

Ecological site F111XE501OH

Till Depression

Last updated: 5/28/2020
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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

111E – Indiana and Ohio Till Plain, Eastern Part. Most of this area is in the Till Plains Section of the Central Lowlands Province of the Interior Plains. The northeast tip of the area is in the Southern New York Section of the Appalachian Highlands. The entire area has been glaciated. It is dominated by ground moraines that are broken in places by kames, lake plains, outwash plains, terraces, and stream valleys. Narrow, shallow valleys commonly are along the few large streams in the area. Elevation ranges from 580 to 1,400 feet (175 to 425 meters), increasing gradually from west to east. Relief is mainly a few meters, but in some areas hills rise as much as 100 feet (30 meters) above the adjoining plain.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Scioto (0506), 33 percent; Muskingum (0504), 31 percent; and Western Lake Erie (0410), 28 percent; Upper Ohio (0503), 5 percent; and Southern Lake Erie (0411), 3 percent. The headwaters of many rivers in central Ohio, including the Vermillion, Black Fork, Sandusky, Little Scioto, and Olentangy Rivers, are in this MLRA.

This MLRA is underlain by late Devonian shale and sandstone. Surficial materials include glacial deposits of till, glaciolacustrine sediments, and outwash from Wisconsin and older glacial periods.

Classification relationships

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

USFS Ecological Regions (USDA, 2007):

Sections –Central Till Plains, Beech Maple (222H), Western Glaciated Allegheny Plateau (221F)

Subsections – Allegheny Plateau (221Fa), Bluffton Till Plains (222Ha), Miami-Scioto Plain – Tipton Till Plain (222Hb)

NatureServe Systems anticipated (NatureServe, 2011): Agriculture - Cultivated Crops and Irrigated Agriculture, Agriculture – Pasture/Hay, North-Central Interior Beech-Maple Forest, North-Central Interior Dry Oak Forest and Woodland

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

Ecological site concept

This site is an upland site formed on glacial till parent materials. It is located on the depressions, toeslopes, of glacial till plains and moraines. Soils have loamy surface textures, are very poorly to poorly drained, exhibit occasional to frequent ponding.

The characteristic vegetation of the site is that of a flatwoods type dominated by pin oak and swamp white oak, with cottonwood, green ash, and silver maple being common in the canopy as well. The large, seasonal fluctuation of water on the site allows for the co-existence of upland and lowland trees. Inundation of the site generally occurs in the spring which leads to a sparse and patchy understory. Fire did occur on the site, but high intensity fires were rare. Low intensity surface fires were more common on sites that are adjacent to more fire prone sites such as prairies and savannas. Ponding in the spring followed by summer drought along with windthrow were the most dominant disturbance factors. A large portion of this site has been drained and is in agricultural production. The majority of the converted acres is used for row crop rotations, specifically corn and soybeans. A much smaller amount of the site is also used for growing forage that is used for pasture or hay production. These sites are predominately cool season grass species and legumes such as tall fescue and clover species.

Associated sites

F111XE502OH	Wet Till Ridge Site is on a convex landscape position; not frequently ponded; and somewhat poorly drained.
F111XE503OH	Till Ridge Site is on a convex landscape position; not frequently ponded; and moderately well to well drained.

Similar sites

F111XE101OH	Lacustrine Flatwood Located on lacustrine parent materials; soils are very poorly to poorly drained
F111XE201OH	Wet Alluvium Floodplain Located on alluvium parent materials; soil surface is 3/2 Munsell or darker; soils are very poorly drained.

Table 1. Dominant plant species

Tree	(1) <i>Quercus palustris</i> (2) <i>Quercus bicolor</i>
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is located in the 111E - Indiana and Ohio Till Plain, Eastern Part Major Land Resource Area. It is classified as an upland site. This site was formed silt covered or loamy till. It is located on the toeslopes of depressions on glacial till plains and moraines, flats, and drainageways with slopes from 0 to 2 percent.

