

Ecological site F111XC009IN Overflow

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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): 111X–Indiana and Ohio Till Plain

A PROVISIONAL ECOLOGICAL SITE is a conceptual grouping of soil map unit components within a Major Land Resource Area (MLRA) based on the similarities in response to management. Although there may be wide variability in the productivity of the soils grouped into a Provisional Site, the soil vegetation interactions as expressed in the State and Transition Model are similar and the management actions required to achieve objectives, whether maintaining the existing ecological state or managing for an alternative state, are similar. Provisional Sites are likely to be refined into more precise group during the process of meeting the APPROVED ECOLOGICAL SITE DESCRIPTION criteria.

This PROVISIONAL ECOLOGICAL SITE has been developed to meet the standards established in the National Ecological Site Handbook. The information associated with this ecological site does not meet the Approved Ecological Site Description Standard, but it has been through a Quality Control and Quality Assurance processes to assure consistency and completeness. Further investigations, reviews and correlations are necessary before it becomes an Approved Ecological Site Description.

111C – Indiana and Ohio Till Plain, Northwestern Part. This MLRA is in the glaciated part of north-central Indiana and is dominated by glacial till plains broken in places by lake plains, outwash plains, and flood plains. Areas that parallel most of the major rivers and streams have deposits of sand.

Although it is an important agricultural region, MLRA 111C hosts a large proportion of Indiana's biodiversity.

Classification relationships

Major Land Resource Area (MLRA)(USDA-Natural Resources Conservation Service, 2006)

USFS Ecological Regions (USDA, 2007):

Sections - Central Till Plains, Beech Maple (222H), South Central Great Lakes (222J), Central Till Plains and Grand Prairies (251D)

Subsections - Kalamazoo-Elkhart Moraines and Plains (222Jh), Steuben Interlobate Moraines (222Ji), Bluffton Till Plains (222Ha), Entrenched Valleys (222Hf), Miami-Scioto Plain-Tipton Till Plain (222Hb), Kankakee Sands (251Dg) and Eastern Grand Prairie (251Dd).

NatureServe Systems anticipated (NatureServe, 2011): Agriculture-Pasture/Hay, Agriculture-Cultivated Crops and Irrigated Agriculture, Harvested Forest-Grass Regeneration, Harvested Forest-Herbaceous Regeneration, Introduced Upland Vegetation – Treed, North-Central Interior Dry Oak Forest & Woodland, North-Central Interior Dry-Mesic Oak Forest & Woodland, North-Central Interior Maple-Basswood Forest.

LANDFIRE Biophysical Settings anticipated (USGS, 2010): North-Central Interior Dry-Mesic Oak Forest and Woodland, North-Central Interior Dry Oak Forest and Woodland, North-Central Interior Beech-Maple Forest, North-

Ecological site concept

This site is an upland site formed on glacial outwash and colluvium parent materials in soils that are somewhat poorly to moderately well drained. There are 4 distinct states: 1. outwash forest (reference state), 2. fire suppressed state, 3. agriculture state, 4. old field state. Low severity surface fires maintained the dominance of oak and hickory trees with a return interval between 20-40 years. Currently, roughly 90%, of the site is in agricultural production, with the majority being used for growing corn and soybeans.

Associated sites

R111XC008IN	Wet Overflow Generally lower on the landscape with less drainage.
R111XC010IN	Well Drained Overflow Higher on the landscape and more steeply sloped.

Similar sites

F111XC007IN	Glacial Ridge Similar composition of dominant canopy species, but not as much cover due to shorter fire return interval.
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Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Carya ovata</i>
Shrub	(1) <i>Rubus</i>
Herbaceous	Not specified

Physiographic features

This site is located in the 111C - Indiana and Ohio Till Plain, Northwestern Part major land resource area. It is classified as an upland site. The site was formed in outwash and colluvium on outwash plains and terraces.

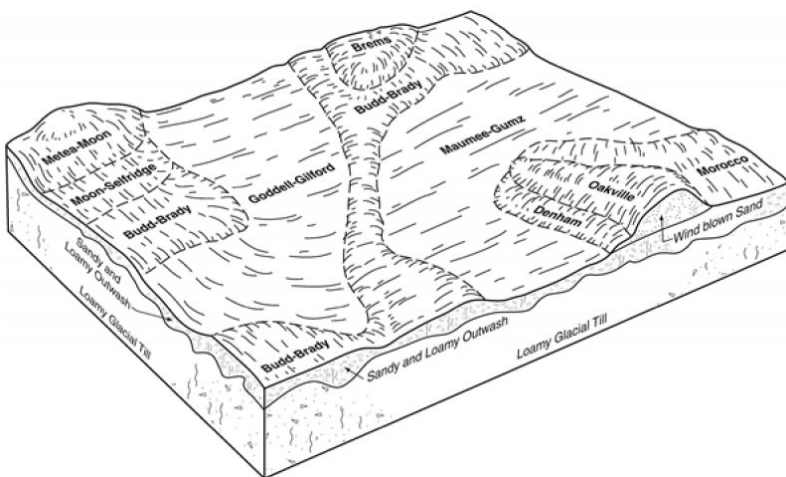


Figure 1. Block Diagram for F111CY009IN - (Budd-Brady)

