

## Ecological site F111XE102OH Lacustrine Forest

Last updated: 5/28/2020  
Accessed: 05/05/2024

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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, Ruderal Forest, Ruderal Upland - Old Field

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 formed on lacustrine parent materials in soils that are somewhat poorly to moderately well drained. These soils generally occur on lake plains, moraines, or terraces often with some slope or on a convex surface. The site is located on generally flat topography, but slopes can reach to 18% at the margins of the

landform features.

The characteristic vegetation of the site is a mesic forest with the understory and canopy dominated by fire sensitive, shade tolerant species most notably sugar maple and American beech, with tulip tree and basswood also being common. Canopy level associates include white oak, hackberry, and black walnut. Catastrophic windthrow was the most common, large scale disturbance event on this site and even those only occurred about every 300-500 years. Small gap disturbance caused by local windthrow or mortality was the main disturbance event that allowed the site to become dominated by fire sensitive, shade tolerant species. The largest risk to extant natural representation of the site is by invasion of non-native plants that, if unchecked, can dominate the understory. This greatly changes the species richness and diversity of the understory as the non-native plants, particularly species of Asian bush honeysuckle, exclude most all other species. The dominant canopy level trees are not threatened by these species, however given enough time this change could alter the composition of the canopy by altering the species that can get established in the understory. A large portion of this site has been drained and is in agricultural production. The majority of the converted acres is used for small grain 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. The largest risk to extant natural representation of the site is by invasion of non-native plants that, if unchecked, can dominate the understory.

### Associated sites

F111XE101OH	<b>Lacustrine Flatwood</b> Lacustrine Flatwood. Soils very poorly or poorly drained
F111XE501OH	<b>Till Depression</b> Till Depression. Located on glacial till parent materials; generally lower on the landscape; frequently ponded.

### Similar sites

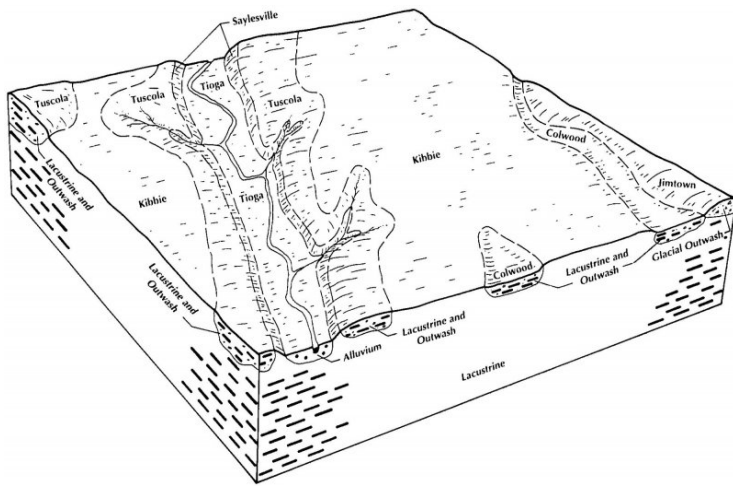
F111XE502OH	<b>Wet Till Ridge</b> Wet Till Ridge. Located on glacial till parent materials; site located on a convex landscape position; soils are somewhat poorly drained.
F111XE503OH	<b>Till Ridge</b> Till Ridge. Located on glacial till parent materials; site located on a convex landscape position; soils are moderately well to well drained.
F111XE204OH	<b>Dry Alluvium Forest</b> Dry Alluvium Forest. Located on alluvium parent materials; soils are moderately well to well drained.
F111XE301OH	<b>Wet Restricted</b> Wet Restricted. Located on residuum parent materials; soils are somewhat poorly drained.
F111XE403OH	<b>Outwash Upland</b> Outwash Upland. Located on outwash parent materials; soils are very poorly to somewhat poorly drained; site often located higher on the landscape.

