USDA Natural Resources Conservation Service

Ecological site F111XE503OH
Till Ridge

Last updated: 5/28/2020
Accessed: 05/20/2024

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

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, Northeastern Interior Dry-Mesic Oak Forest

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

Ecological site concept

This site is an upland site formed on glacial till parent materials located in a swell (convex) landscape position. It is located on summits, shoulders and backslopes on steep slopes that can be up to 50%. The soils are moderately well to well drained with the surface being in the loamy texture group.

The characteristic vegetation of the site is of a till forest with the understory and canopy dominated by sugar maple, American beech, and basswood. Canopy level associates include white oak, bitternut and shagbark hickory, and black walnut. 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, the majority of this site is being used for corn and soybean rotations.

Associated sites

F111XE501OH	**Till Depression** Site is in a concave landscape position and frequently flooded.
F111XE502OH	**Wet Till Ridge** Soils are somewhat poorly drained.

Similar sites

F111XE502OH	**Wet Till Ridge** Soils are somewhat poorly drained.
F111XE403OH	**Outwash Upland** Located on outwash parent materials; soils surface light in color; soils are very poorly to somewhat poorly drained.
F111XE301OH	**Wet Restricted** Located on residuum parent materials; soils are somewhat poorly drained.
F111XE102OH	**Lacustrine Forest** Located on lacustrine parent materials; soils are somewhat poorly drained or drier.

Table 1. Dominant plant species

Tree	(1) *Acer saccharum* (2) *Fagus grandifolia*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

This site is located in the 111E - Indiana and Ohio Till Plain, Eastern Part MLRA. It is classified as an upland site. This site was formed on glacial till, often times with loess or silty layers at the surface, on till plains and moraines. It is located on the summits, shoulders, and backslopes with slopes that range from 2 to 50 percent.

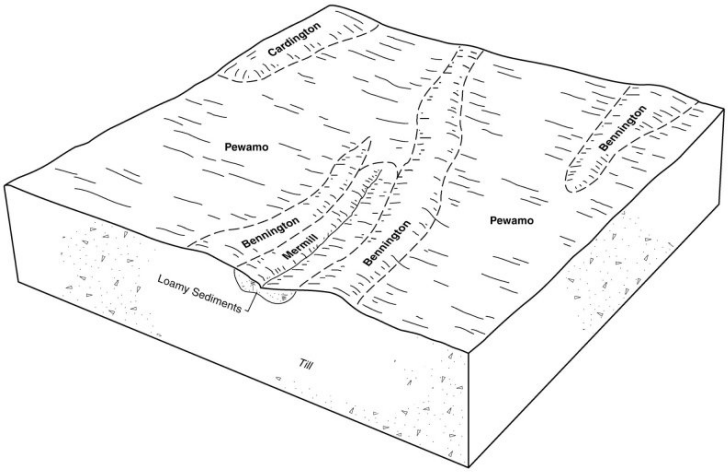

Figure 1. block diagram showing soils on the landscape

Table 2. Representative physiographic features

Landforms	(1) Till plain (2) Moraine
Flooding frequency	None
Ponding frequency	None
Elevation	213–427 m
Slope	2–50%
Water table depth	46–152 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)	137-145 days
Freeze-free period (characteristic range)	174-180 days
Precipitation total (characteristic range)	991-1,041 mm
Frost-free period (actual range)	129-146 days
Freeze-free period (actual range)	171-181 days
Precipitation total (actual range)	991-1,067 mm
Frost-free period (average)	140 days
Freeze-free period (average)	177 days
Precipitation total (average)	1,016 mm

