USDA Natural Resources Conservation Service

Ecological site F111XA005IN
Dry Alluvium

Last updated: 4/16/2020
Accessed: 08/16/2024

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.

111A – Indiana and Ohio Till Plain, Central Part. This area is in the Till Plains Section of the Central Lowland Province of the Interior Plains. It is dominated by broad, nearly level ground moraines that are broken in some areas by kames, outwash plains, and stream valleys along the leading edge of the moraines. Narrow, shallow valleys commonly are along the few large streams in the area. Elevation ranges from 680 to 1,250 feet (205 to 380 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 plains.

The extent of the major Hydrologic Unit Areas (identified by four-digit numbers) that make up this MLRA is as follows: Wabash (0512), 46 percent; Great Miami (0508), 30 percent; Scioto (0506), 22 percent; and the Middle Ohio (0509), 2 percent. The major rivers in the area include the East and West Forks of the White River and the Whitewater River in Indiana and the Great Miami, Stillwater, Big Darby, Scioto, and Big Walnut Rivers in Ohio.

Surface deposits in this area include glacial deposits of till, lacustrine sediments, and outwash from Wisconsin and older glacial periods. A moderately thick mantle of loess covers much of the area. Most of this MLRA is underlain by Silurian and Devonian limestone and dolostone. Also, some areas of Late Ordovician shale and limestone are in the western part of the MLRA (USDA, 2006).

Classification relationships

Major Land Resource Area (USDA-Natural Resources Conservation Service, 2006)
USFS Ecological Regions (USDA, 2007):
Sections – Southern Unglaciated Allegheny Plateau (221E), Central Till Plains, Beech Maple (222H), Interior Low Plateau-Transition Hills (223B), Interior Low Plateau-Bluegrass (223F)
Subsections - Lower Scioto River Plateau (221Eg), Bluffton Till Plains (222Ha), Miami-Scioto Plain-Tipton Till Plain

(222Hb), Little Miami Old Drift Plain (222Hc), Mad River Interlobate Plains (222Hd), Darby Plains (222He), Brown County Hills (223Ba), Northern Bluegrass (223Fd), Muscatatuck Flats and Valleys (223Fe), Scottsburg Lowlands (223Ff)
NatureServe Systems anticipated (NatureServe, 2011): Agriculture - Cultivated Crops and Irrigated Agriculture, Agriculture - Pasture/Hay, Allegheny-Cumberland Dry Oak Forest and Woodland, Appalachian (Hemlock)-Northern Hardwood Forest, Central Appalachian Pine-Oak Rocky Woodland, Central Interior Acidic Cliff and Talus, Central Interior Highlands Calcareous Glade and Barrens, Central Tallgrass Prairie, Clearcut - Grassland/Herbaceous, Introduced Upland Vegetation – Treed, Managed Tree Plantation, Mississippi River Riparian Forest, North-Central Interior and Appalachian Acidic Peatland, North-Central Interior Beech-Maple Forest, North-Central Interior Dry-Mesic Oak Forest and Woodland, North-Central Interior Floodplain, North-Central Interior Freshwater Marsh, North-Central Interior Oak Savanna, North-Central Interior Wet Flatwoods, North-Central Interior Wet Meadow-Shrub Swamp, North-Central Oak Barrens, Northeastern Interior Dry-Mesic Oak Forest, Ruderal Forest, Ruderal Upland - Old Field, South-Central Interior / Upper Coastal Plain Wet Flatwoods, South-Central Interior Large Floodplain, South-Central Interior Mesophytic Forest, South-Central Interior Small Stream and Riparian, Southern Appalachian Oak Forest, Southern Interior Low Plateau Dry-Mesic Oak Forest, Southern Ridge and Valley / Cumberland Dry Calcareous Forest, Successional Shrub/Scrub
LANDFIRE Biophysical Settings anticipated (USGS, 2010): Allegheny-Cumberland Dry Oak Forest and Woodland, Appalachian (Hemlock-) Northern Hardwood Forest, Central Interior and Appalachian Floodplain Systems, Central Interior and Appalachian Riparian Systems, Central Interior and Appalachian Shrub-Herbaceous Wetland Systems, Central Interior and Appalachian Swamp Systems, Central Interior Highlands Calcareous Glade and Barrens, Central Interior Highlands Dry Acidic Glade and Barrens, Central Tallgrass Prairie, Great Lakes Coastal Marsh Systems, North-Central Interior Beech-Maple Forest, North-Central Interior Dry-Mesic Oak Forest and Woodland, North-Central Interior Dry Oak Forest and Woodland, North-Central Interior Oak Savanna, North-Central Interior Wet Flatwoods, South-Central Interior Mesophytic Forest, South-Central Interior/Upper Coastal Plain Flatwoods, Southern Appalachian Oak Forest, Southern Interior Low Plateau Dry-Mesic Oak Forest

