

Ecological site F111XA004IN Wet Alluvium

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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.

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 Ohic (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 Unglaciaded 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 riparian site formed on alluvial parent materials that are very poorly to somewhat poorly drained. It is located along the floodplain of lotic systems in loamy alluvial deposits often overlaying coarser materials. As such the site is often constrained to a narrow landscape that is influenced by the adjacent uplands and riparian areas.

The characteristic vegetation of the site is that of a floodplain forest dominated principally by eastern cottonwood and American sycamore. Additional canopy level species include silver maple, swamp white oak, and walnut. 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, an appreciable amount of this site is in agricultural production after the installation of drainage with the remaining being naturally regenerated vegetation.

Associated sites

F111XA005IN	Dry Alluvium soils are moderately well to well drained
F111XA009IN	Till Ridge parent material is glacial till; soils are moderately well to well drained

Similar sites

F111XA005IN	Dry Alluvium soils are moderately well to well drained
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Table 1. Dominant plant species

Tree	(1) <i>Populus deltoides</i> (2) <i>Platanus occidentalis</i>
Shrub	Not specified

Herbaceous	Not specified
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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 in the floodplains of streams and rivers. This creates a long, linear expression of the site on the landscape.

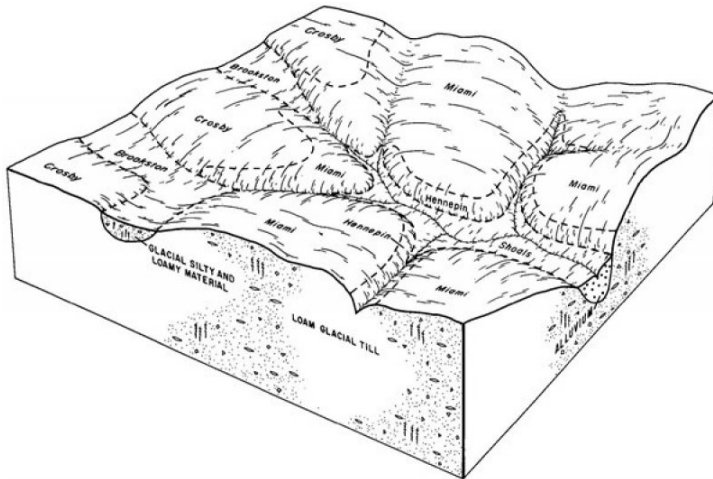


Figure 1. block diagram showing soils on the landscape

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Flooding frequency	Very rare to frequent
Ponding frequency	None to occasional
Elevation	104–381 m
Slope	0–2%
Water table depth	15–61 cm

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)	150-160 days
Freeze-free period (characteristic range)	177-192 days
Precipitation total (characteristic range)	1,067-1,118 mm
Frost-free period (actual range)	149-166 days
Freeze-free period (actual range)	175-194 days
Precipitation total (actual range)	1,016-1,143 mm
Frost-free period (average)	156 days
Freeze-free period (average)	184 days
Precipitation total (average)	1,092 mm

