USDA Natural Resources
Conservation Service

Ecological site F108XD901IA
Loamy Floodplain Forest

Last updated: 10/17/2024
Accessed: 05/13/2025

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.

Figure 1. Mapped extent

Areas shown in blue indicate the maximum mapped extent of this ecological site. Other ecological sites likely occur within the highlighted areas. It is also possible for this ecological site to occur outside of highlighted areas if detailed soil survey has not been completed or recently updated.

MLRA notes

Major Land Resource Area (MLRA): 108X–Illinois and Iowa Deep Loess and Drift

The Illinois and Iowa Deep Loess and Drift, Western Part MLRA covers parts of both Iowa and Missouri and is known locally as part of the Southern Iowa Drift Plain. A silty loess deposit of varying thickness (5 to 20 feet) covers a series of glacial advances known collectively as pre- Illinoisan till. This till, deposited more than half a million years ago, was subjected to multiple instances of extreme erosion as well as periods of subdued erosion and intense weathering. The loess is thickest in the western part of the MLRA and generally thins eastward. In some areas, the loess has been removed and the older weathered till, called a “paleosol,” entirely exposed. These highly weathered soils, or paleosols, have a high content of clay, which slows the downward movement of water through the profile and causes water to move laterally instead of vertically. Wet areas, or “side-hill seeps,” commonly form where these paleosols become exposed along hillsides (Prior, 1991).

The dominant soil orders in this MLRA are Mollisols and Alfisols and, to a lesser extent, Entisols and Inceptisols. Most of the soils are Udolls or Udalfs. Aquolls are on the flatter interfluves. The soils in the area dominantly have a mesic soil temperature regime, an aquic or udic soil moisture regime, and mixed mineralogy. They generally are very deep, well drained to poorly drained, and silty, loamy, or clayey. These soils on uplands include somewhat poorly drained, nearly level Argiudolls (Macksburg series); moderately well drained, gently sloping to strongly sloping Argiudolls (Sharpsburg series); poorly drained, nearly level Argiaquolls (Winterset series); and well drained strongly, sloping to steep Hapludalfs (Gara, Lindley, Ladoga, and Armstrong series) (USDA-NRCS, 2006).

The western part of the Illinois and Iowa Deep Loess and Drift is a segment of three other MLRAs within the Central Feed Grains and Livestock Region. The other areas are: the West-Central part (108C), the East-Central part (108B) and the Eastern part (108A).

Classification relationships

Major Land Resource Area (MLRA): Illinois and Iowa Deep Loess and Drift, Western Part (108D)

USFS Subregions: Central Dissected Till Plains Section (251C); Loess Hills (251Cb) and Central Dissected Till and Loess Plain (251Cc) Subsections (Cleland et al, 2007)
Relationship to Other Established Classifications:

NatureServe Classification: Ecological System: North-Central Interior Floodplain (9338); Ecological Association: Midwestern Cottonwood - Black Willow - Silver Maple Forest (NatureServe, 2013)

Landfire Biophysical Setting: Central Interior and Appalachian Floodplain Systems (4314710) (Landfire, 2009)

Ecological site concept

Loamy Floodplains are within the red areas on the map (Figure 1). These sites formed in alluvial parent material and can be found on floodplains in river valleys. Typically these sites are located along rivers near wet floodplain ecological sites. Soils are typically Mollisols or Mollic Entisols, characterized by deep, dark colored surfaces highly variable in organic matter due to the repeated deposits as a result of flooding. These soils do not have rooting restrictions. Plant communities
consist of mostly trees, forbs, grasses, and few sedges.

Associated sites

R108XD904IA	**Wet Floodplain Prairie** Fine, fine-silty and fine-loamy soils including Ackmore, Amana, Aquents, Carlow, Colo, Fluvaquents, Lawson, Mt. Sterling, Spillville, Vesser, Wabash, Zook and Coland series.
F108XD902IA	**Sandy/Loamy Floodplain Forest** Sandy soils including Alluvial land and Perks series.

Similar sites

F108XD902IA	**Sandy/Loamy Floodplain Forest** Sandy soils including Alluvial land and Perks series.