Ecological site concept

This site is a wetland/riparian site formed on alluvial parent materials that are moderately well to somewhat excessively drained. It is located along the floodplain, often on steps, natural levees, and terraces, of lotic systems in sandy alluvial deposits overlaying coarser materials. The site is generally constrained to a narrow landscape position that is influenced by the adjacent uplands and riparian areas. Flooding can be nonexistent to frequent, depending on the riparian system with durations up to 30 days. Landscape position and internal drainage preclude ponding from occurring on this site.

The characteristic vegetation of the site is that of a floodplain forest dominated principally by sugar maple and swamp white oak. Additional canopy level species include silver maple, elm, and basswood. Active hydrologic and geomorphic process, along with windthrow of established trees, drive the long interval disturbance regime of this tree dominated site. These macro and micro scale disturbance events creates mixed-aged forests that contains both late and early seral species. These dynamics have been drastically changed due to the installation of levees, dams, and channelization of the system. Currently, the areas on broader floodplains are often is in agricultural production with the remaining being naturally regenerated vegetation.

Associated sites

F111XA004IN	**Wet Alluvium** Soils are very poorly to somewhat poorly drained.
F111XA009IN	**Till Ridge** Parent materials is glacial till; soils are moderately well to well drained.

Similar sites

F111XA013IN	**Loess Upland** Parent material is loess; generally in the higher landscape position.

Table 1. Dominant plant species

Tree	(1) *Acer saccharum* (2) *Quercus bicolor*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is located in the 111a - Indiana and Ohio Till Plain, Central Part MLRA. It is classified as a wetland/riparian site. This site was formed in loamy alluvium on natural levees, low terraces, and bars on flood plains. This creates a long, linear expression of the site on the landscape.

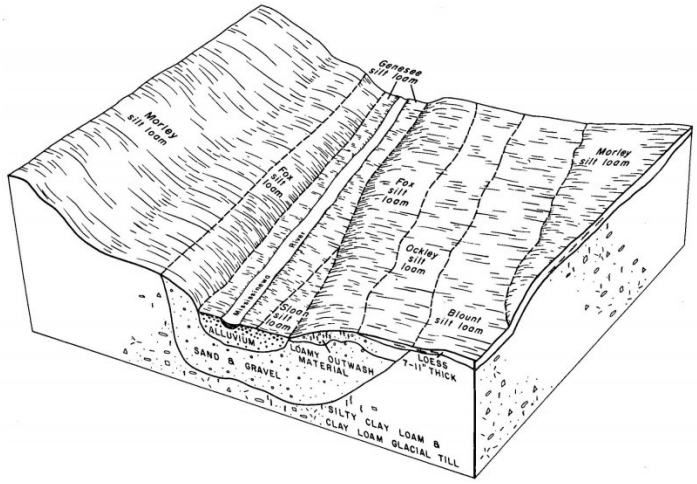

Figure 1. Block diagram showing soil series on the landscape.

Table 2. Representative physiographic features

Landforms	(1) Flood plain (2) Flood-plain step (3) Natural levee
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	341–1,250 ft
Slope	0–6%
Ponding depth	0 in
Water table depth	18–72 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation in this area is 36 to 43 inches (915 to 1,090 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 49 to 53 degrees F (9 to 12 degrees C). The freeze-free period averages about 195 days and ranges from 175 to 215 days.