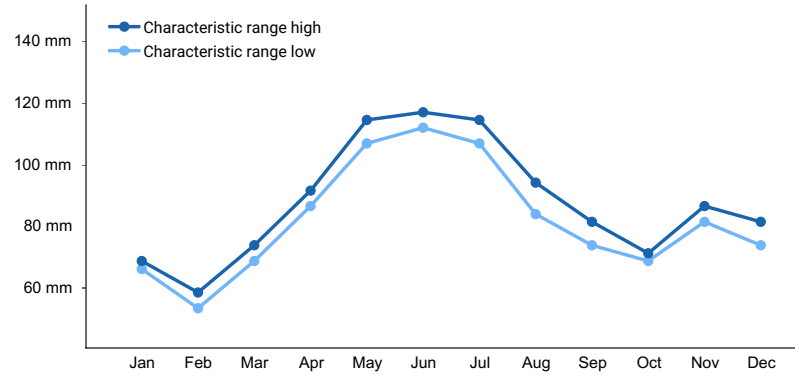

Figure 2. Monthly precipitation range

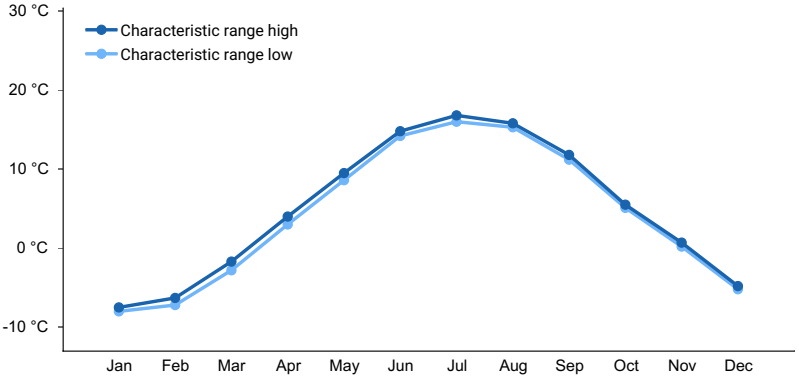

Figure 3. Monthly minimum temperature range

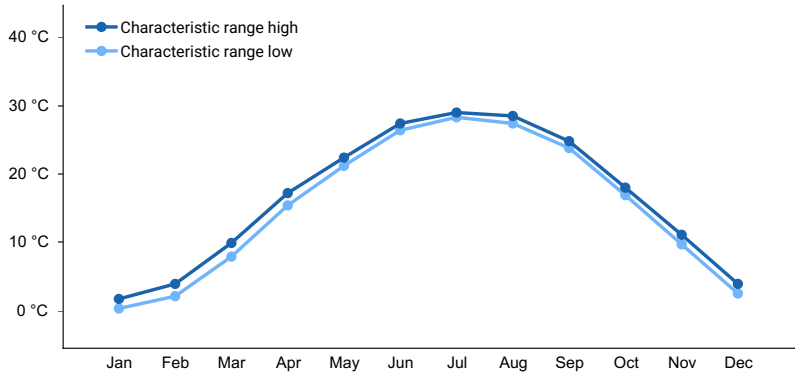

Figure 4. Monthly maximum temperature range

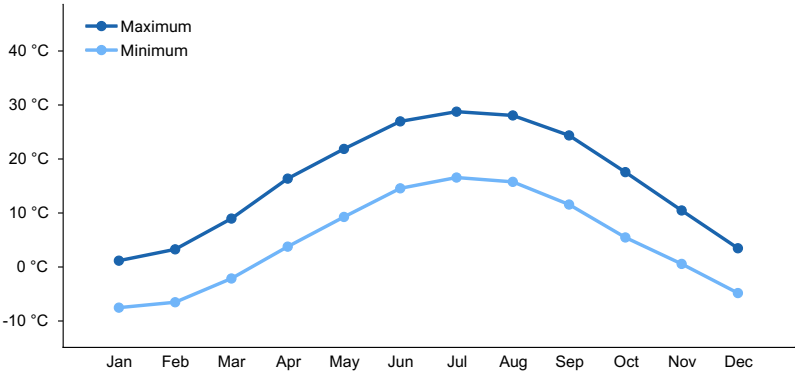

Figure 5. Monthly average minimum and maximum temperature

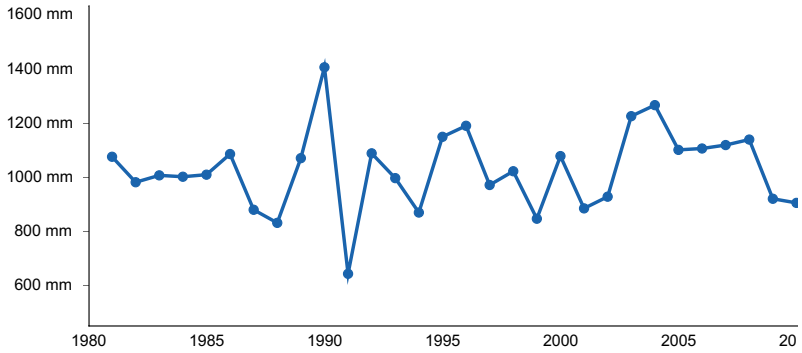

Figure 6. Annual precipitation pattern

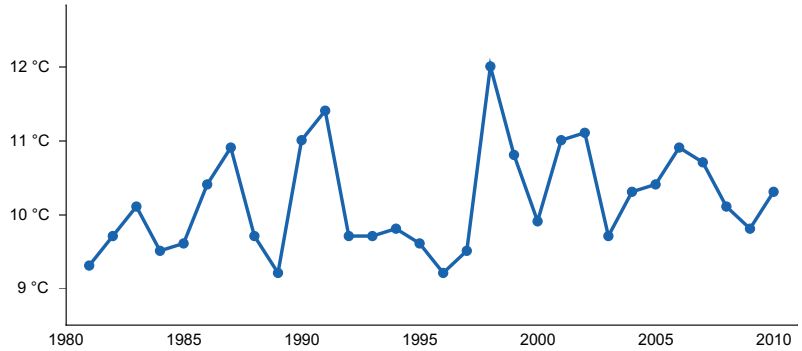

Figure 7. Annual average temperature pattern

Climate stations used

- (1) BUCYRUS [USC00331072], Bucyrus, OH
- (2) GALION WTR WKS [USC00333021], Galion, OH
- (3) CENTERBURG 2 SE [USC00331404], Centerburg, OH
- (4) CHIPPEWA LAKE [USC00331541], Medina, OH
- (5) WESTERVILLE [USC00338951], Westerville, 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: Lykens, Lybrand, Kendallville, Hennepin, Centerburg, Cardington, Amanda, Alexandria. They are moderately deep to deep, moderately well drained to well drained, and slow to moderate permeable soils, with very acidic to neutral soil reaction, that formed in till from limestone, sandstone, and shale.

Parent Materials Kind: till
Surface Texture: clay loam, loam, silt loam, silty clay loam
Subsurface Texture group: loamy

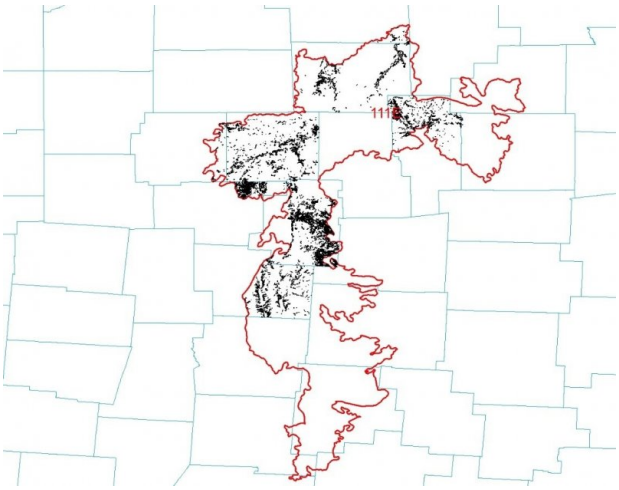

Figure 8. location of mapunits in the MLRA

Table 4. Representative soil features

Parent material	(1) Till
Surface texture	(1) Clay loam (2) Loam (3) Silt loam (4) Silty clay loam
Permeability class	Slow to moderate
Soil depth	94–114 cm
Surface fragment cover <=3"	2–4%
Surface fragment cover >3"	0–1%
Available water capacity (Depth not specified)	12.45–18.8 cm
Calcium carbonate equivalent (Depth not specified)	0–15%
Electrical conductivity (Depth not specified)	0 mmhos/cm
Sodium adsorption ratio (Depth not specified)	0
Soil reaction (1:1 water) (Depth not specified)	5–7.9
Subsurface fragment volume <=3" (Depth not specified)	1–11%
Subsurface fragment volume >3" (Depth not specified)	0–2%

Ecological dynamics

The historic plant community of the Till Ridge ecological site is a till forest with the dominant species in the canopy being sugar maple, beech, and basswood. Canopy associates include white oak, bitternut and shagbark hickory, and black walnut. This site is dominated by fire sensitive and shade tolerant species. Species with these characteristics make it to the canopy via gap-phase recruitment on a local scale. Large scale, stand replacing disturbance was very infrequent, but was usually the result of large scale windthrow or ice damage.