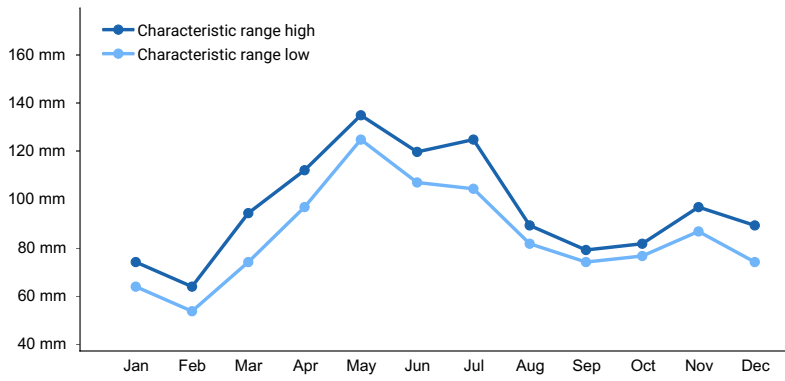


Figure 2. Monthly precipitation range

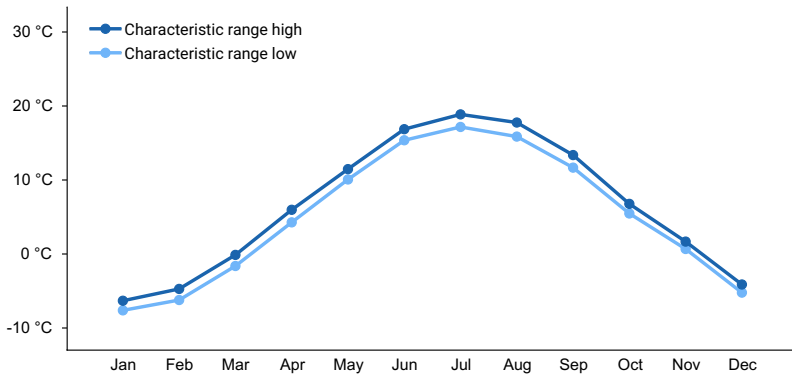


Figure 3. Monthly minimum temperature range

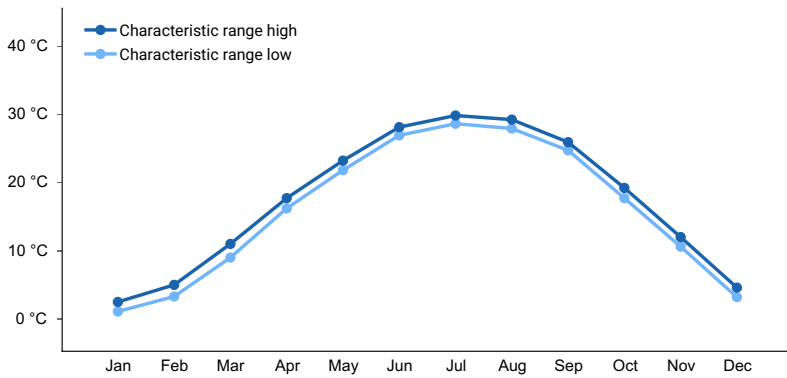


Figure 4. Monthly maximum temperature range

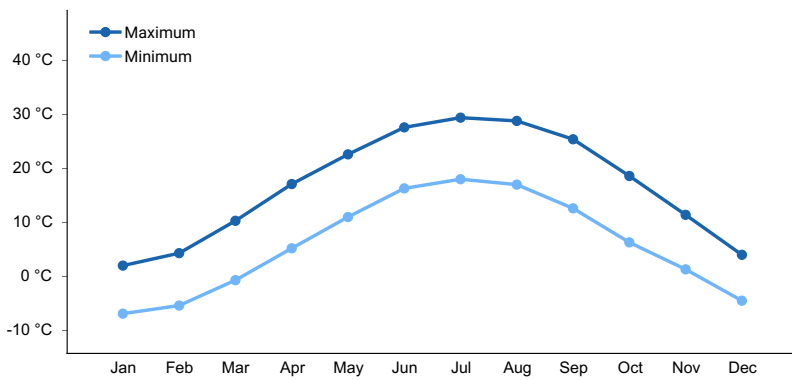


Figure 5. Monthly average minimum and maximum temperature

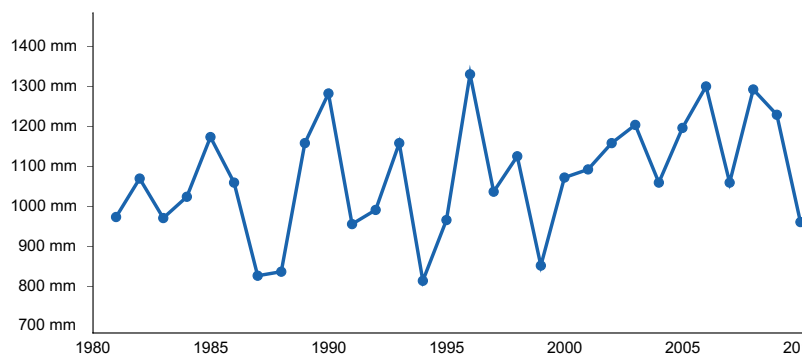


Figure 6. Annual precipitation pattern

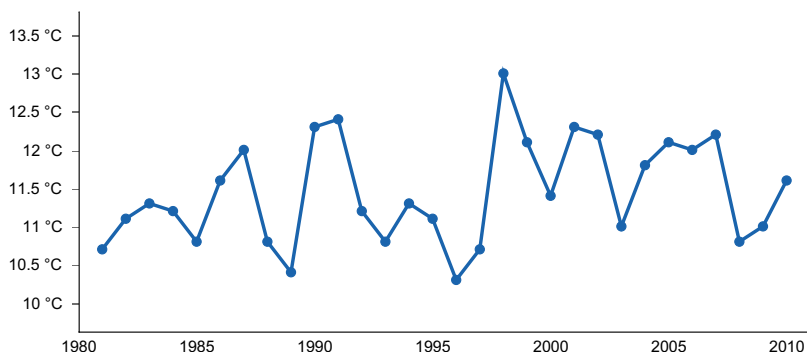


Figure 7. Annual average temperature pattern

Climate stations used

- (1) SHELBYVILLE SEWAGE PLT [USC00127999], Shelbyville, IN
- (2) GREENSBURG [USC00123547], Greensburg, IN
- (3) NEW CASTLE 3 SW [USC00126164], New Castle, IN
- (4) URBANA WWTP [USC00338552], Urbana, OH
- (5) INDIANAPOLIS [USW00093819], Indianapolis, IN
- (6) COLUMBUS [USC00121747], Columbus, IN
- (7) WINCHESTER AIRPORT 3 E [USC00129678], Winchester, IN

