

Ecological site F111XE302OH Dry Restricted

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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-Mesic Oak Forest and Woodland

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

Ecological site concept

This site is an upland site generally formed on residuum weathered from limestone and shale. The depth to the restrictive layer is between 20 and 40 inches. Drainage is moderately well to well drained with slopes generally from 8-50%. This site is generally on steeper slopes and the soil is mostly shallower to the restrictive layer, with higher

drainage than on the commonly adjacent Wet Restricted site (F111EY301OH).

This woodland site was, historically, a mesic oak forest site with oaks, both white and red oak, being the dominant canopy species. The combination of moderately deep soils and slope restricted the impact of fire to portions of the site. This allows the site have also have canopy level, shade tolerant species such as sugar maple with the oak species. Overall, the largest driver of species dynamics is that of gap-phase regeneration that contributes to the maintenance of the site as a mixed hardwoods. Selective tree harvest moves the site to a new state where the canopy becomes dominated by less desirable timber species like sugar maple, tulip tree, hickory and ash species. Currently, the areas with less slope have been converted for agricultural use, mostly hay and pasture, but some are being used for small grains as well.

Associated sites

F111XE301OH	Wet Restricted Soils are SWPD
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Similar sites

F111XE404OH	Dry Outwash Upland Located on outwash parent materials; no restrictive layer within 38 inches of the surface
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Table 1. Dominant plant species

Tree	(1) <i>Quercus alba</i> (2) <i>Quercus rubra</i>
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This ecological site is found in bedrock controlled landscapes in MLRA 111E: Indiana and Ohio Till Plain, Eastern Part. Soils are moderately deep (20-40 inches) from lithic contact. Landforms that contain this site include hills and till plains. Slopes for this site can be quite variable and range from 0 to 70 percent.

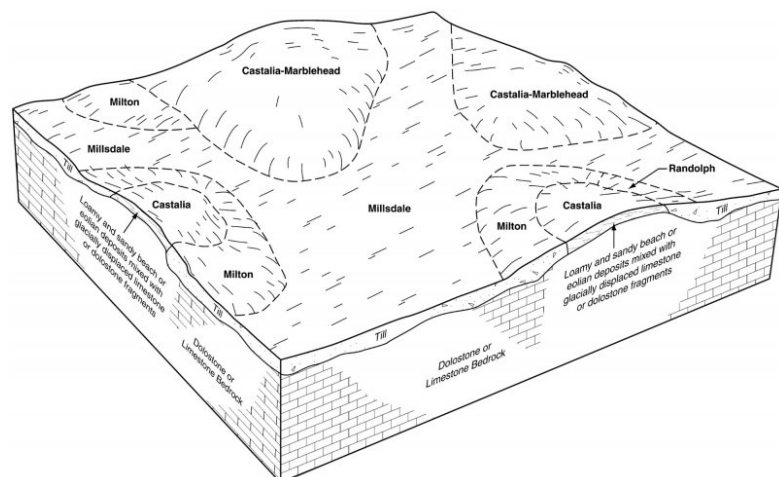


Figure 1. block diagram showing soils on the landscape

Table 2. Representative physiographic features

Landforms	(1) Hill (2) Till plain
Flooding frequency	None
Ponding frequency	None

Elevation	213–366 m
Slope	0–70%
Water table depth	43–48 cm
Aspect	W, NW, N, NE, E, SE, S, SW

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)	137-147 days
Freeze-free period (characteristic range)	170-181 days
Precipitation total (characteristic range)	991 mm
Frost-free period (actual range)	130-152 days
Freeze-free period (actual range)	169-186 days
Precipitation total (actual range)	991-1,041 mm
Frost-free period (average)	142 days
Freeze-free period (average)	177 days
Precipitation total (average)	991 mm

