

# Ecological site F131BY003AR Loamy Flood Plain

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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.

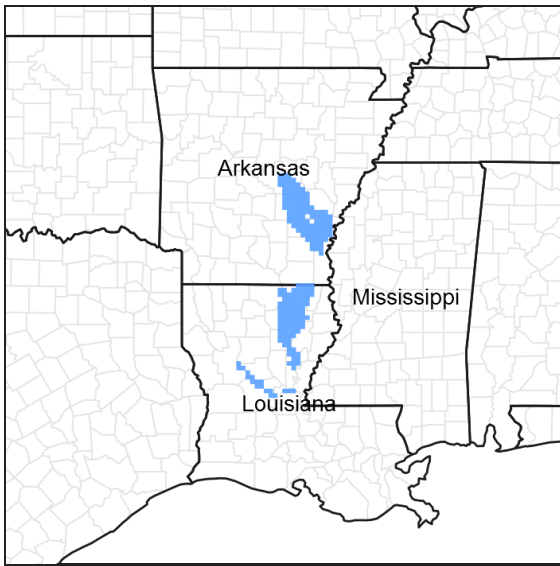


Figure 1. Mapped extent

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): 131B–Arkansas River Alluvium

Major Land Resource Area (MLRA) 131B, the Arkansas River Alluvium, is in Arkansas (67 percent) and Louisiana (33 percent). It makes up about 3,955 square miles. The towns of Montrose, Dumas, and England, Arkansas, and Monroe, Louisiana, are in this MLRA. Interstate 20 passes through Monroe, Louisiana. Most parts of the Overflow National Wildlife Refuge, the Upper Ouachita National Wildlife Refuge, and the D'Arbonne National Wildlife Area are in this MLRA.

## Classification relationships

USDA-Natural Resources Conservation Service, 2006.  
-Major Land Resource Area (MLRA) 131B

## Ecological site concept

The Loamy Floodplain ecological site has loamy-textured, very deep, somewhat poorly to well drained soils that are prone to flooding. Sites can flood for prolonged periods, especially during the winter and early spring.

## Associated sites

F131BY001AR	<b>Loamy Terrace</b> Sites have similar textures, but are in a higher terrace position and do not receive as much water.
F131BY002AR	<b>Sandy Flood Plain</b> Sites are in a similar landscape position, except soils are sandy-textured.
F131BY004AR	<b>Clay Cap Flood Plain</b> Sites on similar landforms, but have clay surface textures over loamy subsurface textures.
F131BY006AR	<b>Clayey Flood Plain</b> Landforms are similar, but have clayey-textured soils.

## Similar sites

F131DY001AR	<b>Loamy Flood Plain</b> Site is very similar, except in a different MLRA.
F131CY002LA	<b>Loamy Flood Plain</b> Site is very similar, except in a different MLRA.

**Table 1. Dominant plant species**

Tree	(1) <i>Quercus nigra</i> (2) <i>Quercus phellos</i>
Shrub	Not specified
Herbaceous	Not specified

## Physiographic features

The ecological site occurs on natural levees on floodplains. Slope ranges from 0 to 5, but is usually less than 3 percent. Flooding varies among sites and can have a water table as high as 18 inches. Water tables are higher in the winter and early spring.

**Table 2. Representative physiographic features**

Landforms	(1) Alluvial plain > Flood plain (2) Alluvial plain > Natural levee
Runoff class	Negligible to low
Flooding duration	Very brief (4 to 48 hours) to long (7 to 30 days)
Flooding frequency	None to frequent
Ponding frequency	None
Elevation	15–76 m
Slope	0–5%
Water table depth	46–203 cm
Aspect	Aspect is not a significant factor

## Climatic features

The average annual precipitation is 56 inches, which increases from north to south. Most of the rainfall occurs as frontal storms during late fall, winter, and early spring, although an appreciable amount of precipitation also occurs as convective thunderstorms during the early part of the growing season. The total amount of the precipitation that occurs as snow ranges from less than one percent in the southern part of the MLRA to five percent in the northern part. Temperatures range from highs in the low 90's during the summer to lows in the low 30's during the winter. The frost-free period averages 222 days, while the freeze-free period averages 256 days.