Table 2. Representative physiographic features

Landforms	(1) Outwash plain (2) Outwash terrace
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Rare to frequent

Ponding frequency	None to rare
Slope	0–6%
Water table depth	15–61 cm
Aspect	Aspect is not a significant factor

Climatic features

The climate is humid continental in nature typified by large season temperature differences, with warm to hot, humid summers and cold winters. Precipitation is relatively well distributed year-round.

The average first frost should occur around October 12 and the last freeze of the season should occur around April 25.

Table 3. Representative climatic features

Frost-free period (average)	163 days
Freeze-free period (average)	192 days
Precipitation total (average)	1,041 mm

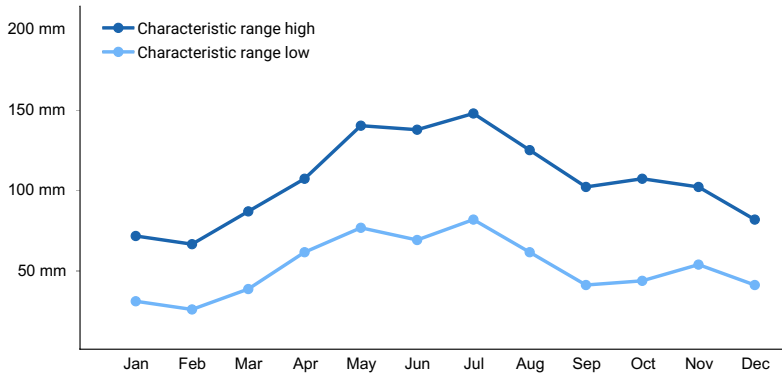


Figure 2. Monthly precipitation range

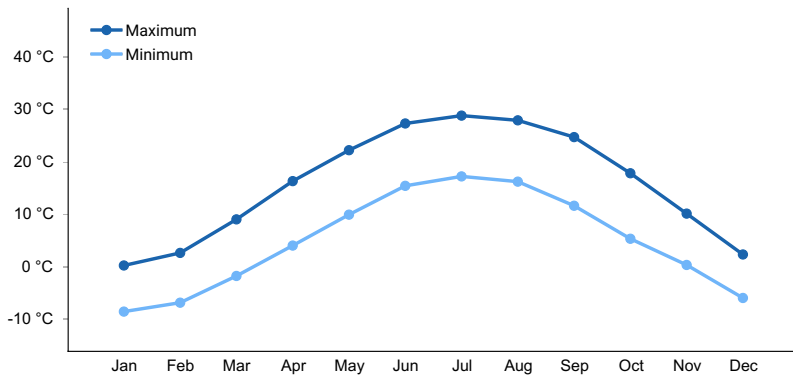


Figure 3. Monthly average minimum and maximum temperature

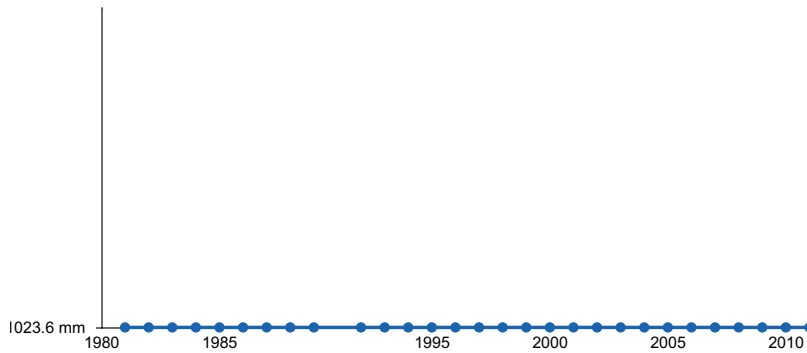


Figure 4. Annual precipitation pattern

Climate stations used

- (1) RENSSELAER [USC00127298], Rensselaer, IN
- (2) ROCHESTER [USC00127482], Rochester, IN
- (3) CHALMERS 5 W [USC00121417], Chalmers, IN
- (4) DELPHI 2 N [USC00122149], Delphi, IN
- (5) GOSHEN 3SW [USC00123418], Goshen, IN
- (6) FRANCESVILLE [USC00123078], Francesville, IN
- (7) LOGANSPOURT CICOTT ST [USC00125117], Logansport, IN
- (8) WEST LAFAYETTE 6 NW [USC00129430], West Lafayette, IN
- (9) WINAMAC 2SSE [USC00129670], Winamac, IN

Influencing water features

This being an upland site, it is not influenced by water from a wetland or stream.