Table 1. Dominant plant species

Tree	(1) *Acer saccharinum* (2) *Populus deltoides*
Shrub	Not specified
Herbaceous	(1) *Laportea canadensis*

Physiographic features

Loamy Floodplain Forests are of large extent, and can be found on floodplains in river valleys throughout MLRA 108D. These sites are within a dissected till plain landscape. Slopes are generally less than 2 percent. These sites typically occur in along streams and rivers and are subjected to flooding.

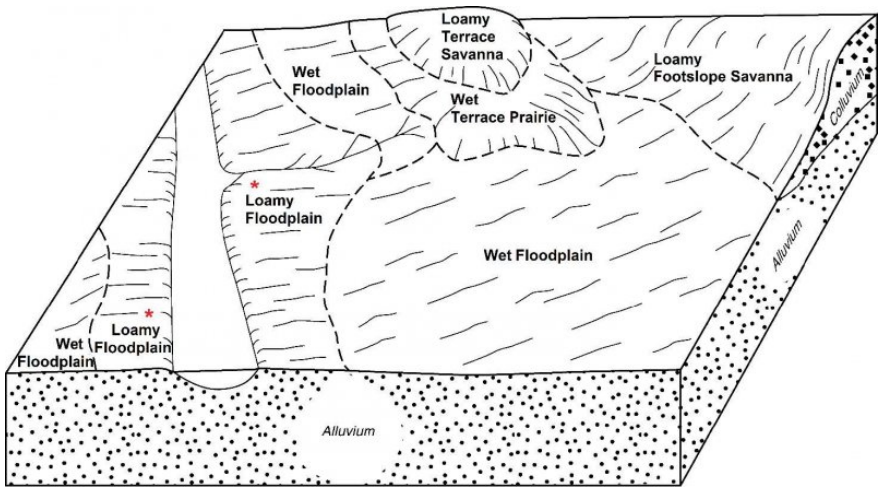


Figure 2. Block diagrams representing typical soil-landform sequences in Loess Ridges, Glacial Till Side/Footslopes. Red asterisks identify soil components correlated to Loamy Floodplain Forest.

Table 2. Representative physiographic features

Landforms	(1) Flood plain
Runoff class	Low to medium
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	152–475 m
Slope	0–2%
Water table depth	122–198 cm
Aspect	Aspect is not a significant factor

Climatic features

The soil temperature regime of MLRA 108D is classified as “mesic” where the mean annual soil temperature is between 46 and 59°F (Soil Survey Staff, 2014). The average freeze-free period of this ecological site is about 178 days, while the frost-free period is about 152 days. Average annual precipitation is 32 inches, which includes rainfall plus the water equivalent from snowfall . The average annual low and high temperatures are 39 and 61°F, respectively.

Table 3. Representative climatic features

Frost-free period (characteristic range)	135-146 days
Freeze-free period (characteristic range)	157-174 days
Precipitation total (characteristic range)	889-940 mm
Frost-free period (actual range)	130-152 days
Freeze-free period (actual range)	152-181 days
Precipitation total (actual range)	889-965 mm
Frost-free period (average)	141 days
Freeze-free period (average)	166 days
Precipitation total (average)	914 mm

Climate stations used

- (1) BEDFORD [USC00130576], Bedford, IA
- (2) CRESTON 2 SW [USC00131962], Creston, IA
- (3) GUTHRIE CTR [USC00133509], Guthrie Center, IA
- (4) INDIANOLA 2W [USC00134063], Indianola, IA
- (5) GREENFIELD [USC00133438], Greenfield, IA
- (6) KNOXVILLE [USC00134502], Knoxville, IA
- (7) WINTERSET 1N [USC00139132], Winterset, IA
- (8) DES MOINES INTL AP [USW00014933], Des Moines, IA
- (9) CLARINDA [USC00131533], Clarinda, IA
- (10) CORNING [USC00131833], Corning, IA
- (11) MARYVILLE 2E [USC00235340], Maryville, MO

Influencing water features

This site is well or moderately well drained. Permeability is moderately slow to rapid. The soil at this site is in hydrologic group B or C (Hydrologic Soil Group, 2016). Land capability class is 1, 2w, 4w or 5w (Land Capability Classification, 2016). Depth of endosaturation is between 40 and 72 inches.