**Table 3. Representative climatic features**

Frost-free period (average)	222 days
Freeze-free period (average)	256 days
Precipitation total (average)	1,422 mm

### Climate stations used

- (1) PORTLAND [USC00035866], Portland, AR
- (2) COLUMBIA LOCK [USC00161979], Columbia, LA
- (3) MONROE ULM [USC00166314], Monroe, LA
- (4) RAYVILLE [USC00167691], Rayville, LA
- (5) DUMAS [USC00032148], Dumas, AR
- (6) MONROE RGNL AP [USW00013942], Monroe, LA
- (7) DERMOTT 3 NE [USC00031962], Dermott, AR
- (8) KEO [USC00033862], England, AR
- (9) ROHWER 2 NNE [USC00036253], Pickens, AR
- (10) BASTROP [USC00160537], Bastrop, LA

### Influencing water features

The site exists on floodplains with flooding regimes ranging from none to frequent.

### Wetland description

Some of the soils within the ecological site are hydric but all need an onsite examination to be determined a wetland as defined by the United States Army Corps of Engineers.

### Soil features

The soils consist of very deep, somewhat poorly to well drained, very slow to moderately permeable soils. Most of the soils have a silt loam surface, but can range from very fine sandy loam to silty clay loam. Soils correlated to this site include: Caspiana, Coughatta, Dardanelle, Gallion, Hebert, Keo, Mcgehee, Mer Rouge, Oklared, Rilla, Roxana, Severn, and Sterlington.

**Table 4. Representative soil features**

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Silt loam (2) Silty clay loam (3) Very fine sandy loam
Family particle size	(1) Loamy
Drainage class	Somewhat poorly drained to well drained
Permeability class	Very slow to moderate
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	0–22.86 cm
Calcium carbonate equivalent (0-101.6cm)	0–20%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm

Sodium adsorption ratio (0-101.6cm)	0-1
Soil reaction (1:1 water) (0-101.6cm)	4.5-8.4
Subsurface fragment volume <=3" (Depth not specified)	0-1%
Subsurface fragment volume >3" (Depth not specified)	0%

## Ecological dynamics

The information in this ecological site description (ESD), including the state-and-transition model (STM), was developed using archeological and historical data, professional experience, and scientific studies. The information is representative of a complex set of plant communities. Not all scenarios or plants are included. Key indicator plants, animals, and ecological processes are described to inform land management decisions.

**Introduction** - This Arkansas River Alluvium (MLRA 131B) is on the alluvial plains along the lower Arkansas River in Arkansas and the Ouachita River in Louisiana and Arkansas. The landforms in the area are level or depressional to very gently undulating alluvial plains, backswamps, oxbows, natural levees, and terraces. Landform shapes range from convex on natural levees and undulating terraces, to concave in oxbows. Landform shapes differentiate water-shedding positions from water-receiving positions, both of which affect soil formation and hydrology. Average elevations start at about 50 feet in the southern part of the area and gradually rise to about 250 feet in the northwestern part. Maximum local relief is about 10 feet, but relief is considerably lower in most of the area.

**Geology** - Bedrock in this area consists of Tertiary and Cretaceous sands formed as beach deposits during the retreat of the Cretaceous ocean from the midsection of the United States. Alluvial deposits from flooding and lateral migration of the Arkansas and Ouachita Rivers typically lie above the bedrock. These sediments are sandy to clayey fluvial deposits of Holocene to late Pleistocene age and are many feet thick. The geologic surfaces are identified as the Arkansas Lowlands, which extend from the Yazoo Basin up the Arkansas River to the margin of the Coastal Plain, and the parts of the Tensas Basin west of Macon Ridge. The deposits on both of these surfaces are of Holocene age. In some areas late Pleistocene terrace deposits are within several feet of the present surfaces, but they do not crop out in the MLRA.