Soil features

In a representative profile for the Overflow ecological site, the soils of the site are a very dark or dark grayish brown at the surface and very deep. Taxonomically most of the soils for this site are Hapludalfs or Endoaqualfs.

Table 4. Representative soil features

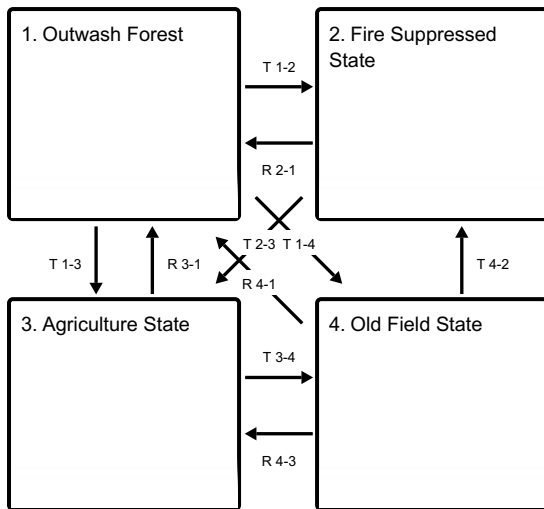
Surface texture	(1) Loam (2) Sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Moderate to moderately rapid
Soil depth	122–152 cm
Surface fragment cover <=3"	0–25%
Subsurface fragment volume <=3" (Depth not specified)	0–25%

Ecological dynamics

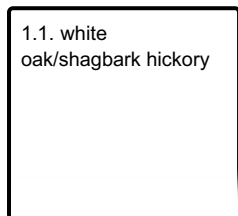
The historic plant community of the Overflow ecological site is an outwash forest. The forest canopy is dominated by white oak and shagbark hickory with high level of canopy cover. The site was maintained by periodic surface fires that occurred every 25-65 years. Once this fire return interval exceeded 40 years, less fire tolerant species such as sugar maple and beech would invade the understory. Continued absence of fire would lead to their dominance in the canopy to the exclusion of the oaks and hickories. Since settlement, 90% of the site has been converted to agricultural use with the majority bine used to grow corn and soybeans.

State and transition model

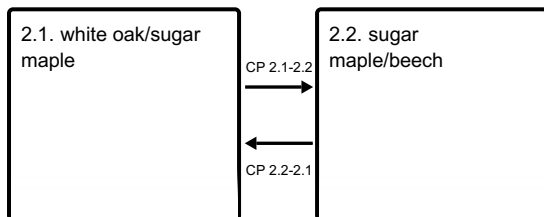
Ecosystem states



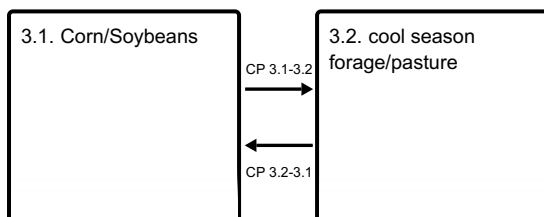
State 1 submodel, plant communities



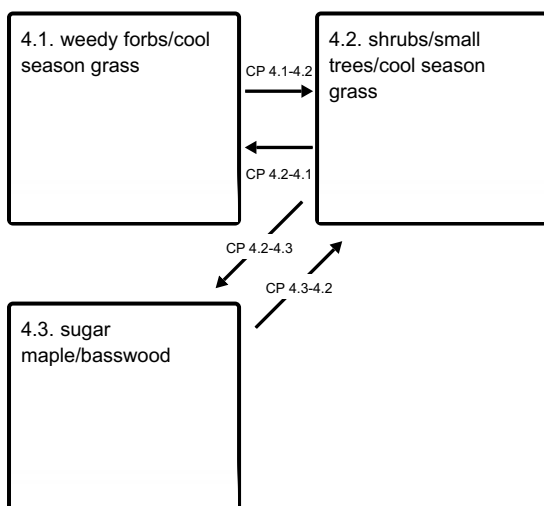
State 2 submodel, plant communities



State 3 submodel, plant communities



State 4 submodel, plant communities



State 1

Outwash Forest

This is the reference or diagnostic plant community for this site. In reference conditions, this forested site was dominated by white oak and shagbark hickory in the canopy. Secondary species included black oak, black cherry, shellbark hickory, and pignut hickory. Brambles and native roses were common in the understory. Less common, but present were some of the prairie species such as Pennsylvania sedge and big bluestem. The absence of fire will shift this state towards a mesophytic forest. Restoration involves selective tree harvest and the use of fire.