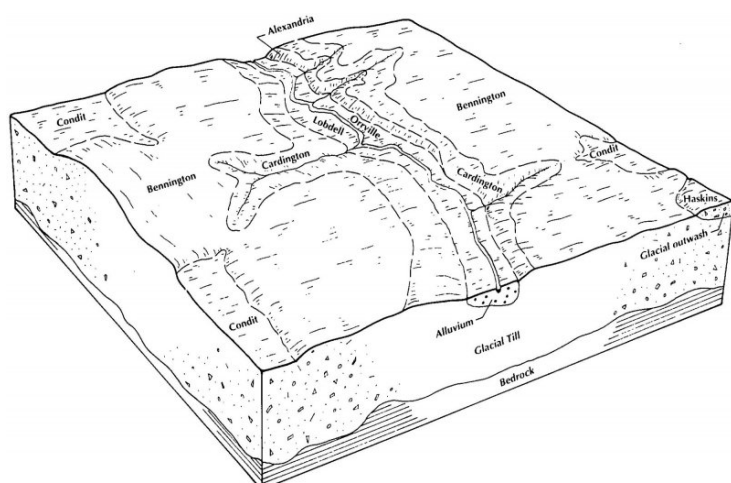


Figure 1. block diagram showing soils on the landscape

Table 2. Representative physiographic features

Landforms	(1) Till plain (2) Moraine (3) Flat (4) Drainageway
Flooding frequency	None
Ponding duration	Brief (2 to 7 days) to long (7 to 30 days)
Ponding frequency	Occasional to frequent
Elevation	213–396 m
Slope	0–2%
Ponding depth	0–38 cm
Water table depth	0–61 cm
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation in this area is 35 to 41 (890 to 1,040 millimeters). Most of the rainfall occurs as convective thunderstorms during the growing season. About half or more of the precipitation occurs during the freeze-free period. Snowfall is common in winter. The average annual temperature is 48 to 52 degrees F (9 to 11 degrees C). The freeze-free period averages about 185 days and ranges from 165 to 205 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	143-149 days
Freeze-free period (characteristic range)	177-181 days
Precipitation total (characteristic range)	991-1,067 mm
Frost-free period (actual range)	131-153 days
Freeze-free period (actual range)	172-186 days
Precipitation total (actual range)	991-1,092 mm
Frost-free period (average)	144 days
Freeze-free period (average)	179 days
Precipitation total (average)	1,041 mm