**Table 1. Dominant plant species**

Tree	(1) <i>Acer saccharum</i> (2) <i>Fagus grandifolia</i>
Shrub	Not specified
Herbaceous	Not specified

### Physiographic features

This ecological site is found in till plain landscapes in MLRA 111E: Indiana and Ohio Till Plain, Eastern Part. It developed on lake plains, deltas, flats, and outwash plains on lacustrine parent material. Landform positions include footslopes, backslopes, shoulders, and summits with slopes that range from 0 to 18 percent.



**Figure 1. Block diagram showing soils on the landscape.**

**Table 2. Representative physiographic features**

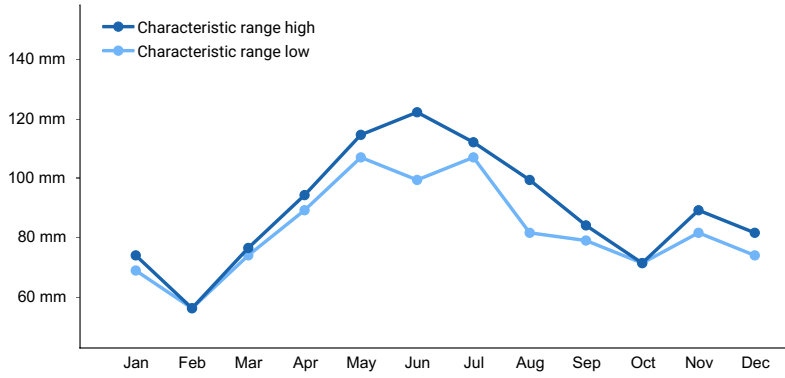
Landforms	(1) Lake plain (2) Delta plain (3) Outwash plain
Flooding frequency	None
Ponding frequency	None
Elevation	152–366 m
Slope	0–18%
Water table depth	30–145 cm
Aspect	Aspect is not a significant factor

### Climatic features

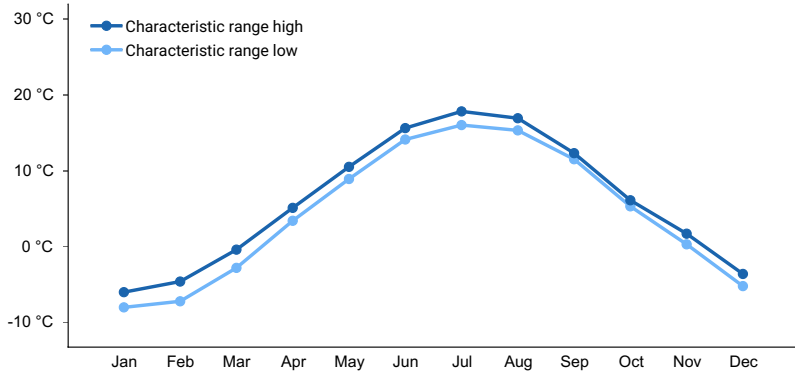
The average annual precipitation in this area is 35 to 41 (890 to 1,040 millimeters). Most of the rainfall occurs as convective thunderstorms during the growing season. About half or more of the precipitation occurs during the freeze-free period. Snowfall is common in winter. The average annual temperature 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**

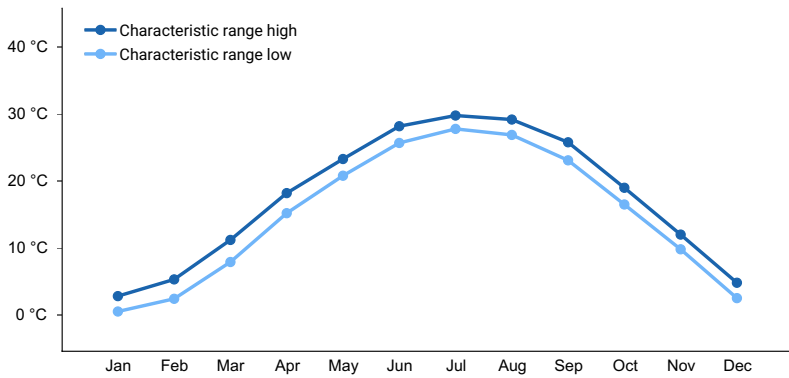
Frost-free period (characteristic range)	127-145 days
Freeze-free period (characteristic range)	172-177 days
Precipitation total (characteristic range)	991-1,067 mm
Frost-free period (actual range)	126-148 days
Freeze-free period (actual range)	171-178 days
Precipitation total (actual range)	991-1,118 mm
Frost-free period (average)	136 days
Freeze-free period (average)	175 days
Precipitation total (average)	1,041 mm