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 very long (more than 30 day) duration depending on the riverine system. Similarly, ponding can occur frequently with a durations ranging from very brief (4 to 48 hours) to very long (> 30 days). 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 somewhat 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, Backswamp, Flood Plain; forested. This site has a Cowardin Classification of PFO6An; it is a forested palustrine system that is temporarily flooded/ponded on mineral soil.

Soil features

The soil series associated with this site are: Aetna, Algiers, Banlic, Bartle, Beaucoup, Bellcreek, Ceresco, Cohoctah, Euclid, Evansville, Henshaw, Holton, Orrville, Piopolis, Rockmill, Saranac, Shoals, Sloan, Southwest, Stendal, Vincennes, Wakeland, Washtenaw, Wilhite. They are very deep, very poorly drained to somewhat poorly drained, and very slow to rapid permeable soils, with strongly acidic to neutral soil reaction, that formed in alluvium, drift, glaciofluvial deposits, glaciolacustrine deposits, slope alluvium, and till.

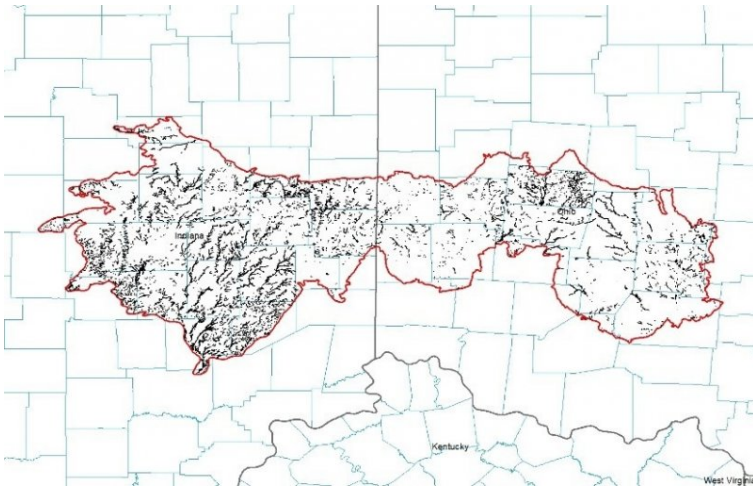


Figure 8. location of mapunits within the MLRA

Table 4. Representative soil features

Parent material	(1) Alluvium (2) Drift (3) Glaciofluvial deposits (4) Glaciolacustrine deposits (5) Slope alluvium (6) Till
Surface texture	(1) Loam (2) Clay loam (3) Silty clay loam
Family particle size	(1) Loamy
Drainage class	Very poorly drained to somewhat poorly drained
Permeability class	Very slow to rapid
Soil depth	66–124 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	13.46–30.23 cm
Calcium carbonate equivalent (0-101.6cm)	0–15%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	5.5–7.5
Subsurface fragment volume <=3" (Depth not specified)	0–18%
Subsurface fragment volume >3" (Depth not specified)	0–3%

Ecological dynamics

The historic plant community of the Wet Alluvium ecological site is a floodplain forest. The dominant species in the canopy are cottonwood and sycamore, with silver maple, swamp white oak, and walnut 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 frequent low intensity flooding events that do not greatly effect the dominant

species often. This is punctuated by high intensity events (ie. 100+ year floods, tornados, or ice storms) that remove the dominate species. Succession starts with a shrub dominated community that is a mix of pioneering species such as willows and herbaceous species. Since settlement, just under 50% 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