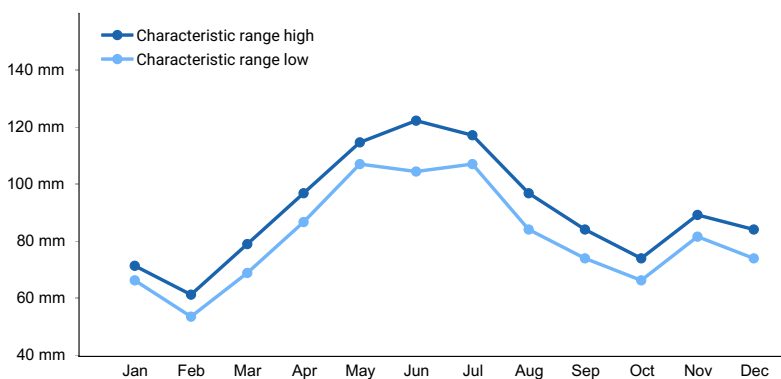


Figure 2. Monthly precipitation range

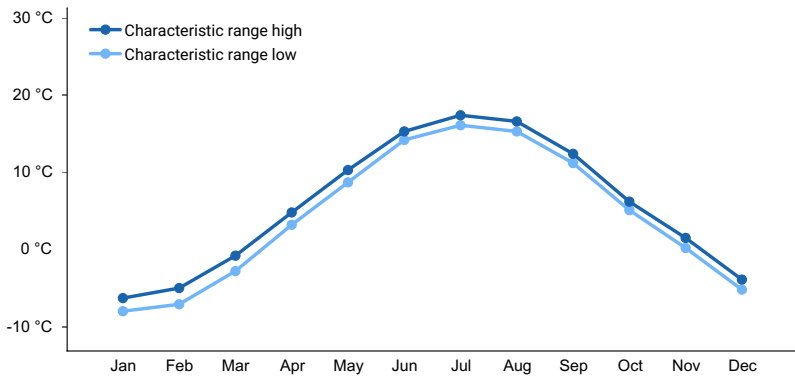


Figure 3. Monthly minimum temperature range

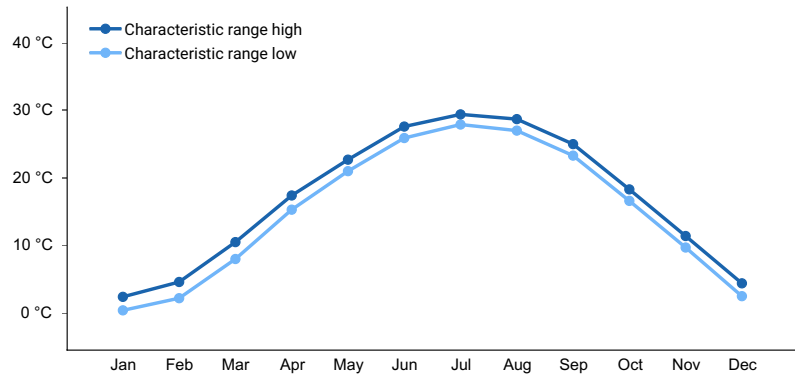


Figure 4. Monthly maximum temperature range

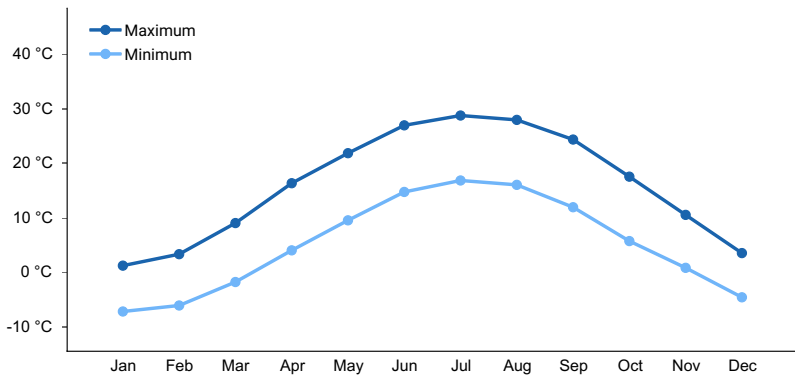


Figure 5. Monthly average minimum and maximum temperature

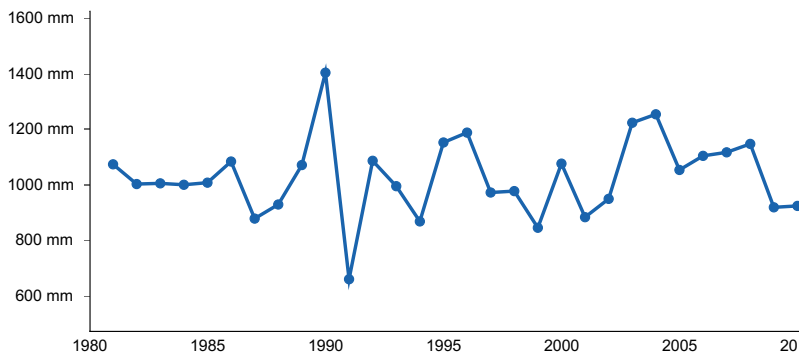


Figure 6. Annual precipitation pattern

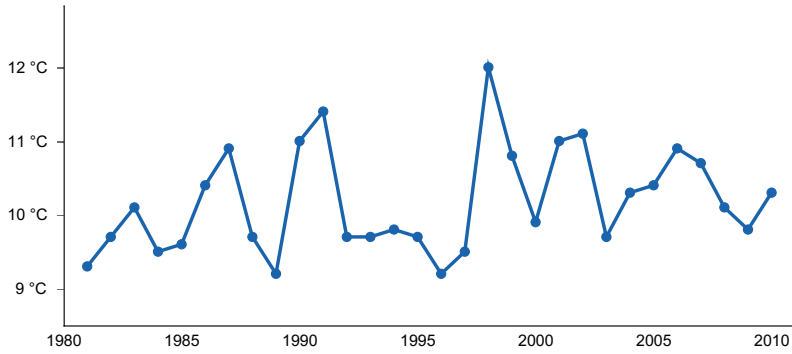


Figure 7. Annual average temperature pattern

Climate stations used

- (1) GALION WTR WKS [USC00333021], Galion, OH
- (2) COLUMBUS PORT COLUMBUS INTL AP [USW00014821], Columbus, OH
- (3) CENTERBURG 2 SE [USC00331404], Centerburg, OH
- (4) MANSFIELD LAHM MUNI AP [USW00014891], Mansfield, OH
- (5) BUCYRUS [USC00331072], Bucyrus, OH
- (6) CHIPPEWA LAKE [USC00331541], Medina, OH
- (7) WESTERVILLE [USC00338951], Westerville, OH