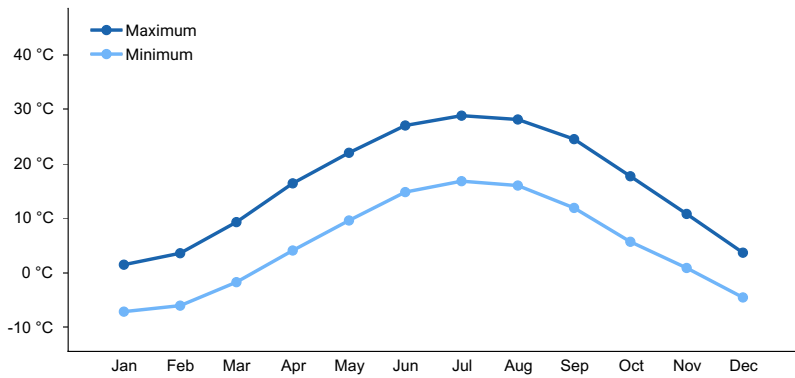
**Figure 2. Monthly precipitation range**



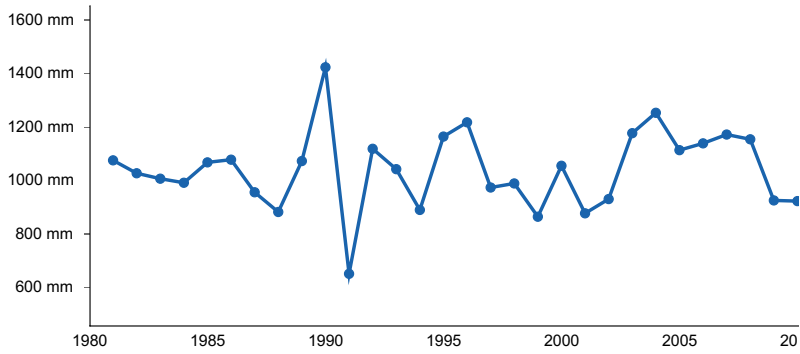
**Figure 3. Monthly minimum temperature range**



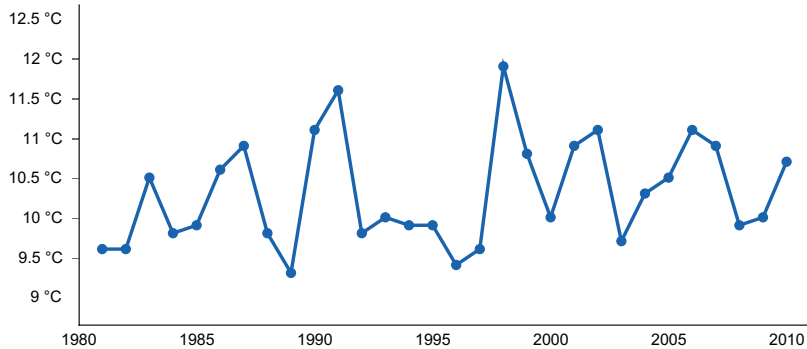
**Figure 4. Monthly maximum temperature range**



**Figure 5. Monthly average minimum and maximum temperature**



**Figure 6. Annual precipitation pattern**



**Figure 7. Annual average temperature pattern**

### Climate stations used

- (1) MANSFIELD LAHM MUNI AP [USW00014891], Mansfield, OH
- (2) CHIPPEWA LAKE [USC00331541], Medina, OH
- (3) LANCASTER [USC00334403], Lancaster, OH
- (4) WESTERVILLE [USC00338951], Westerville, OH
- (5) GALION WTR WKS [USC00333021], Galion, 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: Tuscola, Shinrock, Mentor, Kibbie, Glenford, Fitchville. They are very deep, somewhat poorly drained to well drained, and moderately slow to moderately rapid permeable soils, with strongly acidic to neutral soil reaction, that formed in glaciofluvial deposits, glaciolacustrine deposits, or lacustrine deposits.