This ecological site is typically in natural levee positions directly adjacent to a perennial stream. Stream levels typically respond quickly to storm events, especially in watersheds where surface runoff is dominant. Short- to

medium- duration flooding is common in many areas, particularly during spring and early summer storm events. Constructed levees, often accompanied by stream channelization, have altered the hydrology and flooding dynamics in many places. Streambeds are typically incised into the surrounding floodplain by as much as 10 feet. Some soils in this ecological site have seasonal water tables below about two feet in the winter and spring, generally receding with the falling river levels in the early summer. The water table has a minimal effect on the vegetative community.

Soil features

These soils have no major rooting restriction. The soils were formed under forest vegetation, and have dark, organic-rich surface horizons. Parent material is alluvium. The soils have fine sandy loam or silt loam surface horizons (Table 5). Subsoils are silt loam, silty clay loam, loam, loamy sand, sandy loam, or sand. Soil series associated with this site include Nodaway, Landes, Kennebec and Huntsville.

Table 4. Representative soil features

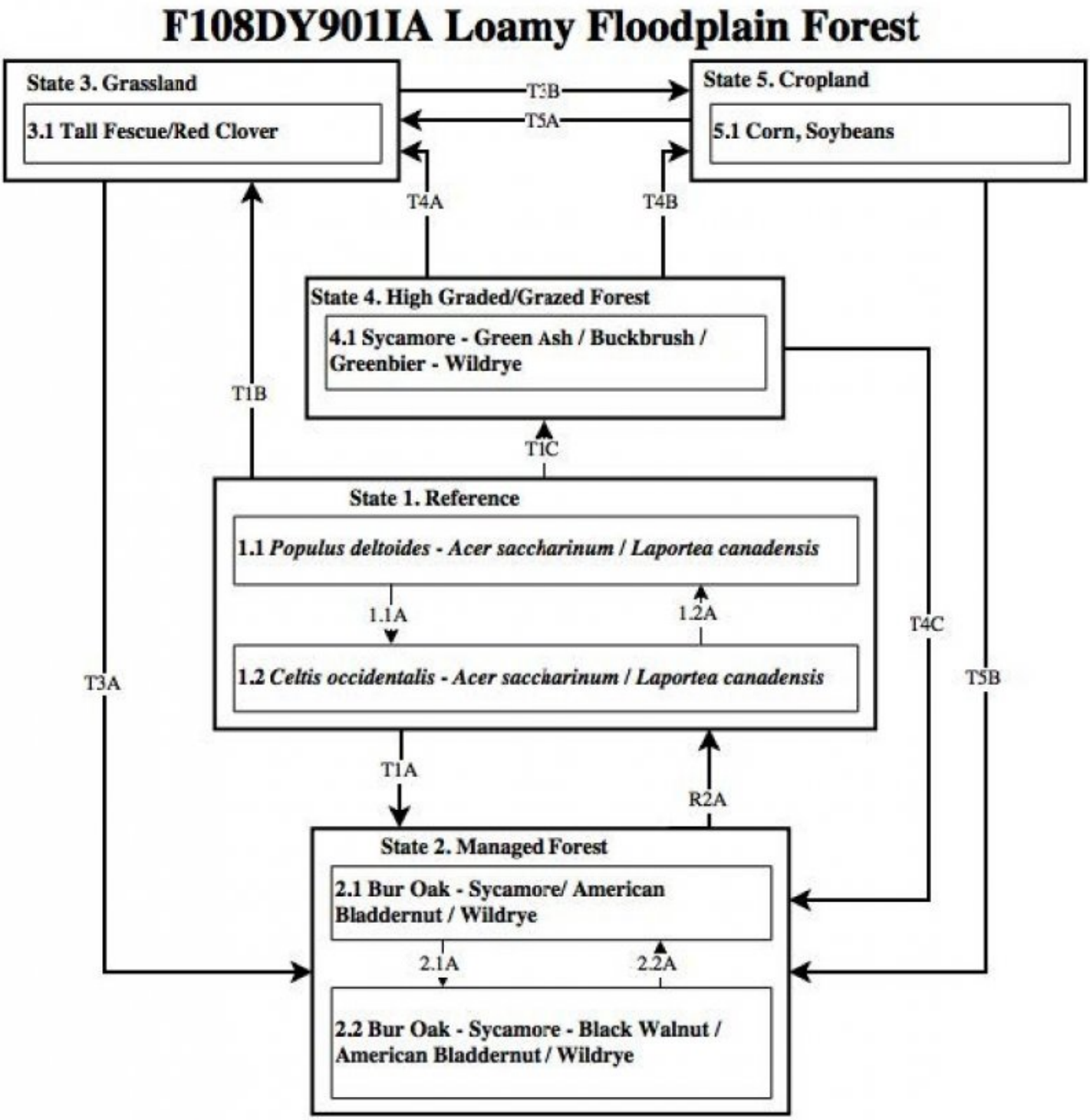
Parent material	(1) Alluvium
Surface texture	(1) Sandy loam (2) Silty clay loam (3) Loam (4) Silt loam (5) Loamy sand (6) Sand
Drainage class	Moderately well drained to well drained
Permeability class	Moderately slow to moderately rapid
Soil depth	152–203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (Depth not specified)	13.46–23.11 cm
Calcium carbonate equivalent (Depth not specified)	0%
Soil reaction (1:1 water) (Depth not specified)	6–6.7
Subsurface fragment volume <=3" (Depth not specified)	2–4%
Subsurface fragment volume >3" (Depth not specified)	0%

Ecological dynamics

Reference plant community is categorized as a cottonwood/maple floodplain forest and includes trees, forbs, grasses and sedges. Species composition typically includes *Populus deltoides*, *Acer saccharinum*, *Celtis occidentalis*, *Laportea canadensis*, *Galium aparine*, *Polygonum amphibium*, and *Leersia virginica* (Rosburg, 2015).

Flooding, scouring, and deposition are the major disturbances influencing the dynamics at this site. Changes in channel course causing stream bank erosion, scouring from floodwaters and also deposition as sediment loads are released where floodwaters are moving more slowly, contributes to an extremely variable natural community (Rutel, 2008). As this region was settled, these areas were altered to better suit agricultural needs. Grazing, and crop production are common in these areas today.

State and transition model



Code	Process
T1A	Uneven-age timber management; harvesting
T1B, T4A	Clearing; pasture planting; prescribed grazing
T5A	Pasture planting; prescribed grazing
T1C	Poorly planned harvest (high-grading); uncontrolled grazing
T3B	Tillage; conservation cropping system
T4B	Clearing; tillage; conservation cropping system
T3A, T5B	Tree planting; long-term succession (+30-50 years); forest stand improvement; access control
T4C	Forest stand improvement; access control
R2A	Forest stand improvement; long-term succession (+10-20 years)
1.1A	Long term succession (+10-30 years); sediment accumulation
1.2A	Catastrophic flood; blow-down
2.1A	Crop Tree Release; little to no harvesting (10-20 years)
2.2A	Uneven-age timber management; harvesting

Figure 9. STM

State 1
Reference State

As a cottonwood/maple floodplain, this state has a reference plant community which is categorized as floodplain forest and includes trees, forbs grasses and sedges.

Dominant plant species

- silver maple (*Acer saccharinum*), tree
- eastern cottonwood (*Populus deltoides*), tree
- common hackberry (*Celtis occidentalis*), tree
- Canadian woodnettle (*Laportea canadensis*), other herbaceous

Community 1.1
Eastern cottonwood - silver maple / Canadian woodnettle

Mixed hardwood floodplain forest.

Community 1.2
Common hackberry - silver maple / Canadian clearweed

Mixed hardwood floodplain forest.

Pathway P1.1A
Community 1.1 to 1.2

Long term succession and sediment accumulation can cause this state to shift into state 1.2.

Pathway P1.2A
Community 1.2 to 1.1

Catastrophic floods and blow-down can cause a shift back towards the 1.1 reference community.

State 2
MANAGED FOREST STATE

Where this state remains, it has often been subjected to very selective timber harvests. While these forested areas may resemble the reference state, the diversity of tree species has been selectively (removal of oak and walnut) altered.

Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- American sycamore (*Platanus occidentalis*), tree
- American bladdernut (*Staphylea trifolia*), shrub
- wildrye (*Elymus*), grass

Community 2.1
bur oak - sycamore / American bladdernut / wildrye

Forest with management inputs.

Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- American sycamore (*Platanus occidentalis*), tree
- American bladdernut (*Staphylea trifolia*), shrub
- wildrye (*Elymus*), grass

Community 2.2
Bur oak - sycamore - black walnut / American bladdernut / wildrye

Managed forestland

Dominant plant species

- bur oak (*Quercus macrocarpa*), tree
- American sycamore (*Platanus occidentalis*), tree
- black walnut (*Juglans nigra*), tree
- American bladdernut (*Staphylea trifolia*), shrub
- wildrye (*Elymus*), grass

Pathway P2.1A
Community 2.1 to 2.2

Crop tree release; little to no harvesting (10-20 years).

Pathway P2.2A
Community 2.2 to 2.1

Uneven age timber management; harvesting.

State 3
GRASSLAND STATE

Many acres of this ecological site have been converted to non-native grasslands of tall fescue and red clover. This state frequently transitions to a cropland state especially when commodity prices are high. A return to a near-reference state from this state is not recommended. Transitioning to a Managed Forest state is possible through long-term commitments of time and money.

Community 3.1
Tall fescue / Red clover

managed pasture.

Dominant plant species

- tall fescue (*Schedonorus arundinaceus*), grass
- red clover (*Trifolium pratense*), other herbaceous

State 4
HIGH GRADED / GRAZED FOREST STATE

This state is subjected to uncontrolled grazing and high-graded timber harvests. The grazing will open up the understory and remove much of the diverse ground flora. This can lead to erosion of the topsoil during floods. Grazed units also often undergo timber harvest removing a wide variety of outstanding hardwood trees, further diminishing the structural and compositional diversity

Community 4.1
Sycamore - Green ash / buckbrush / greenbrier - wildrye

a high graded or grazed forest community

Dominant plant species

- American sycamore (*Platanus occidentalis*), tree
- green ash (*Fraxinus pennsylvanica*), tree
- buckbrush (*Ceanothus cuneatus*), shrub
- greenbrier (*Smilax*), shrub
- wildrye (*Elymus*), grass

State 5
CROPLAND STATE

Some areas of this ecological site have been converted to row crop agriculture. They often transition to a grassland state. A return to the near-reference state is not practical from this state. Transitioning to a Managed Forest state may be possible through long-term commitments of time and money.

Community 5.1
Corn, soybeans

Row crop agriculture. Many species may be planted depending on landowner objectives.

Transition T1A
State 1 to 2

Uneven- age timber management; harvesting.

Transition T1B
State 1 to 3

Clearing; pasture planting; prescribed grazing.

Transition T1C
State 1 to 4

Poorly planned harvest; uncontrolled grazing.

Restoration pathway R2A
State 2 to 1

Forest stand improvement; long term succession (10-20+ years)

Transition T3A
State 3 to 2

Tree planting; long term succession; forest stand improvement; access control.

Transition T3B
State 3 to 5

Tillage; conservation cropping system

Transition T4C
State 4 to 2

Forest stand improvement; access control.

Restoration pathway T4A
State 4 to 3

Clearing; pasture planting; prescribed grazing

Transition T4B
State 4 to 5

Clearing; tillage; conservation cropping system.

Transition T5B
State 5 to 2

Tree planting long term succession; forest stand improvement; access control

Restoration pathway T5A
State 5 to 3

Pasture planting; prescribed grazing

Additional community tables

Inventory data references

No field plots were available for this site. A review of the scientific literature and professional experience were used to approximate the plant communities for this provisional ecological site. Information for the state-and-transition model was obtained from the same sources. All community phases are considered provisional based on these plots and the sources identified in ecological site description.

Other references

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Approval

Suzanne Mayne-Kinney, 10/17/2024

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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)	John Hammerly, soil scientist Dan Pulido, SSOL
Contact for lead author	
Date	05/13/2025
Approved by	Suzanne Mayne-Kinney
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:**