Table 3. Representative climatic features

Frost-free period (characteristic range)	146-156 days
Freeze-free period (characteristic range)	177-187 days
Precipitation total (characteristic range)	39-43 in

Frost-free period (actual range)	145-164 days
Freeze-free period (actual range)	176-192 days
Precipitation total (actual range)	39-44 in
Frost-free period (average)	152 days
Freeze-free period (average)	182 days
Precipitation total (average)	41 in

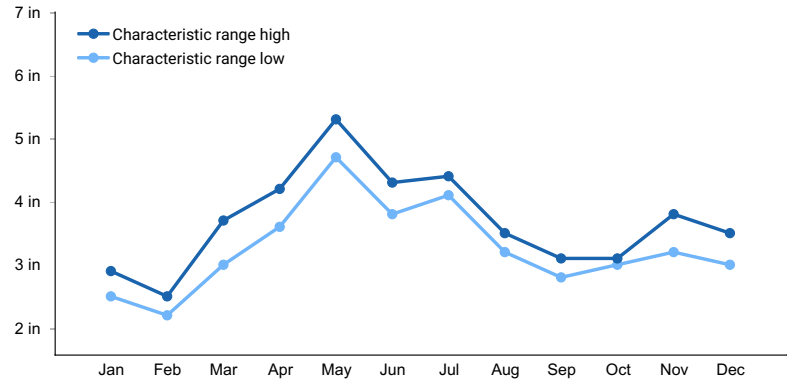

Figure 2. Monthly precipitation range

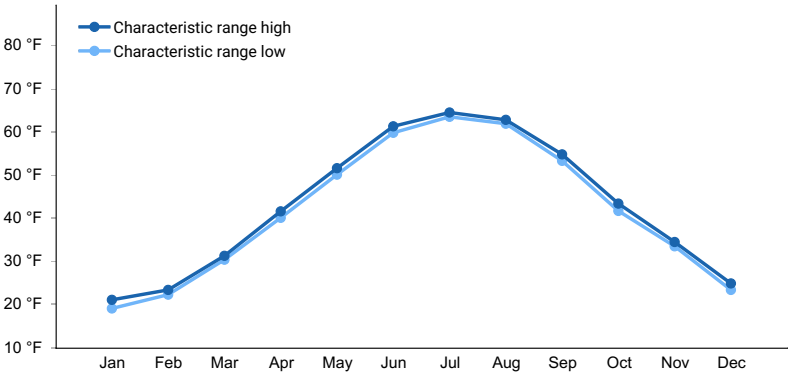

Figure 3. Monthly minimum temperature range

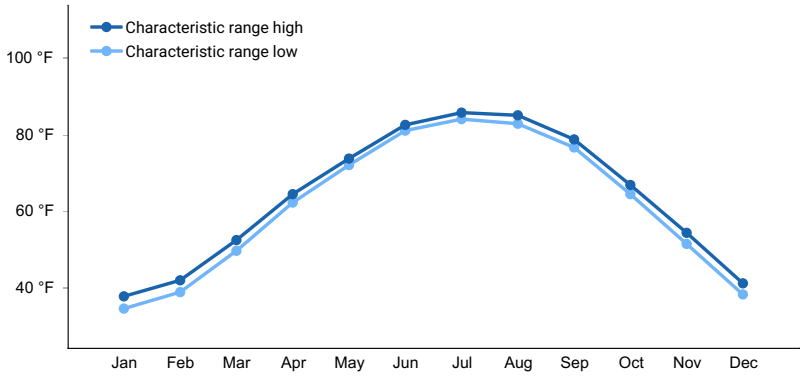

Figure 4. Monthly maximum temperature range

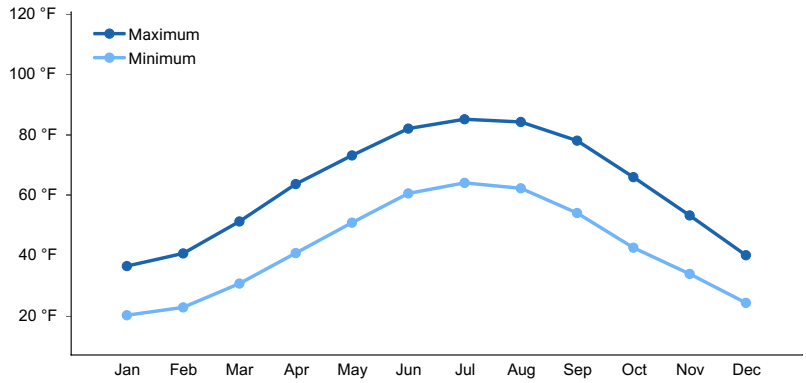

Figure 5. Monthly average minimum and maximum temperature

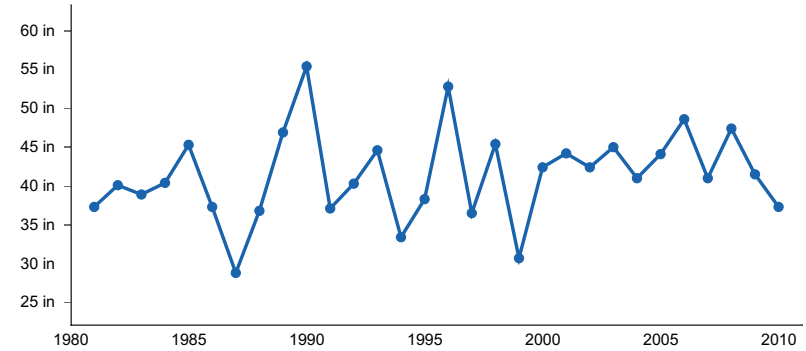

Figure 6. Annual precipitation pattern

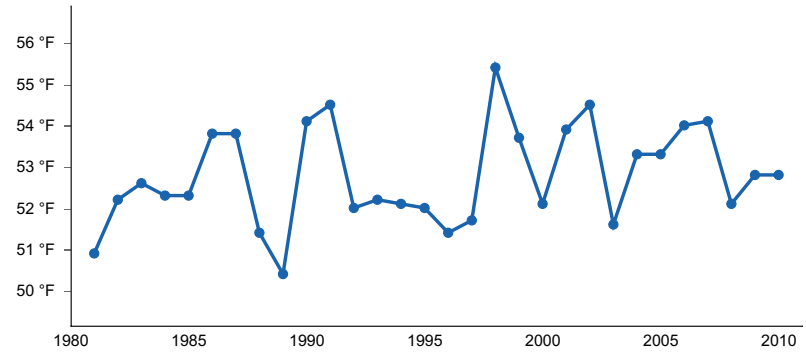

Figure 7. Annual average temperature pattern

Climate stations used

- (1) BROOKVILLE [USC00121030], Metamora, IN
- (2) INDIANAPOLIS SE SIDE [USC00124272], Indianapolis, IN
- (3) CIRCLEVILLE [USC00331592], Circleville, OH
- (4) ANDERSON SEWAGE PLT [USC00120177], Anderson, IN
- (5) COLUMBUS [USC00121747], Columbus, IN
- (6) FRANKLIN [USC00332928], Franklin, OH
- (7) SPRINGFIELD NEW WWKS [USC00337935], Springfield, OH

Influencing water features