Parent Materials Kind: glaciofluvial deposits, glaciolacustrine deposits, lacustrine deposits

Surface Texture: fine sandy loam, loam, silt loam

Subsurface Texture group: loamy

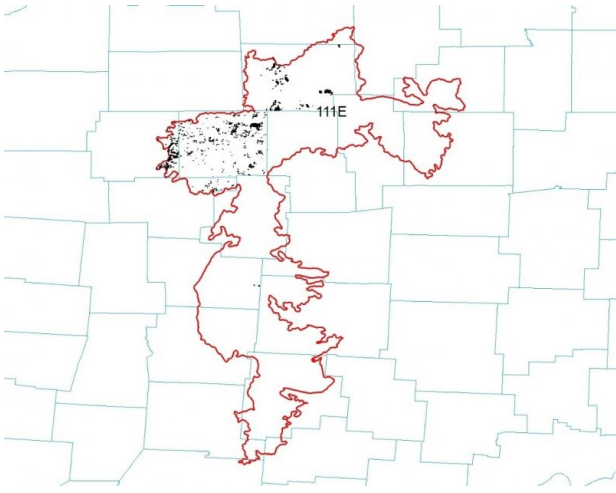


Figure 8. Location of mapunits in the MLRA

Table 4. Representative soil features

Parent material	(1) Lacustrine deposits (2) Glaciolacustrine deposits (3) Glaciofluvial deposits
Surface texture	(1) Loam (2) Silt loam (3) Fine sandy loam
Drainage class	Somewhat poorly drained to well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	14.48–20.07 cm
Calcium carbonate equivalent (Depth not specified)	0–20%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	5.5–7.9
Subsurface fragment volume <=3" (Depth not specified)	2–5%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

The historic plant community of the Lacustrine Forest ecological site is a mesic forest. The dominant species in the canopy and understory are sugar maple and American beech, with white oak. Canopy associates may include tulip tree, basswood, and black walnut. Small gap disturbance is the most common disturbance event that allowed propagation of these species. Stand replacing fire was rare (<1000 year intervals) on this site, with catastrophic windthrow occurring in at about half that interval. The site is dominated by fire sensitive and shade tolerant species.