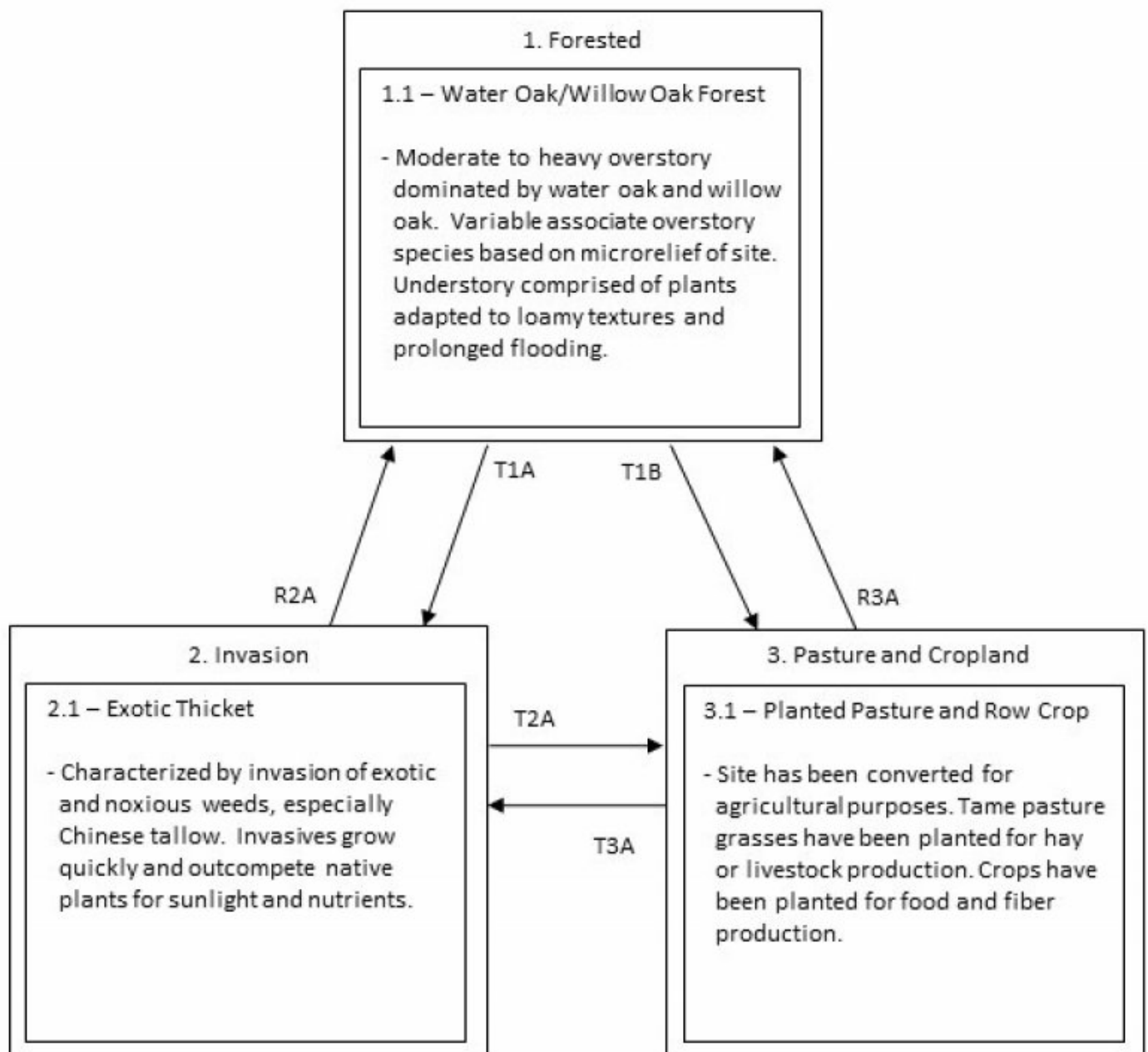
**Biological Resources** - This area once consisted entirely of bottomland hardwood deciduous forest and mixed hardwood and cypress swamps pocked with areas of prairies on the terraces. The major tree species in the native plant communities in the areas of bottomland hardwoods formerly were and currently are water oak (*Quercus nigra*), Nuttall oak (*Quercus texana*), cherrybark oak (*Quercus pagoda*), pecan (*Carya illinoensis*), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), eastern cottonwood (*Populus deltoides*), and hickory (*Carya* sp.). The major tree species in the native plant communities in the swamps formerly were and currently are bald cypress (*Taxodium distichum*), water tupelo (*Nyssa aquatica*), green ash (*Fraxinus pennsylvanica*), and black willow (*Salix nigra*). The important native understory species are palmetto (*Sabal minor*), greenbrier (*Smilax* sp.), wild grape (*Vitis* sp.), and poison ivy (*Toxicodendron radicans*) in the areas of bottomland hardwoods and buttonbush (*Cephalanthus occidentalis*), lizardtail (*Saururus cernuus*), waterlily (*Nymphaea* sp.), sedges (*Carex* sp.), and rushes (*Juncus* sp.) in the swamps. Switchgrass (*Panicum virgatum*), big bluestem (*Andropogon gerardii*), little bluestem (*Schizachyrium scoparium*), Indiangrass (*Sorghastrum nutans*), and eastern gamagrass (*Tripsacum dactyloides*) vegetate the prairie terraces.