Community 1.1

white oak/shagbark hickory

This phase is characterized by being a oak-hickory forest with the dominant species being white oak and shagbark hickory. The competitive advantage of these species is maintained by fire every 24-40 years.

State 2

Fire Suppressed State

This state is characterized by a longer than normal fire return interval or the absence of fire as a disturbance agent. Shade tolerant species, specifically sugar maple and beech, that are present in the understory in relatively small amounts become the dominant tree species.

Community 2.1

white oak/sugar maple

This state is characterized by a longer than normal fire return interval (100+ years) or the absence of fire. Sugar maple becomes quite common in the canopy.

Community 2.2

sugar maple/beech

This state is characterized by a longer than normal fire return interval (150+ years) or the absence of fire. Sugar maple and beech are the dominant species in the canopy.

Pathway CP 2.1-2.2

Community 2.1 to 2.2

No management

Pathway CP 2.2-2.1

Community 2.2 to 2.1

Selective tree harvest to create openings for white oaks.

State 3

Agriculture State

This site has largely been converted to agricultural use. Most of the historic acres are now in row crop agricultural use. Most common is a corn and soybean rotation of various types. Roughly 2% of the site is not used to grow hay or cool season forage and used for grazing.

Community 3.1

Corn/Soybeans

This phase is characterized by row crop agriculture of small grains, primarily corn and soybeans.

Community 3.2

cool season forage/pasture

This phase is characterized by forage or grazing agriculture. Different mixes of, generally, cool season grasses and forbs, largely clovers, are grown.

Pathway CP 3.1-3.2

Community 3.1 to 3.2

Planting of cool season pasture/forage species and management.

Pathway CP 3.2-3.1

Community 3.2 to 3.1

Planting, either by conventional or no-till methods, of row crop. Management that keeps the site in row crop production

State 4

Old Field State

Abandoned agricultural lands move into the old field state. This state is dominated at the outset by cool season grasses, mostly fescue, and weedy, opportunistic forbs. Absent management or fire, the site will progress to a shrub dominated phase then to that of a mesic forest.

Community 4.1

weedy forbs/cool season grass

This phase is characterized by the absence of any management after being used for agriculture. Weedy forbs and non-native cool season grasses dominate.

Community 4.2

shrubs/small trees/cool season grass

Continued absence of management allows the site to become dominated by woody species. Shrubs and smaller, colonizing species, trees dominate the site. The same herbaceous component as found in phase 4.1 is present, just at a reduced amount.

Community 4.3

sugar maple/basswood

Continued absence of management allows for the site to develop into a mixed mesic forest. Sugar maple and basswood are the two most dominate tree species in the canopy.

Pathway CP 4.1-4.2

Community 4.1 to 4.2

Succession with no management.

Pathway CP 4.2-4.1

Community 4.2 to 4.1

Disturbance, of any type, that removes the woody species.

Pathway CP 4.2-4.3

Community 4.2 to 4.3

Succession with no management.

Pathway CP 4.3-4.2

Community 4.3 to 4.2

Disturbance, of any type, that removes some or all of the trees.

Transition T 1-2

State 1 to 2

No management that selects for certain tree species, in this case white oak and shagbark hickory. No fire for 40-100 years.

Transition T 1-3

State 1 to 3

Removal of the tree species, installation of drainage, tillage, and planting of the agricultural crop transition the site to state 3.

Transition T 1-4

State 1 to 4

Removal of the trees with no management afterwards to include the lack of fire. This moves the site to the Old Field State (4).

Restoration pathway R 2-1

State 2 to 1

Prescribed tree thinning to give competitive advantage to desired species and fire move the site back to the reference state.

Transition T 2-3

State 2 to 3

All trees removed, drainage installed, the site prepared, tillage and planting the of the agricultural crop.

Restoration pathway R 3-1

State 3 to 1

Remove drainage, tree planting, timber stand improvement and application of fire.

Transition T 3-4

State 3 to 4

No management. Agricultural practices abandoned and succession allowed to take place

Restoration pathway R 4-1

State 4 to 1

Timber stand improvement, to include tree removal. Planting of desired tree species, especially white oak and shagbark hickory, if not present. The periodic application of surface fires.

Transition T 4-2

State 4 to 2

No management over a long time frame (100+ years) in the absence of fire.

Restoration pathway R 4-3 State 4 to 3

Clear the woody species from the site, tillage, and plant the agricultural crop will move the site to state 3. Regular agricultural practices will maintain the site in that state.

Additional community tables

Inventory data references

Site concept developed through expert opinion, review of the literature, and field reconnaissance.

Other references

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Contributors

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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	
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:

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:**
-