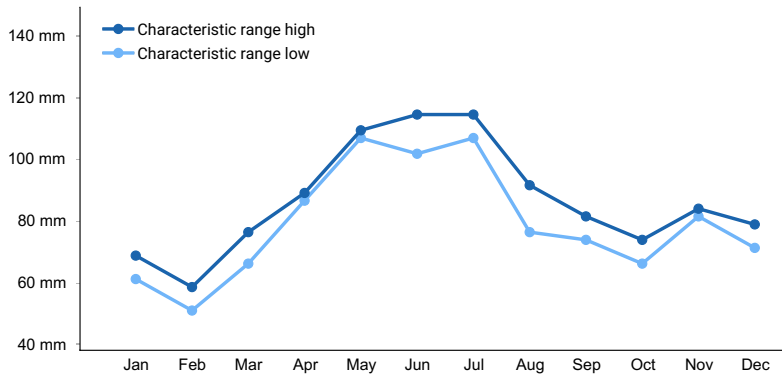


Figure 2. Monthly precipitation range

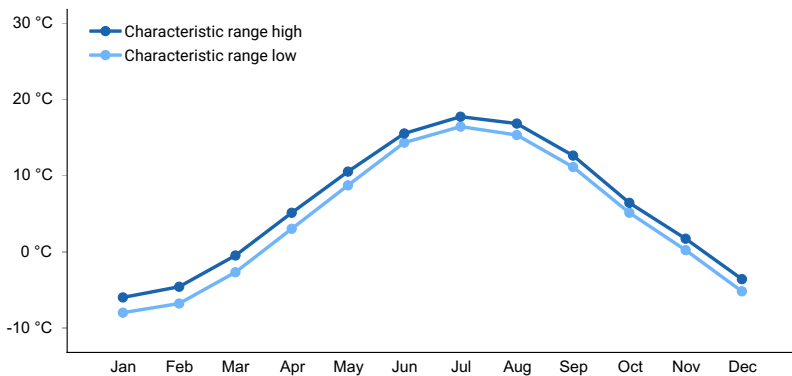


Figure 3. Monthly minimum temperature range

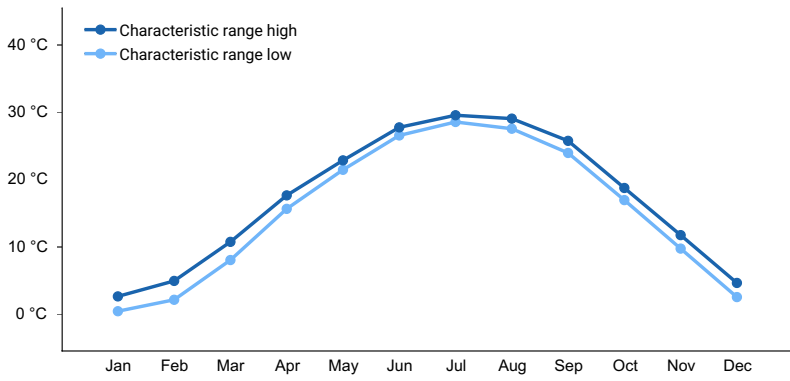


Figure 4. Monthly maximum temperature range

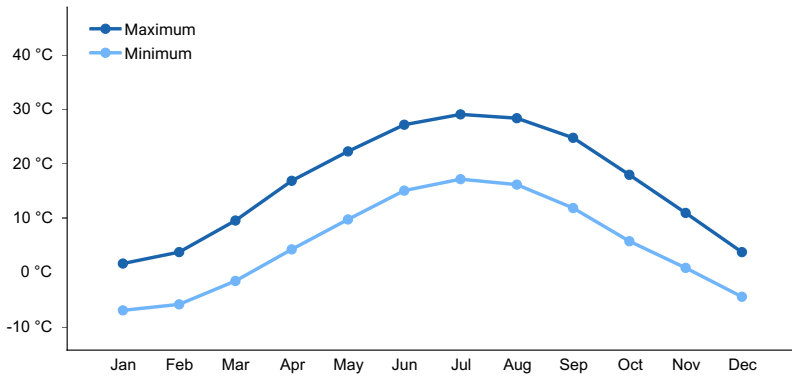


Figure 5. Monthly average minimum and maximum temperature

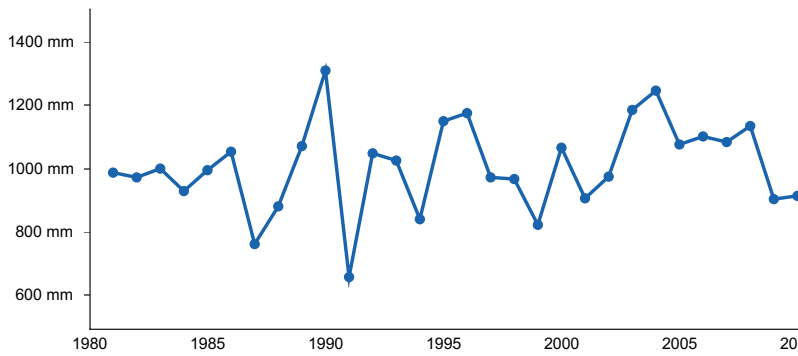


Figure 6. Annual precipitation pattern

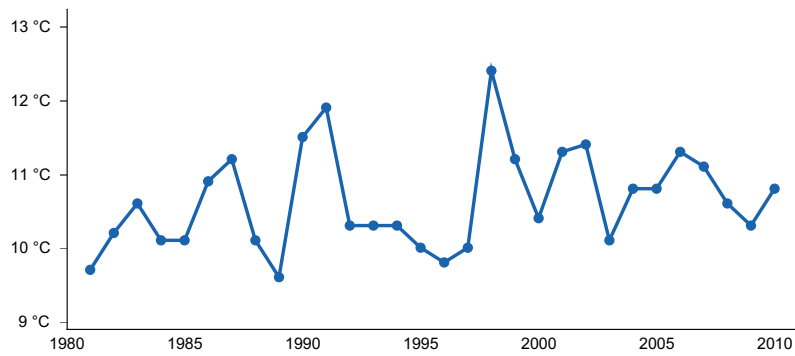


Figure 7. Annual average temperature pattern

Climate stations used

- (1) WESTERVILLE [USC00338951], Westerville, OH
- (2) BUCYRUS [USC00331072], Bucyrus, OH
- (3) DELAWARE [USC00332119], Delaware, OH

- (4) COLUMBUS PORT COLUMBUS INTL AP [USW00014821], Columbus, OH
- (5) CENTERBURG 2 SE [USC00331404], Centerburg, OH
- (6) CHIPPEWA LAKE [USC00331541], Medina, OH

Influencing water features

This ecological site is not influenced by wetland or riparian water features.

Soil features

The soil series associated with this site are: Rarden, Milton, Loudonville, Latham, Heverlo, Brecksville. They are moderately deep, moderately well drained to well drained, and very slow to moderate permeable soils, with very acidic to neutral soil reaction, that formed in Loess, Residuum, and till.

Parent Materials Kind: residuum, till, loess

Surface Texture: silt loam, silty clay, silty clay loam

Surface modifier: channery

Subsurface Texture group: loamy



Figure 8. mapunit location in the MLRA

Table 4. Representative soil features

Parent material	(1) Residuum (2) Till (3) Loess
Surface texture	(1) Silt loam (2) Silty clay (3) Silty clay loam
Drainage class	Moderately well drained to well drained
Permeability class	Very slow to moderate
Soil depth	56–97 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	8.38–16 cm
Calcium carbonate equivalent (Depth not specified)	0–10%
Electrical conductivity (Depth not specified)	0 mmhos/cm

Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	4.5–7.3
Subsurface fragment volume <=3" (Depth not specified)	2–14%
Subsurface fragment volume >3" (Depth not specified)	1–3%

Ecological dynamics

The historic plant community of this ecological site is a mesic oak forest. The dominant species in the canopy are a variety of oak and hickory species principally, with sugar maple, American beech and red maple being present as well. This site is naturally dominated by stable, uneven-aged forests with the canopy dynamics being driven by gap-phase regeneration. Wind and ice storms occasionally create larger canopy openings.