This site is characterized by its location in a floodplain of a perennial stream and there is most affected by the flooding, scouring, and channel movement of the adjacent lotic system. Flooding can be nonexistent to frequent with a long (7 to 30 day) duration depending on the riverine system. Ponding does not occur on the site largely due to drainage and coarseness of soil, but also due to landform position. The proximity of the site to a perennial stream/river and therefore low topographic location result in a seasonally high water table in the spring that recedes during the summer. Levees, dams, and channelization have greatly altered the hydrology and flooding of the riparian systems in many places.

The hydrogeographic model classification for this site is RIVERINE: Alluvial Plain, Stream Terrace, Flood Plain; sandy, forested. This site has a Cowardin Classification of PFO6An; it is a forested palustrine system that is temporarily flooded on mineral soil.

Soil features

The soil series associated with this site are: Wirt, Wilbur, Uniontown, Tremont, Stonelick, Steff, Skidmore, Sardinia, Rossburg, Ross, Romeo, Pekin, Otwell, Oldenburg, Moundhaven, Millstone, Medway, Lobdell, Lash, Lanier, Landes, Kinn, Haymond, Gessie, Genesee, Elkinsville, Eel, Dearborn, Cuba, Clifty, Chagrin, Beckville, Armiesburg. They are very shallow to very deep, poorly drained to somewhat excessively drained, and very slow to rapid permeable soils, with neutral to moderately alkaline soil reaction, that formed in alluvium, lacustrine deposits, loess, outwash, residuum, till from limestone, limestone and shale, sedimentary rock.