Influencing water features

This site is a depressional wetland that receives water via precipitation and runoff from surrounding landscapes and draining it to the groundwater system, making it a recharge depression. The soils are very poorly to poorly drained. Drainage and permeability (slow to moderate) along with landscape position lead much of the site being frequently ponded, most often in the spring and occasionally in the fall. Duration of ponding varies from brief (2 to 7 days) to very long (> 30 days). Ponding depth is has an average maximum of 15 inches.

The hydrogeographic model classification of this site is DEPRESSIONAL: Till Plain, Ponded, Swale; forested. This site has a Cowardin Classification of PFO6An; it is a deciduous forested palustrine system that is temporarily ponded on mineral soil.

Soil features

The soil series associated with this site are: Pewamo, Mermill, Marengo, Condit. They are very deep, very poorly drained to poorly drained, and slow to moderate permeable soils, with moderately acidic to neutral soil reaction that formed in glaciolacustrine deposits, till from limestone, sandstone, and shale.

Parent Materials Kind: till

Surface Texture: loam, silt loam, silty clay loam

Subsurface Texture group: loamy

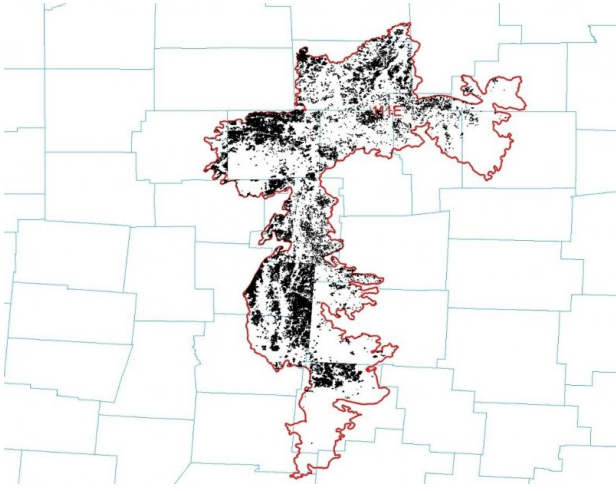


Figure 8. Location of mapunits on the landscape.

Table 4. Representative soil features

Parent material	(1) Till
Surface texture	(1) Loam (2) Silty clay loam (3) Silt loam

Ecological dynamics

The historic plant community of this ecological site is a flatwood forest. The dominant species in the canopy are pin oak, swamp white oak and cottonwood, with green ash, and silver maple being common as well. The soils of this site are very poorly or poorly drained and characterized by seasonal ponding in the spring and much drier in the summer. This seasonal change in water presence limited seed germination and diversity of shrubs and ground layer species. Fire did occur on the site, but high intensity fires were rare. Low intensity surface fires were more common on sites that are adjacent to more fire prone sites such as prairies and savannas. Ponding in the spring followed by summer drought along with windthrow were the most dominant disturbance factors.