**Land Use** - Land use varies throughout the MLRA consisting of 70 percent cropland, 2 percent grassland, 22 percent forest, 1 percent urban development, 3 percent water, and 2 percent other. Farms and scattered tracts of forested wetlands make up nearly all of this area. The farms produce mainly cash crops. Cotton, soybeans, milo, and corn are the main crops. In many areas furrow irrigation is used during droughty parts of the growing season. Throughout the area, catfish are produced commercially on farm ponds that are contained by levees. Migratory waterfowl are harvested throughout the area. Hardwood timber is harvested on some forested wetlands, and most forested areas are managed for wildlife.

**Conservation** - The major resource concerns are control of surface water, management of soil moisture, and maintenance of the content of organic matter and productivity of the soils. Conservation practices on cropland

generally include nutrient management, crop residue management, and alternative tillage systems, especially no-till systems. In many areas land leveling or shaping optimizes the control of surface water. Other major cropland management practices are control of competing vegetation and insects through aerial or ground spraying of herbicides and insecticides and fertility management programs that make use of chemical fertilizers.

## State and transition model



Code	Practice
T1A	Invasion by exotic weed(s).
T1B, T2A	Site is prepared and planted to grass or crops.
T3A	No management and invasion by exotic weed(s).
R2A	Removal of invasive plants through biological, mechanical, or chemical control(s).
R3A	Tree planting and return to natural flooding intervals.

Figure 6. STM

## State 1 Forest

The overall state has a high overstory cover of bottomland hardwood species. The dominant overstory species are water oak and willow oak (*Quercus phellos*). Flooding is common, varying from brief durations to long durations depending on micro-relief, size of precipitation events, and current saturation of the soil. This microrelief has significant impact on the plant communities as well. Sites receiving more water will have more hydrophytic vegetation than sites that are higher, or near the peripheries. The most common disturbance is treefall due to windthrow. The rooting systems in the bottoms are oftentimes shallow. In combination with some mortality due to prolonged flooding, downed trees and upright snags are common. A canopy-clearing disturbance, such as hurricanes or tornadoes, can be inhabited by light-seeded species. If advanced oak reproduction is present at time of disturbance the stand will retain its oak dominance. Oaks will sprout, grow, die-back, and regrow for many years. Otherwise, green ash and sweetgum will colonize the canopy due to their rapid growth and ability to grow into the crown early.

### Dominant plant species

- water oak (*Quercus nigra*), tree
- willow oak (*Quercus phellos*), tree

## Community 1.1

### Water Oak/Willow Oak Forest



Besides the co-dominants water oak and willow oak, associate species may include: sweetgum, Nuttall oak, overcup oak (*Quercus lyrata*), hackberry (*Celtis laevigata*), green ash, and red maple. Understory shrub species include: swamp dogwood (*Cornus foemina*), green hawthorn (*Crataegus viridis*), and possumhaw (*Ilex decidua*). Common understory herbaceous species include: peppervine (*Ampelopsis arborea*), trumpet-creeper (*Campsis radicans*), and poison ivy. Sedges and other herbaceous vegetation adapted to seasonally prolonged flooding inhabit the forest understory.

## State 2

### Invasion

Chinese tallow (*Triadica sebifera*) is an undesired, invasive species brought to the United States in 1776 (Randall & Marinelli, 1996). Rapid expansion along the gulf coastal states has allowed the species to invade many ecosystems and consequently reduce diversity. Tallow trees are known to cause gastrointestinal upset, contact dermatitis, and toxicity in livestock and humans. Mechanical and chemicals options exist as a means to control the trees.

### Dominant plant species

- Chinese tallow (*Triadica sebifera*), shrub

## Community 2.1

### Exotic Thicket

Chinese tallow invade the ecological site via flooding events as nearby waterways transport seeds. Once settled, the seeds produce saplings viable to reproduce seeds in as little as three years. The rapid establishment

immediately blocks sunlight to understory species and reduces diversity. Unabated growth quickly allows the saplings to grow into the overstory, thus changing the ecological state entirely. Reductions in size and number of all vegetative species are seen in all canopy tiers.