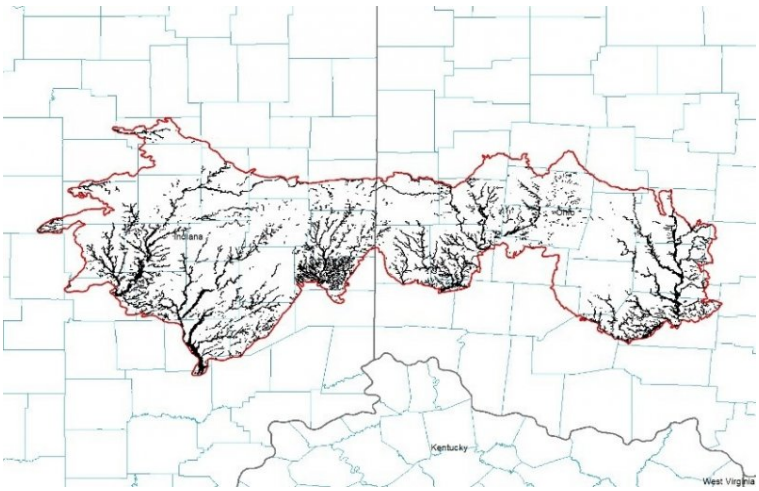

Figure 8. mapunit location within the MLRA

Table 4. Representative soil features

Parent material	(1) Alluvium–limestone and shale (2) Lacustrine deposits–limestone
Surface texture	(1) Cobbly fine sandy loam (2) Gravelly loamy fine sand (3) Sandy loam
Family particle size	(1) Sandy
Drainage class	Moderately well drained to somewhat excessively drained
Permeability class	Very slow to rapid
Soil depth	4–70 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	0.7–9.2 in
Calcium carbonate equivalent (0-40in)	0–20%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	5.3–7.9

Subsurface fragment volume <=3" (Depth not specified)	0–33%
Subsurface fragment volume >3" (Depth not specified)	0–38%

Ecological dynamics

The historic plant community of the Dry Alluvium ecological site is a dry floodplain forest. The dominant species in the canopy are sugar maple and swamp white oak, with silver maple, elm, and basswood being common as well. This site is the result of hydrologic and geomorphic process at the macro scale and windthrow on a more local scale. The disturbance regime is one of somewhat frequent low intensity flooding events punctuated punctuated by high intensity events (ie. 100+ year floods, tornados, or ice storms). Since settlement, approximately 30% of this site is in agriculture production. The balance being largely a mix of the reference state and the invaded state.