State and transition model

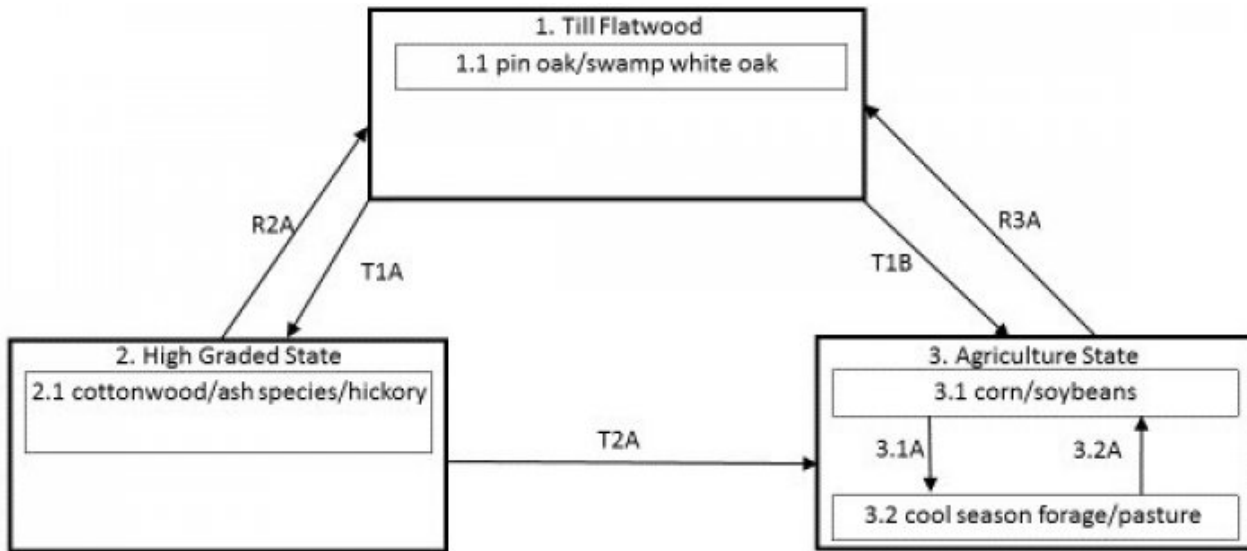


Figure 9. STM

Diagram Legend

T1A	Selective tree harvest
T1B	Remove woody species, drainage, site preparation, planting, management
T2A	Remove woody species, drainage, site preparation, planting, management
R2A	Timber stand improvement, tree planting
R3A	Drainage removal, tree planting, TSI management
3.1A	Pasture/forage planting and maintenance
3.2A	Tillage/no-till planting and management of row crops.

Figure 10. Legend

State 1 Till Flatwood

This is the diagnostic plant community of the site. The dominant species in the canopy are pin oak and swamp white oak, with cottonwood, green ash, and silver maple being common as well. The seasonal change in water presence limited seed germination and diversity of shrubs and ground layer species. The occasional high intensity fires and more regular ground fires help selective for more fire tolerant species, oaks, to become dominant in the canopy.

Dominant plant species

- pin oak (*Quercus palustris*), tree
- swamp white oak (*Quercus bicolor*), tree

Community 1.1

pin oak -swamp white oak

This phase is characterized by a closed to partially open canopy dominated by pin oak and swamp white oak.

Dominant plant species

- pin oak (*Quercus palustris*), tree
- swamp white oak (*Quercus bicolor*), tree

State 2

High Graded State

This phase is characterized by the removal of the more marketable tree species, primarily oak species. The resulting tree species, cottonwood, ash, hickory, become the dominant species in the canopy.

Dominant plant species

- cottonwood (*Populus*), tree
- ash (*Fraxinus*), tree
- hybrid hickory (*Carya*), tree

Community 2.1

eastern cottonwood - ash - hickory

This phase is characterized by the removal of the more marketable tree species, primarily oak species. The resulting tree species, cottonwood, ash, hickory, become the dominant species in the canopy.

Dominant plant species

- eastern cottonwood (*Populus deltoides*), tree
- ash (*Fraxinus*), tree
- hybrid hickory (*Carya*), tree

State 3

Agricultural State

This state is characterized by the conversion of the site to agricultural use. Most common practice is a corn and soybean rotation of various types. A small portion of the historic acres are used for forage and pasture.

Community 3.1

Row crops (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 P3.1A

Community 3.1 to 3.2

Planting of cool season pasture/forage species and management to maintain them.

Pathway P3.2A **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

Transition T1A **State 1 to 2**

Selective tree harvest of the more marketable species, primarily oaks.

Transition T1B **State 1 to 3**

Removal of trees and other woody species. Install drainage system (if warranted), prepare the site for planting the agricultural crop, and regular agricultural practices.

Restoration pathway R2A **State 2 to 1**

Timber stand improvement practices and planting (if warranted) of desired species.

Transition T2A **State 2 to 3**

Timber stand improvement practices and planting (if warranted) of desired species.

Restoration pathway R3A **State 3 to 1**

Removal of drainage system (if warranted), site preparation, and tree planting.

Additional community tables

Inventory data references

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

Other references

Other References

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Approval

Chris Tecklenburg, 5/28/2020

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)	TYLER STAGGS
Contact for lead author	
Date	05/07/2024
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:
-
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:**

17. **Perennial plant reproductive capability:**
