemble the reference state, the diversity of tree species has been selectively (removal of oak and walnut) altered.

Community 2.1 bur oak - sycamore / American bladdernut / wildrye

Forest with management inputs.

Dominant plant species

- bur oak (Quercus macrocarpa), tree
- American sycamore (Platanus occidentalis), tree
- American bladdernut (Staphylea trifolia), shrub
- wildrye (*Elymus*), grass

Community 2.2 Bur oak - sycamore - black walnut / American bladdernut / wildrye

Managed forestland

Dominant plant species

- bur oak (Quercus macrocarpa), tree
- American sycamore (Platanus occidentalis), tree
- black walnut (Juglans nigra), tree
- American bladdernut (*Staphylea trifolia*), shrub
- wildrye (Elymus), grass

Pathway P2.1A Community 2.1 to 2.2

Crop tree release; little to no harvesting (1-20 years).

Pathway P2.2A Community 2.2 to 2.1

Uneven age timber management; harvesting.

State 3 GRASSLAND STATE

Many acres of this ecological site have been converted to non-native grasslands of tall fescue and red clover. This state frequently transitions to a cropland state especially when commodity prices are high. A return to a near-reference state from this state is not recommended. Transitioning to a Managed Forest state is possible through long-term commitments of time and money.

Community 3.1 Tall fescue / Red clover

managed pasture.

Dominant plant species

- tall fescue (Schedonorus arundinaceus), grass
- red clover (Trifolium pratense), other herbaceous

State 4 HIGH GRADED / GRAZED FOREST STATE

This state is subjected to uncontrolled grazing and high-graded timber harvests. The grazing will open up the understory and remove much of the diverse ground flora. This can lead to erosion of the topsoil during floods. Grazed units also often undergo timber harvest removing a wide variety of outstanding hardwood trees, further diminishing the structural and compositional diversity

Dominant plant species

- American sycamore (Platanus occidentalis), tree
- green ash (Fraxinus pennsylvanica), tree
- buckbrush (Ceanothus cuneatus), shrub
- wildrye (Elymus), grass
- greenbrier (Smilax), other herbaceous

Community 4.1 Sycamore - Green ash / buckbrush / greenbrier - wildrye

a high graded or grazed forest community

Dominant plant species

- American sycamore (Platanus occidentalis), tree
- green ash (Fraxinus pennsylvanica), tree
- buckbrush (*Ceanothus cuneatus*), shrub
- wildrye (*Elymus*), grass
- greenbrier (Smilax), other herbaceous

CROPLAND STATE

Some areas of this ecological site have been converted to row crop agriculture. They often transition to a grassland state. A return to the near-reference state is not practical from this state. Transitioning to a Managed Forest state may be possible through long-term commitments of time and money.

Community 5.1 Corn, soybeans

Row crop agriculture. Many species may be planted depending on landowner objectives.

Transition T1A State 1 to 2

Uneven- age timber management; harvesting.

Transition T1B State 1 to 3 Clearing; pasture planting; prescribed grazing.

Transition T1C State 1 to 4

Poorly planned harvest; uncontrolled grazing.

Restoration pathway R2A State 2 to 1

Forest stand improvement; long term succession (10-20 plus years)

Transition T3A State 3 to 2

Tree planting; long term succession; forest stand improvement; access control.

Transition T3B State 3 to 5

Tillage; conservation cropping system

Transition T4C State 4 to 2

Forest stand improvement; access control.

Restoration pathway T4A State 4 to 3

Clearing; pasture planting; prescribed grazing

Transition T4B State 4 to 5

Clearing; tillage; conservation cropping system.

Transition T5B State 5 to 2

Tree planting long term succession; forest stand improvement; access control

Restoration pathway T5A State 5 to 3

Pasture planting; prescribed grazing

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 ecological site description.

Other references

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Approval

Acknowledgments

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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)	John Hammerly soil scientist Dan Pulido SSOL
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Date	05/11/2025
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 annualproduction):
- 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: