

# Ecological site F111XE502OH

## Wet Till Ridge

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

Hierarchical 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, Northeastern Interior Dry-Mesic Oak Forest

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

### Ecological site concept

This site is an upland site formed on glacial till parent materials. It is located in a convex landscape position on summits, shoulders, footslopes, and backslopes on relatively shallow angles of slope ( $\geq 6\%$ ) with soils that are

somewhat poorly soil drained.

The characteristic vegetation of the site is of a till mesic forest with the understory and canopy dominated by American beech and sugar maple with American elm, white ash, and basswood being common as well. Canopy level associates include white oak, black walnut, and shagbark hickory. The site is dominated by shade tolerant, fire sensitive species. The most common disturbance dynamic is individual tree or small group mortality or windthrow with catastrophic windthrow or damage from ice storms to occur very infrequently. 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. Currently, a large portion of the site has been converted for agricultural use, primarily corn and soybean rotations. The conversion to agriculture is started by the removal of the woody species followed by the installation of drainage either through ditching, field tile, or both. Tillage and/or management keep the site in the agricultural state.

### Associated sites

F111XE501OH	<b>Till Depression</b> Site is in a concave landscape position and frequently flooded.
F111XE503OH	<b>Till Ridge</b> Soils are moderately well to well drained

### Similar sites

F111XE503OH	<b>Till Ridge</b> Soils are moderately well to well drained.
F111XE403OH	<b>Outwash Upland</b> Located on outwash parent materials; soils are very poorly to somewhat poorly drained
F111XE301OH	<b>Wet Restricted</b> Located on residuum parent materials; soils are somewhat poorly drained; soils have a restrictive layer within 36 inches of the surfac
F111XE102OH	<b>Lacustrine Forest</b> Located on lacustrine parent materials; soils are somewhat poorly drained or drier.

Table 1. Dominant plant species

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

### Physiographic features

This ecological site is found on till plains in MLRA 111E: Indiana and Ohio Till Plain, Eastern Part. Soils in this site are loamy and located on slopes from 0 to 6 percent. The site is found on backslopes, footslopes, shoulders, and summits. Unique landforms where the site is found include moraines, lake plains, and till plains

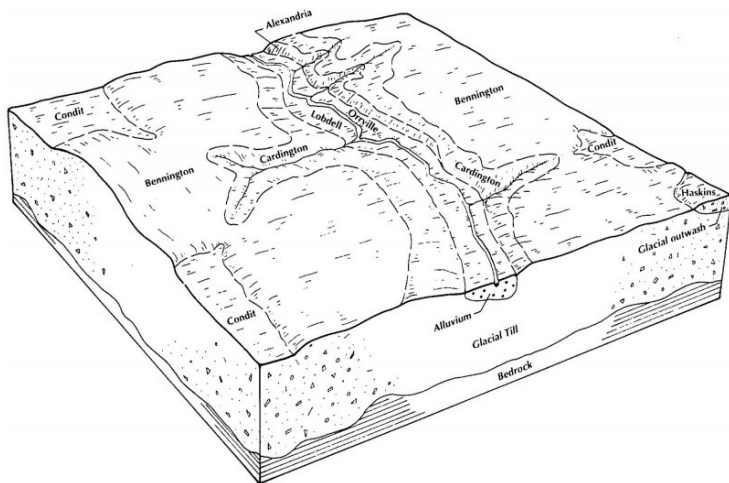


Figure 1. block diagram showing soils on the landscape

Table 2. Representative physiographic features

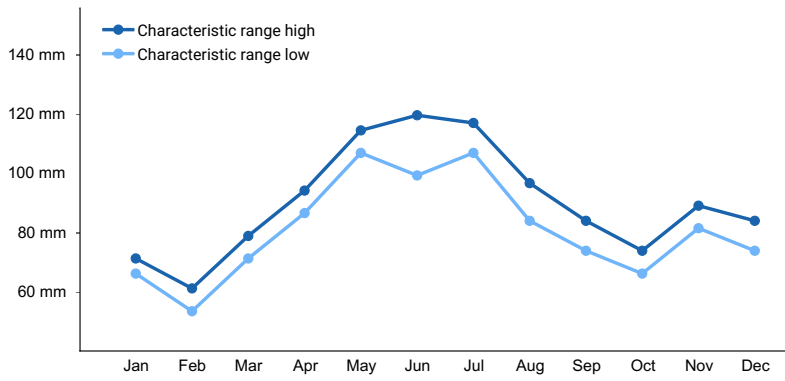
Landforms	(1) Moraine (2) Lake plain (3) Till plain
Flooding frequency	None
Ponding frequency	None
Elevation	Not specified
Slope	0–6%
Water table depth	23–53 cm
Aspect	Aspect is not a significant factor

## Climatic features

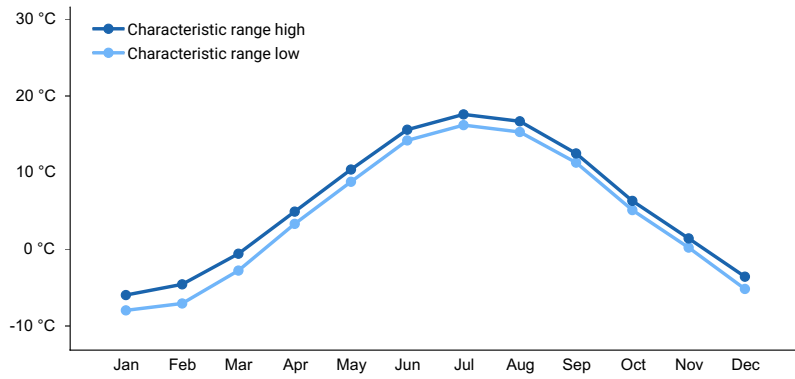
The average annual precipitation in this area is 35 to 41 (890 to 1,040 millimeters). Most of the rainfall occurs as convective thunderstorms during the growing season. About half or more of the precipitation occurs during the freeze-free period. Snowfall is common in winter. The average annual temperature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

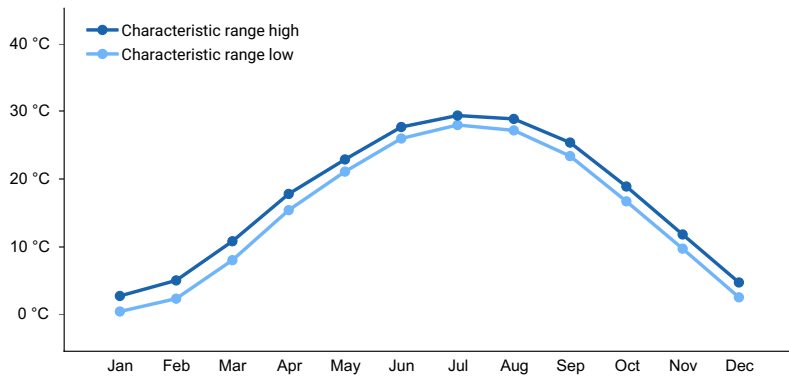
Frost-free period (characteristic range)	143-153 days
Freeze-free period (characteristic range)	177-182 days
Precipitation total (characteristic range)	991-1,041 mm
Frost-free period (actual range)	132-155 days
Freeze-free period (actual range)	172-186 days
Precipitation total (actual range)	991-1,092 mm
Frost-free period (average)	146 days
Freeze-free period (average)	179 days
Precipitation total (average)	1,016 mm



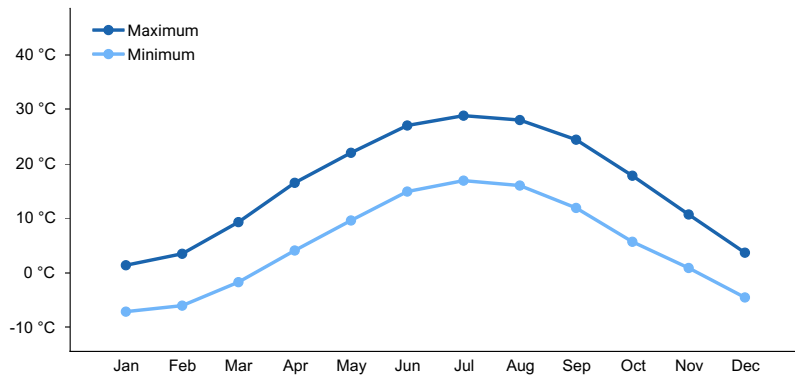
**Figure 2. Monthly precipitation range**



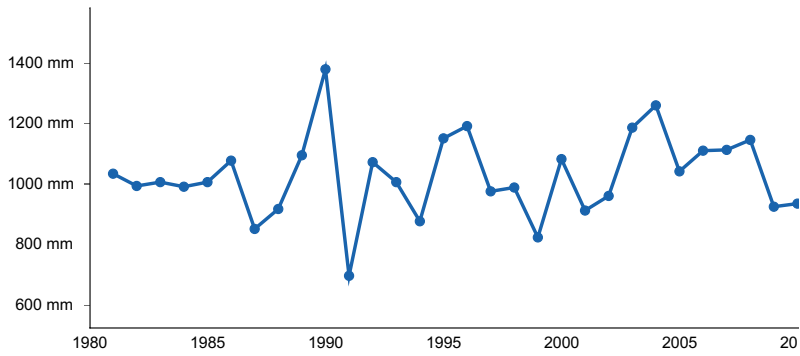
**Figure 3. Monthly minimum temperature range**



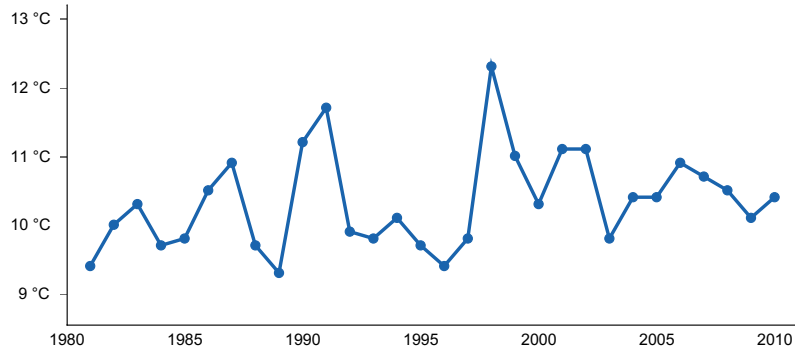
**Figure 4. Monthly maximum temperature range**



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



**Figure 6. Annual precipitation pattern**



**Figure 7. Annual average temperature pattern**

### **Climate stations used**

- (1) BUCYRUS [USC00331072], Bucyrus, OH
- (2) CENTERBURG 2 SE [USC00331404], Centerburg, OH
- (3) GALION WTR WKS [USC00333021], Galion, OH
- (4) CHIPPEWA LAKE [USC00331541], Medina, OH
- (5) WESTERVILLE [USC00338951], Westerville, OH
- (6) CIRCLEVILLE [USC00331592], Circleville, OH
- (7) COLUMBUS PORT COLUMBUS INTL AP [USW00014821], Columbus, OH
- (8) MANSFIELD LAHM MUNI AP [USW00014891], Mansfield, 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: Tiro, Hyatts, Haskins, Bennington. They are deep, somewhat poorly drained and slow to moderate permeable soils, with strongly acidic to neutral soil reaction that formed in till from sandstone and shale.

Parent Materials Kind: till

Surface Texture: loam, silt loam

Subsurface Texture group: loamy

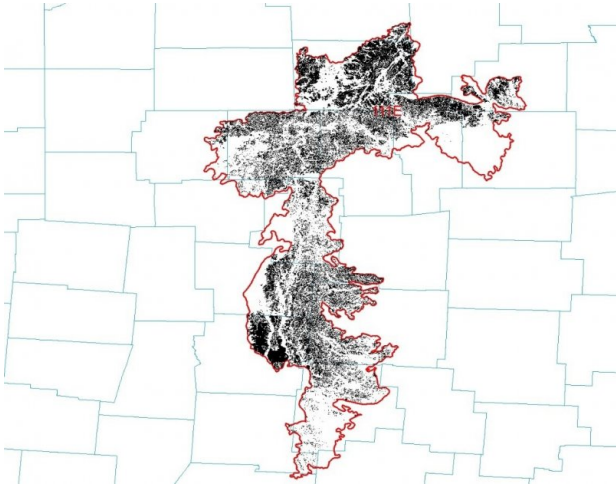


Figure 8. location of mapunits in MLRA

Table 4. Representative soil features

Parent material	(1) Till
Surface texture	(1) Loam (2) Silt loam
Permeability class	Slow to moderate
Soil depth	102–152 cm
Surface fragment cover <=3"	1–2%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	13.21–17.78 cm
Calcium carbonate equivalent (Depth not specified)	0–15%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Soil reaction (1:1 water) (Depth not specified)	5.5–7.6
Subsurface fragment volume <=3" (Depth not specified)	1–9%
Subsurface fragment volume >3" (Depth not specified)	0–2%

## Ecological dynamics

This site is an upland site formed on glacial till parent materials. It is located in a convex landscape position on summits, shoulders, footslopes, and backslopes on relatively shallow angles of slope ( $\geq 6\%$ ) with soils that are somewhat poorly soil drained.