## State and transition model

### Lacustrine Forest, F111EY102OH

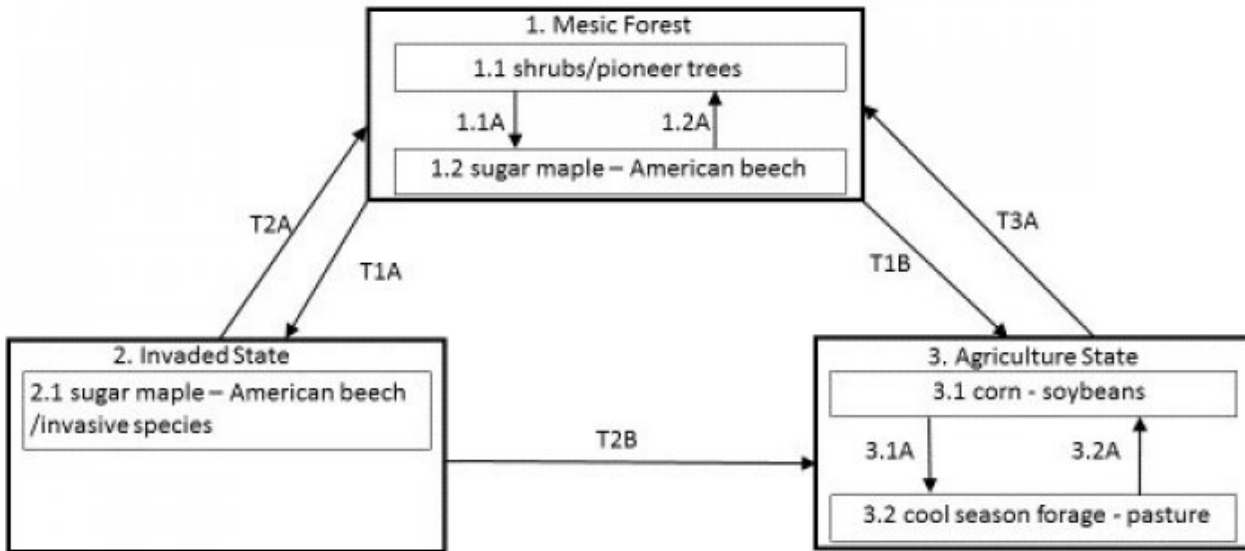


Figure 9. STM

### Lacustrine Forest, F111EY102OH Diagram Legend

T1A	Invasive species 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 canopy trees
3.1A	Pasture/forage planting and maintenance
3.2A	Tillage/no-till planting and management of row crops.

Figure 10. Legend

### State 1 Mesic Forest

The dominant species in the canopy and understory are sugar maple and American beech, with white oak. Canopy associates may include tulip tree, basswood, and black walnut. S

#### Dominant plant species

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

## **Community 1.1**

### **shrubs / pioneer trees**

This phase is characterized by pioneering woody species that respond rapidly to increased light availability. White oak, basswood and tulip-tree were common. Cover is generally very heavy, but not usually very tall. As time and succession progress, the trees become larger and less dense.

#### **Dominant plant species**

- white oak (*Quercus alba*), tree
- tuliptree (*Liriodendron tulipifera*), tree
- American basswood (*Tilia americana*), tree

## **Community 1.2**

### **sugar maple - American beech**

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

#### **Dominant plant species**

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

## **Pathway P1.1A**

### **Community 1.1 to 1.2**

Time and succession will move the site from this phase to the full expression of Community Phase 1.2

## **Pathway P1.2A**

### **Community 1.2 to 1.1**

Disturbance, whether natural or as management, that removes a large portion of the trees will move the site towards phase 1.1

## **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, but most impacted is the understory. Common invasives for this site include, but are not limited to, species of Asian bush honeysuckle and Callery pear.

#### **Dominant plant species**

- sugar maple (*Acer saccharum*), tree
- Callery pear (*Pyrus calleryana*), shrub
- Amur honeysuckle (*Lonicera maackii*), shrub

## **Community 2.1**

### **sugar maple - American beech/ Invasive species**

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

#### **Dominant plant species**

- sugar maple (*Acer saccharum*), tree
- American beech (*Fagus grandifolia*), tree
- Amur honeysuckle (*Lonicera maackii*), shrub



### **State 3**

#### **Agriculture**

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**

##### **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**

Establishment of invasive understory species with no management to control their abundance or distribution.

#### **Transition T1B**

##### **State 1 to 3**

Remove woody species, install drainage if needed, prepare the site for planting, and regular agricultural management will move the site to the Agriculture state and maintain it there.

#### **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 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, and tree planting.

## **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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## **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	05/05/2024
Approved by	Chris Tecklenburg
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

## Indicators

1. **Number and extent of rills:**  

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2. **Presence of water flow patterns:**  

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3. **Number and height of erosional pedestals or terracettes:**  

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**  

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5. **Number of gullies and erosion associated with gullies:**  

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6. **Extent of wind scoured, blowouts and/or depositional areas:**  

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7. **Amount of litter movement (describe size and distance expected to travel):**  

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**  

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**  

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10. **Effect of community phase composition (relative proportion of different functional groups) and spatial distribution on infiltration and runoff:**  

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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:

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13. **Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):**
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14. **Average percent litter cover (%) and depth ( in):**
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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:**
-