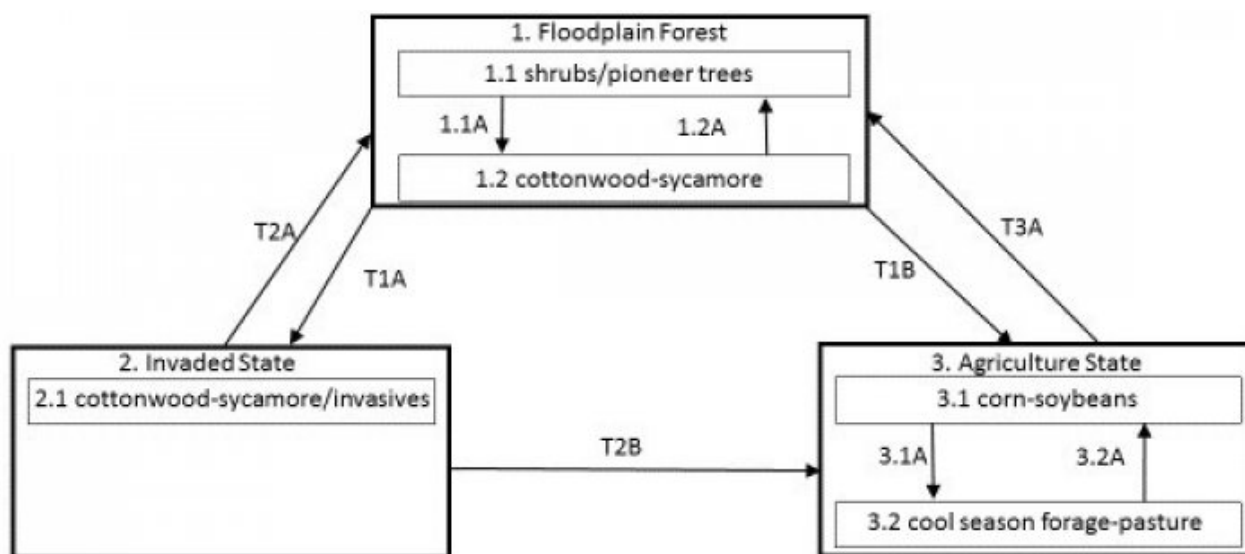


Figure 9. STM

Wet Alluvium, F111AY004IN Diagram Legend

T1A	Establishment, no management
T1B	Remove woody species, drainage, site preparation, planting, management
T2A	Chemical/mechanical treatment of invasive species
T2B	Remove woody species, drainage, site preparation, planting, management
T3A	Drainage removal, planting, TSI management
1.1A	Succession
1.2A	Disturbance that removes trees
3.1A	Pasture/forage planting and maintenance
3.2A	Tillage/no-till planting and management of row crops.

Figure 10. Legend

State 1

Floodplain Forest

This is the reference or diagnostic plant community for this site. In reference condition (mature), this site was dominated by cottonwood and sycamore trees. Other canopy tree species include silver maple, swamp white oak, and black walnut. An earlier successional phase of this site is comprised largely of young cottonwoods, willows, dogwoods and pawpaw along with herbaceous species. 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. Nearly one-half 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

- cottonwood (*Populus*), tree
- American sycamore (*Platanus occidentalis*), tree

Community 1.1 shrubs/pioneer trees

This phase is characterized by pioneering woody species. Most common and numerous are willow species, cottonwoods, and dogwoods. This is the early successional phase after a large disturbance even on the vegetating of a new bank or island of the riparian area. Cover is generally very heavy, but usually not more than 10 feet tall. As time and succession progress, the trees become bigger but fewer.

Dominant plant species

- cottonwood (*Populus*), tree
- dogwood (*Cornus*), shrub
- willow (*Salix*), shrub

Community 1.2 cottonwoods/sycamore

This phase is characterized by tree species dominance, particularly cottonwood and sycamores. Additional canopy species include black walnut, silver maple, and swamp white oak. Understory woody species include dogwoods, spicebush, and paw-paw.

Dominant plant species

- cottonwood (*Populus*), tree
- American sycamore (*Platanus occidentalis*), tree
- dogwood (*Cornus*), shrub
- pawpaw (*Asimina triloba*), shrub
- northern spicebush (*Lindera benzoin* var. *benzoin*), shrub

Pathway P1.1A Community 1.1 to 1.2

Succession.

Pathway P1.2A Community 1.2 to 1.1

Disturbance removes trees

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

- cottonwood (*Populus*), tree
- American sycamore (*Platanus occidentalis*), tree

Community 2.1 cottonwoods/sycamore/invasives

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

Dominant plant species

- cottonwood (*Populus*), tree
- American sycamore (*Platanus occidentalis*), tree

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 used 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

Pasture /forage planting and maintenance

Pathway P3.2A Community 3.2 to 3.1

tillage / no till planting and management 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 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, prepare the site for planting the agricultural crop, and regular agricultural practices.

Restoration pathway R3A

State 3 to 1

Removal of drainage system, 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, 5/01/2020

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	04/17/2020
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:**
-