State and transition model

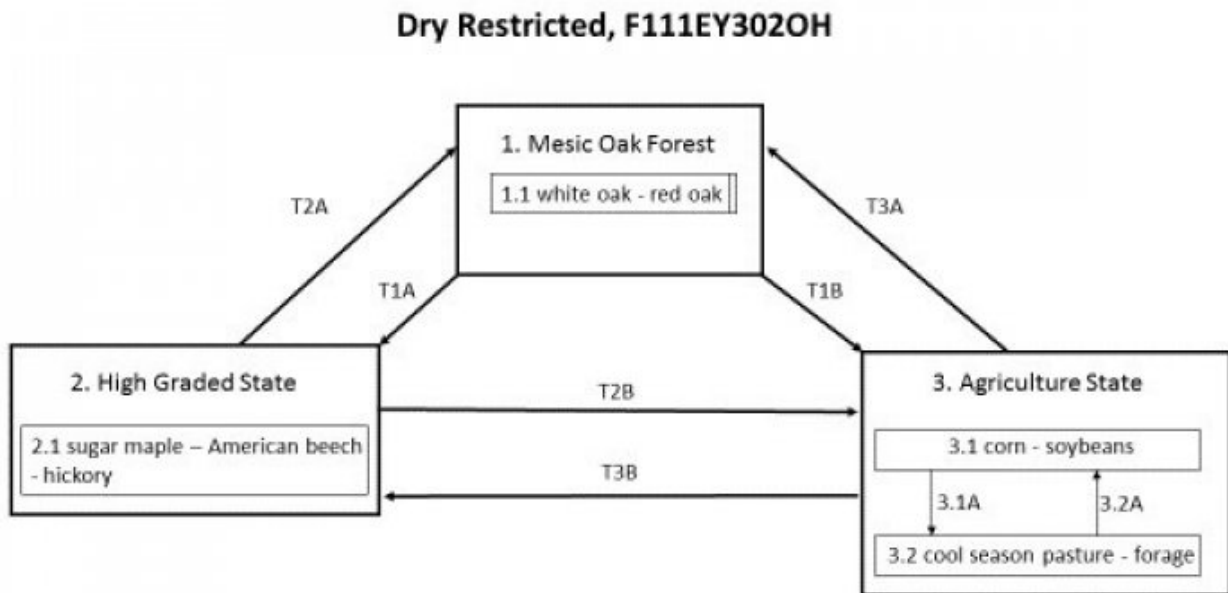


Figure 9. STM

Dry Restricted, F111EY302OH

Diagram Legend

T1A	Removal of marketable tree species; no management to replace
T1B	Remove woody species, drainage (if needed), site preparation, planting
T2A	Plant desired species, low intensity fire
T2B	Remove woody species, drainage (if needed), site preparation, planting
T3A	Plant desired species, low intensity fire
T3B	Tree planting or succession; removal of marketable tree species.
3.1A	Pasture/forage planting and management
3.2A	Conventional/no-till planting and management of row crops

Figure 10. Legend

State 1 Mesic Oak Forest

This is the diagnostic plant community for this site. White oak and red are the dominant canopy tree species. This site is naturally dominated by stable, uneven-aged forests with the canopy dynamics being driven by gap-phase regeneration. This lends towards the canopy containing a diverse number of species.

Community 1.1 white oak -red oak

This phase is characterized by tree dominance, particularly white and red oak. Additional canopy species include hickories, sugar maple, beech, basswood, and tulip-tree.

Dominant plant species

- white oak (*Quercus alba*), tree
- northern red oak (*Quercus rubra*), tree

State 2 High Graded State

This phase is characterized by the removal of the more marketable tree species, primarily oaks and black walnut, and occasionally tulip-tree. The resulting tree species, tulip-tree, hickory species, and ash become the dominant species in the canopy.

Dominant plant species

- tuliptree (*Liriodendron tulipifera*), tree
- ash (*Fraxinus*), tree
- hybrid hickory (*Carya*), tree

Community 2.1 sugar maple - America Beech

This phase is characterized by the removal of the oaks species. The sugar maple/beech/hickory trees dominate the canopy

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- American beech (*Fagus grandifolia*), tree

State 3

Agricultural State

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

Community 3.1

Community 3.2

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

Removal of highly marketable tree species, primarily oaks will move the site towards State 2.

Transition T1B

State 1 to 3

Removal off trees and other wood species. Install drainage system (if warranted), prepare the site for planting the agricultural crop, and regular agricultural practices move the site towards State 3.

Restoration pathway R2A

State 2 to 1

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

Transition T2B

State 2 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 R3A

State 3 to 1

Removal of drainage system (if warranted), site preparation, tree planting, followed by timber practices that select for and perpetuate the desired species.

Restoration pathway T3B

State 3 to 2

Removal of drainage system (if warranted), site preparation, tree planting, followed by selective tree harvest.

Additional community tables

Inventory data references

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

Other references

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Other References

Anderson, D. M. 1982. Plant communities of Ohio: A preliminary classification and description. Columbus, OH: Ohio Dept. of Natural Resources, Division of Natural Areas and Preserves.

Braun, E. Lucy. 2001. Deciduous forests of eastern North America. Caldwell, N.J.: Blackburn Press.

Gordon, R. B. 1969. The natural vegetation of Ohio in pioneer days. Columbus: Ohio State University.

Homoya, M. A., Abrell, D. B., Aldrich, J. R., & Post, T. W. (1985). The Natural Regions of Indiana. Indiana Academy of Science, 94, 245-269.

Lafferty, M. B. 1979. Ohio's natural heritage. Columbus: Ohio Academy of Science.

NatureServe. (2011). An online encyclopedia of life [web application]. NatureServe, Arlington, VA, USA [Online: www.natureserve.org/explorer].

Jackson, Marion T. 1997. The Natural heritage of Indiana. Bloomington: Indiana University Press, published in association with the Indiana Department of Natural Resources and the Indiana Academy of Science.

Johnson, Paul S., Stephen R. Shifley, and Robert Rogers. 2002. The ecology and silviculture of oaks. Wallingford, Oxon: CABI

USDA. (2007). Ecological Subregions: Sections and Subsections for the Conterminous United States. Washington, DC: USDA - Forest Service.

USDA. (2006). Land Resource Regions and Major Land Resource Areas of the United States, the Caribbean, and the Pacific Basin. U. S. Department of Agriculture, Natural Resources Conservation Service. U. S. Department of Agriculture Handbook 296.

USGS. (2010). LANDFIRE Biophysical Settings. Retrieved from <http://www.landfire.gov>

Whitaker, John O., Charles J. Amlaner, Marion T. Jackson, George R. Parker, and Peter Evans Scott. 2012.

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	05/04/2024
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:**