The characteristic vegetation of the site is of a till mesic forest with the understory and canopy dominated by American beech and sugar maple with American elm, white ash, and basswood being common as well. Canopy level associates include white oak, black walnut, and shagbark hickory. The site is dominated by shade tolerant, fire sensitive species. The most common disturbance dynamic is individual tree or small group mortality or windthrow with catastrophic windthrow or damage from ice storms to occur very infrequently. 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. Currently, a large portion of the site has been converted for

agricultural use, primarily corn and soybean rotations. The conversion to agriculture is started by the removal of the woody species followed by the installation of drainage either through ditching, field tile, or both. Tillage and/or management keep the site in the agricultural state.

## State and transition model

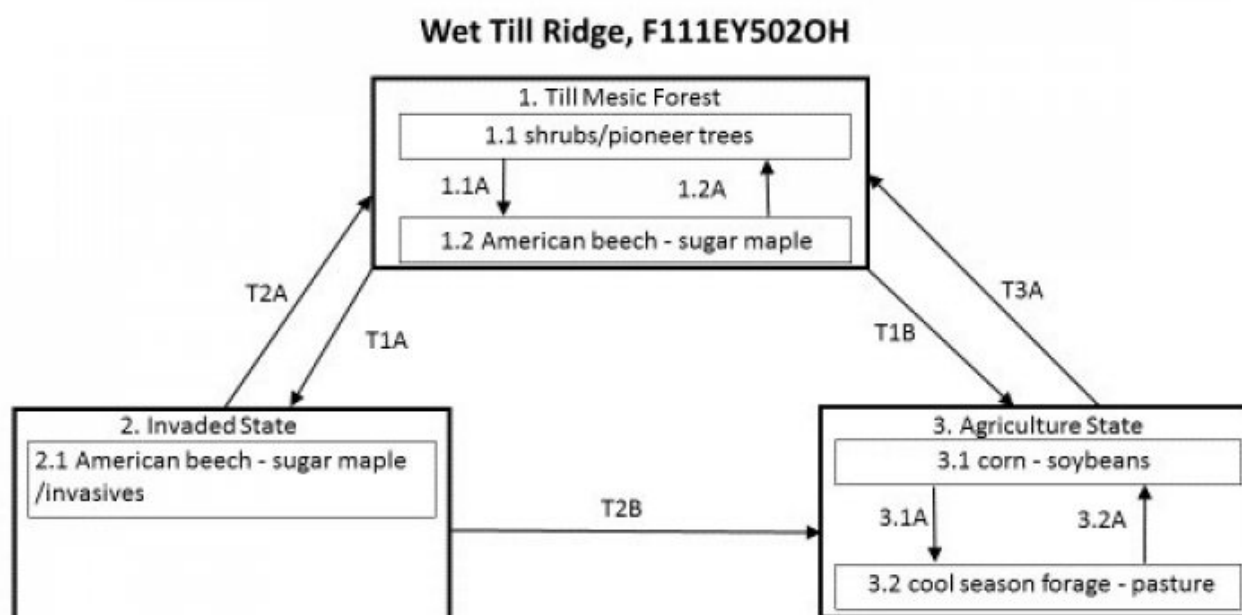


Figure 9. stm

## Wet Till Ridge, F111EY502OH

### Diagram Legend

T1A	Invasive species establishment, no management
T1B	Remove woody species, drainage, site preparation, planting, management
T2A	Chemical/mechanical treatment of invasive species, timber stand improvement practices
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 Till Mesic Forest

This is the diagnostic plant community for this site. In reference condition, this site was dominated by beech and sugar maple trees. An earlier successional phase of this site is comprised largely of shrubs and pioneering species like white oak and white ash. Stand replacing events were very uncommon. Small gap disturbance was the most common disturbance event that allowed propagation of these species.

#### **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 elm 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
- basswood (*Tilia*), tree
- elm (*Ulmus*), tree

#### **Community 1.2 Till Mesic Forest**

This phase is characterized by tree dominance, particularly beech and sugar maple. Additional canopy species include basswood, American elm, black walnut, white oak, and shagbark hickory.

#### **Dominant plant species**

- American beech (*Fagus grandifolia*), tree
- sugar maple (*Acer saccharum*), 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, especially in the understory. Common invasive species for this site include, but are not limited to, species of Asian bush honeysuckle and Callery pear.

#### **Dominant plant species**

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



## **Community 2.1**

### **American beech - sugar maple / invasives**

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

#### **Dominant plant species**

- American beech (*Fagus grandifolia*), tree
- sugar maple (*Acer saccharum*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub
- Callery pear (*Pyrus calleryana*), shrub
- tree of heaven (*Ailanthus altissima*), shrub

## **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 pasture forage**

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**

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 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)	
Contact for lead author	
Date	05/03/2024
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):**

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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):**

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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:**

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