### **State 3 Pasture and Cropland**

The Pasture and Cropland State is a result of conversion activities. The landowner has maximized agriculture production by planting a monoculture of introduced grass species or agricultural row crops.

#### **Dominant plant species**

- Bermudagrass (*Cynodon dactylon*), grass
- bahiagrass (*Paspalum notatum*), grass

### **Community 3.1 Planted Pasture and Row Crop**

Typical perennial warm-season grasses include Bermudagrass, bahiagrass, dallisgrass, and Johnsongrass. Spring and fall forages may include legumes such as clover. The grasses are grown for livestock production through direct grazing or baling hay for later use. Agricultural row crops are grown for food and fiber production. Typical crops include cotton, soybeans, milo, corn, rice, and sugarcane. Many farmers use herbicides to reduce unwanted plant competition which yields a plant community unrepresentative of State 1 or subsequent vegetative states.

### **Transition T1A State 1 to 2**

The transition from State 1 to State 2 is a result of occupancy by invasive species or other noxious weeds. Invasive plants outcompete, and eventually choke out, all other native species.

### **Transition T1B State 1 to 3**

The transition is due to the land manager maximizing agricultural production. If present, merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

### **Restoration pathway R2A State 2 to 1**

The driver for restoration is control of Chinese tallow. Although an option, mechanical removal of the trees is difficult because they readily regrow from roots and seeds. Several chemical methods are available, including glyphosate for cut-stump treatments, triclopyr for cut-stump and foliar treatments, imazamox for broad spectrum application, and imazapyr as a foliar spray. Many aquatic herbicides have water use restrictions and can potentially kill hardwoods, so labels and restrictions should be read carefully prior to application.

### **Transition T2A State 2 to 3**

The transition is due to the land manager maximizing agricultural production. Merchantable timber is harvested by clearcut, then the site is prepared and planted to either a tame grass or row crop.

### **Restoration pathway R3A State 3 to 1**

This restoration pathway may be accomplished by restoring bottomland hardwoods. Restoration efforts for bottomland hardwood forests have proven difficult and much research has been done on these ecosystems. Many times restoring the function of the ecosystem is the most difficult obstacle. Evapotranspiration and hydrioperiod are closely linked and may never fully be restored until a forested condition exists again (Stanturf et al., 2001). Local

tree availability may limit the possibilities of species composition. Careful planning of available species, site design, and further management actions should be conversed with a knowledgeable restoration source. With this in mind, oftentimes late summer and early fall are the best times to begin due to possibly wet conditions during the late fall to early spring. Many detailed guides have been written to assist with restoration, and suggested readings include, "A Guide to Bottomland Hardwood Restoration" (Allen et al., 2001).

## **Transition T3A**

### **State 3 to 2**

The transition is due to the land manager not managing the invasion of exotic weeds. Without proper management, the crops and pastures can become an exotic thicket of invasive species that becomes increasingly harder to control.

## **Additional community tables**

### **Inventory data references**

These site descriptions were developed as part of the provisional ecological site initiative using historic soil survey manuscripts and low intensity field sampling.

### **Other references**

Allen, J. A., B. D. Keeland, J. A. Stanturf, and A. F. Kennedy Jr. 2001. A guide to bottomland hardwood restoration. Technical report, USGS/BRD/ITR-2000-0011.

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Randall, J. M., and J. Marinelli. 1996. Invasive plants: weeds of the global garden. Volume 149. Brooklyn Botanic Garden, Brooklyn, NY.

Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database.

Stanturf, J. A., S. H. Schoenholtz, C. J. Schweitzer, and J. P. Shepard. 2001. Achieving restoration success: Myths in bottomland hardwood forests. *Restoration Ecology*, 9:189-200.

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U.S. Army Corps of Engineers. 2010. Regional supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plain Region (Version 2.0). U.S. Army Corps of Engineers, Engineer Research and Development Center, Environmental Laboratory ERDC/EL TR-10-20.

USDA-NRCS Ag Handbook 296 (2006).

## **Contributors**

Tyson Hart

## **Approval**

Bryan Christensen, 9/22/2023



## 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	11/03/2021
Approved by	Bryan Christensen
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:

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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):**
- 

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:**
-