State and transition model

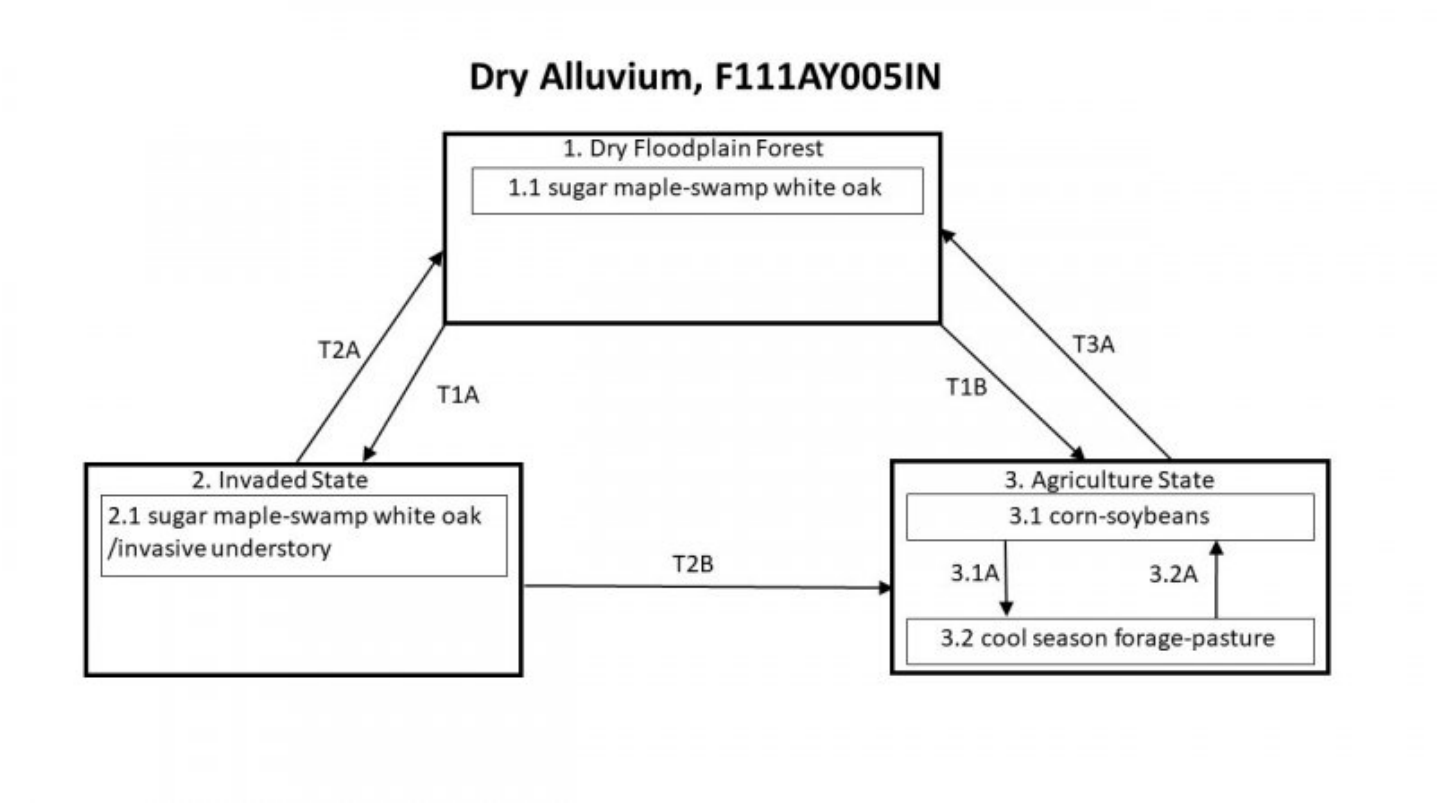

Figure 9. Dry Alluvium STM

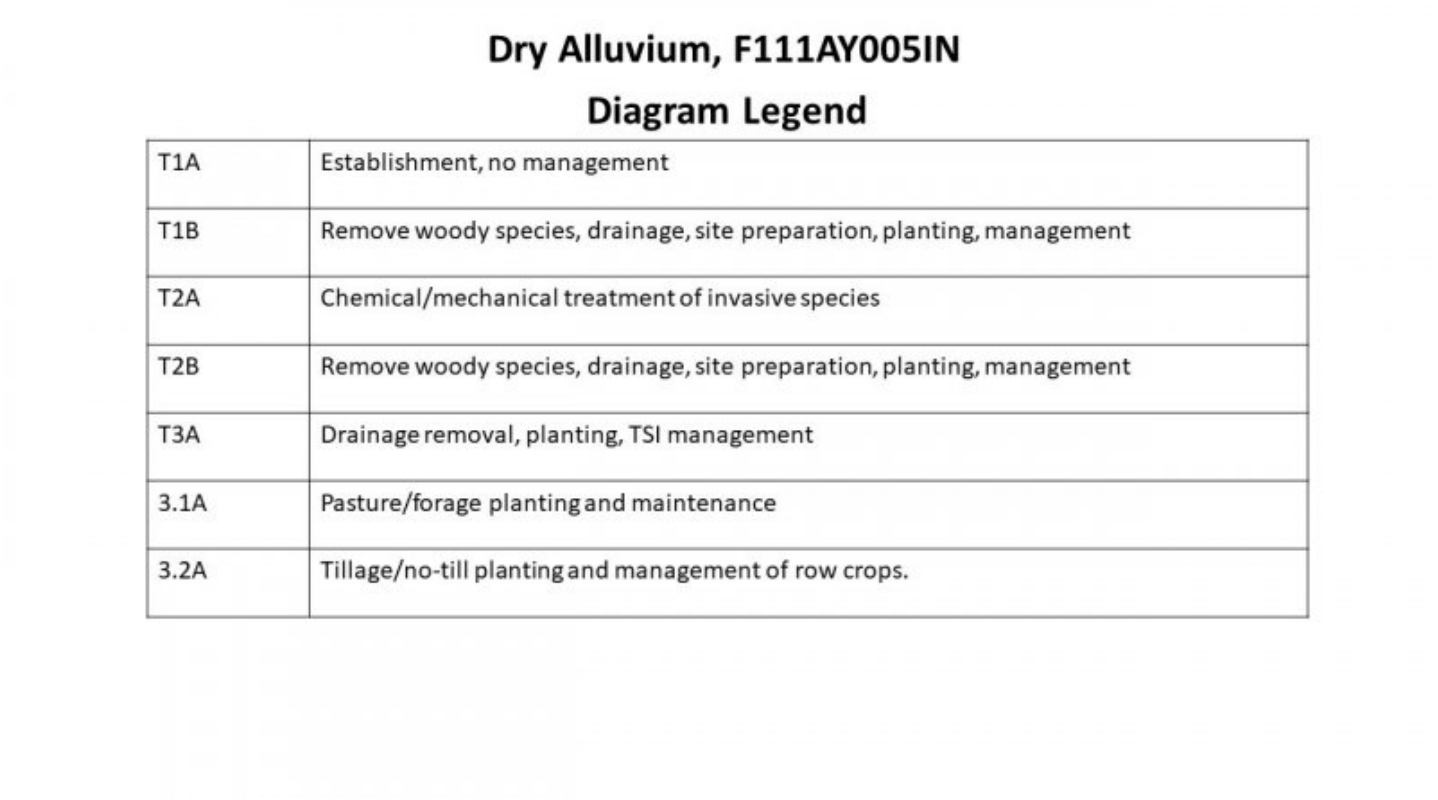

Figure 10. legend

State 1
Dry Floodplain Forest

This is the reference or diagnostic plant community for this site. In reference condition (mature), this site was dominated by sugar maple and swamp white oak trees. Other canopy tree species include black walnut, shagbark hickory, and elm. Prior to settlement, the dynamics of the site were largely controlled by flooding, channel meandering, sedimentation and erosion. These process still occur, at some level, yet to this day, but have been greatly altered from pre-settlement conditions by bank stabilization, dams, diversions, and channel straightening. Approximately 30% of this site is in agricultural production, most of which is used to grow corn and soybeans. Many of the areas that are relatively intact have been affected by invasive species and the disruption of the hydrologic and geomorphic processes listed above.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- swamp white oak (*Quercus bicolor*), tree

Community 1.1
sugar maple/swamp white oak

This phase is characterized by tree species dominance, particularly sugar maple and swamp white oak. Additional canopy species include black walnut, basswood, and shagbark hickory. Understory woody species include hornbeam, spicebush, and eastern redbud.

State 2
Invaded State

This state is characterized by the establishment and eventual dominance of invasive species in the understory. This greatly reduces the species richness and diversity of the site as a whole. Common invasives for this site include, but are not limited to, species of Asian bush honeysuckle, Callery pear, autumn olive and ailanthus.

Dominant plant species

- Amur honeysuckle (*Lonicera maackii*), shrub

- autumn olive (*Elaeagnus umbellata*), shrub
- tree of heaven (*Ailanthus altissima*), shrub
- Callery pear (*Pyrus calleryana*), shrub

Community 2.1
sugar maple/swamp white oak/invasives

This phase is characterized by the understory being dominated by woody, mostly non-native, invasive species.

State 3
Agriculture 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. About 10% of the historic acres are use for forage and pasture.

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 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

Establishment and maintenance of row crops.

Transition T1A
State 1 to 2

The establishment of an invasive species without management to remove or control it will transition the site to the Invaded State (2).

Transition T1B
State 1 to 3

Removal of the trees and, in some cases, the installation of a drainage system are the first steps in converting the site to the Agriculture State. Regular agricultural practices will maintain the site in that state.

Restoration pathway R2A
State 2 to 1

Chemical and mechanical treatment of the invasive species. Planting of desired species may be needed if they are not enough left to recolonize the site.

Transition T2B
State 2 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.

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 work.

Other references

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Contributors

Tyler Staggs

Approval

Chris Tecklenburg, 4/16/2020

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	08/16/2024
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:**