State and transition model

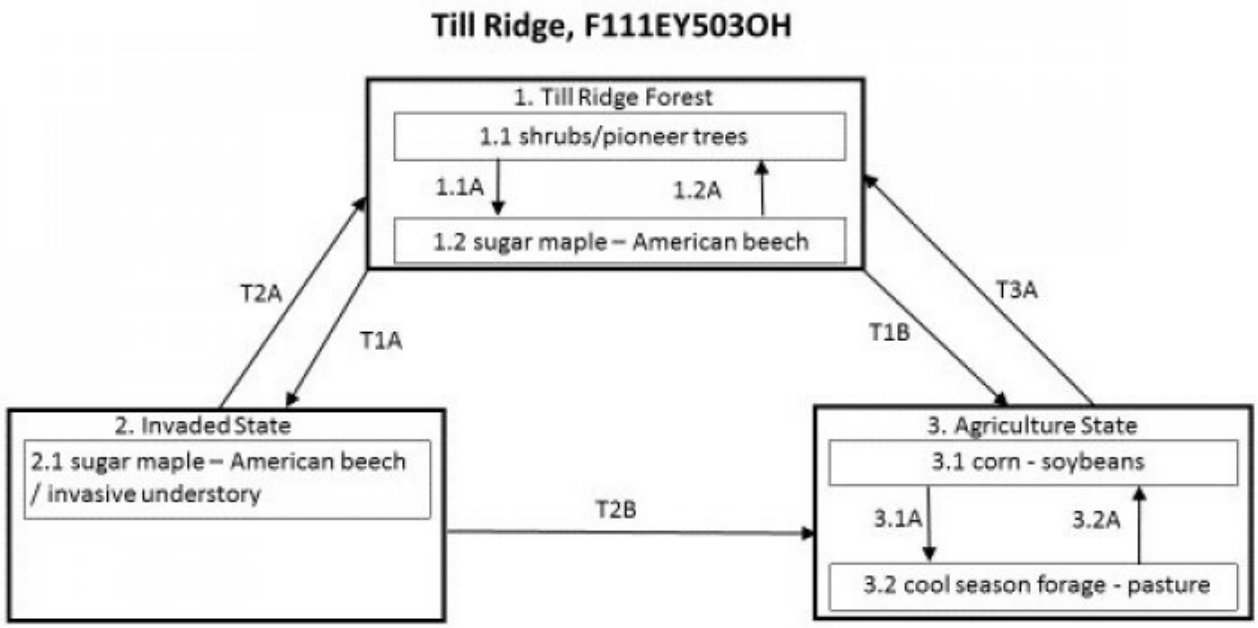

Figure 9. STM

Till Ridge, F111EY503OH

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 Ridge Forest

This is the diagnostic plant community for this site. In reference condition, this site was dominated by sugar maple, beech and basswood 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 in characterized by pioneering woody species that respond rapidly to increased light availability. Cover is generally very heavy, but not usually very tall. As time and succession progress, the trees become larger and less dense.

Community 1.2
sugar maple - American beech

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

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 especially in the understory. Common invasive species for this site include, but are not limited to, species of Asian bush honeysuckle, Callery pear, and ailanthus.

Dominant plant species

- sugar maple (*Acer saccharum*), tree
- American beech (*Fagus grandifolia*), tree
- honeysuckle (*Lonicera*), shrub
- autumn olive (*Elaeagnus umbellata*), shrub

Community 2.1
sugar maple - American beech

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
- autumn olive (*Elaeagnus umbellata*), shrub

- honeysuckle (*Lonicera*), 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, 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

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 (3). 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)	TYLER STAGGS
Contact for lead author	
Date	05/20/2024
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:

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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:**
