Ecological site F131BY004AR
Clay Cap Flood Plain

Last updated: 9/22/2023
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.

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 Clay Cap Floodplain is unique in that the surface texture is clayey, while the subsurface texture is loamy. The site undergoes periodic flooding and vegetation is adapted to the soil textures and varying inundations of floodwaters.

Associated sites

F131BY002AR	**Sandy Flood Plain** Sites are in a similar landscape position, except soils are sandy-textured.
F131BY003AR	**Loamy Flood Plain** Sites are in a similar landscape position, except soils are loamy-textured throughout the profile.
F131BY006AR	**Clayey Flood Plain** Sites are in a similar landscape position, except soils are clayey-textured throughout the profile.

Similar sites

F131CY003LA	**Clay Cap Flood Plain** Site is very similar, except in a different MLRA.

Table 1. Dominant plant species

Tree	(1) *Liquidambar styraciflua* (2) *Fraxinus pennsylvanica*
Shrub	Not specified

Herbaceous	Not specified

Physiographic features

These nearly level to very gently sloping soils are on natural levees on alluvial plains. Slope ranges from 0 to 3 percent. Flooding ranges from none to occasional and a water table can exist at 24 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	Medium to very high
Flooding duration	Extremely brief (0.1 to 4 hours) to brief (2 to 7 days)
Flooding frequency	None to occasional
Ponding frequency	None
Elevation	15–76 m
Slope	0–3%
Water table depth	61–203 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

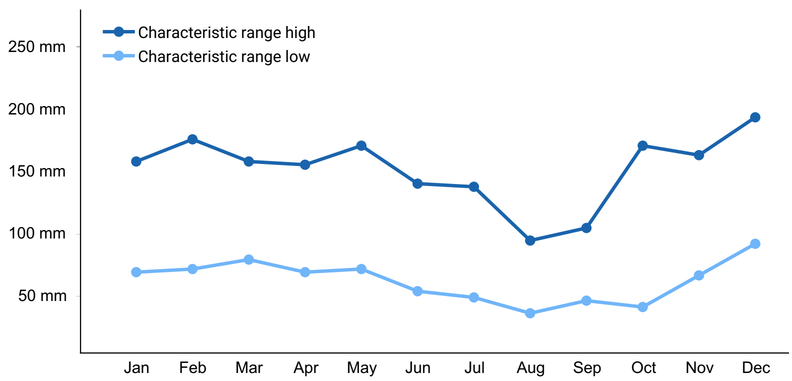


Figure 1. Monthly precipitation range

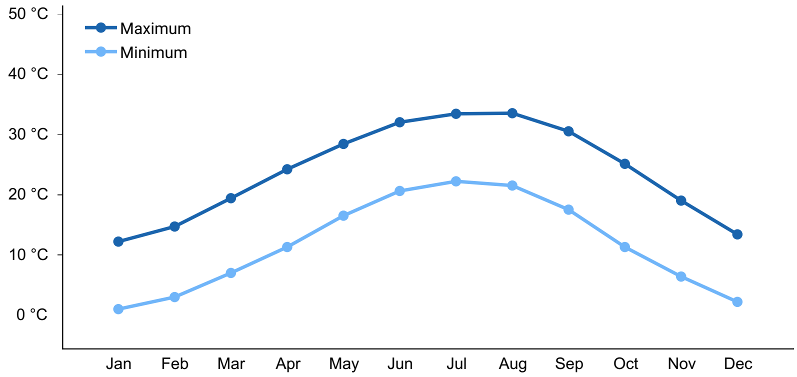


Figure 2. Monthly average minimum and maximum temperature

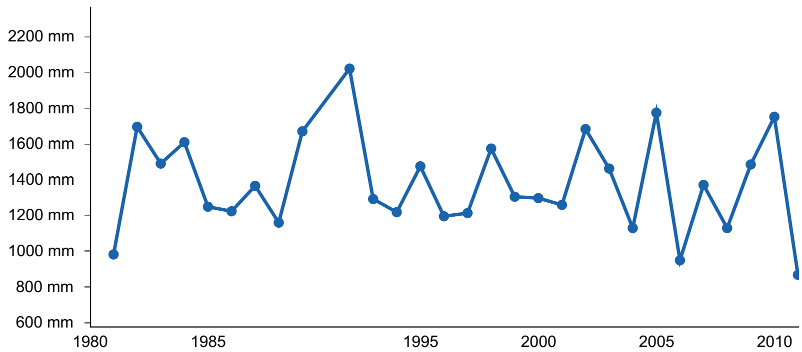


Figure 3. Annual precipitation pattern

Climate stations used

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

Influencing water features

The ecological site exists on floodplains. Some of the soils are listed as hydric, but onsite delineations are needed to determine if they meet the United States Corps of Engineers definition of a wetland.

Soil features

The Latanier and Wabbaseka series consists of very deep, somewhat poorly to moderately well drained soils that are very slow to impermeable. The soils formed in reddish clayey Holocene alluvium overlying Holocene loamy alluvium, of the Arkansas and Red Rivers. Latanier is classified as a clayey over loamy, smectitic over mixed, superactive, thermic Oxyaquic Hapludert and Wabbaseka as a clayey over loamy, mixed, active, thermic Fluventic Hapludoll.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Clay (2) Silty clay

Family particle size	(1) Clayey over loamy
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Very slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	15.24–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0–1%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	6.1–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–2%
Subsurface fragment volume >3" (Depth not specified)	0–2%

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.

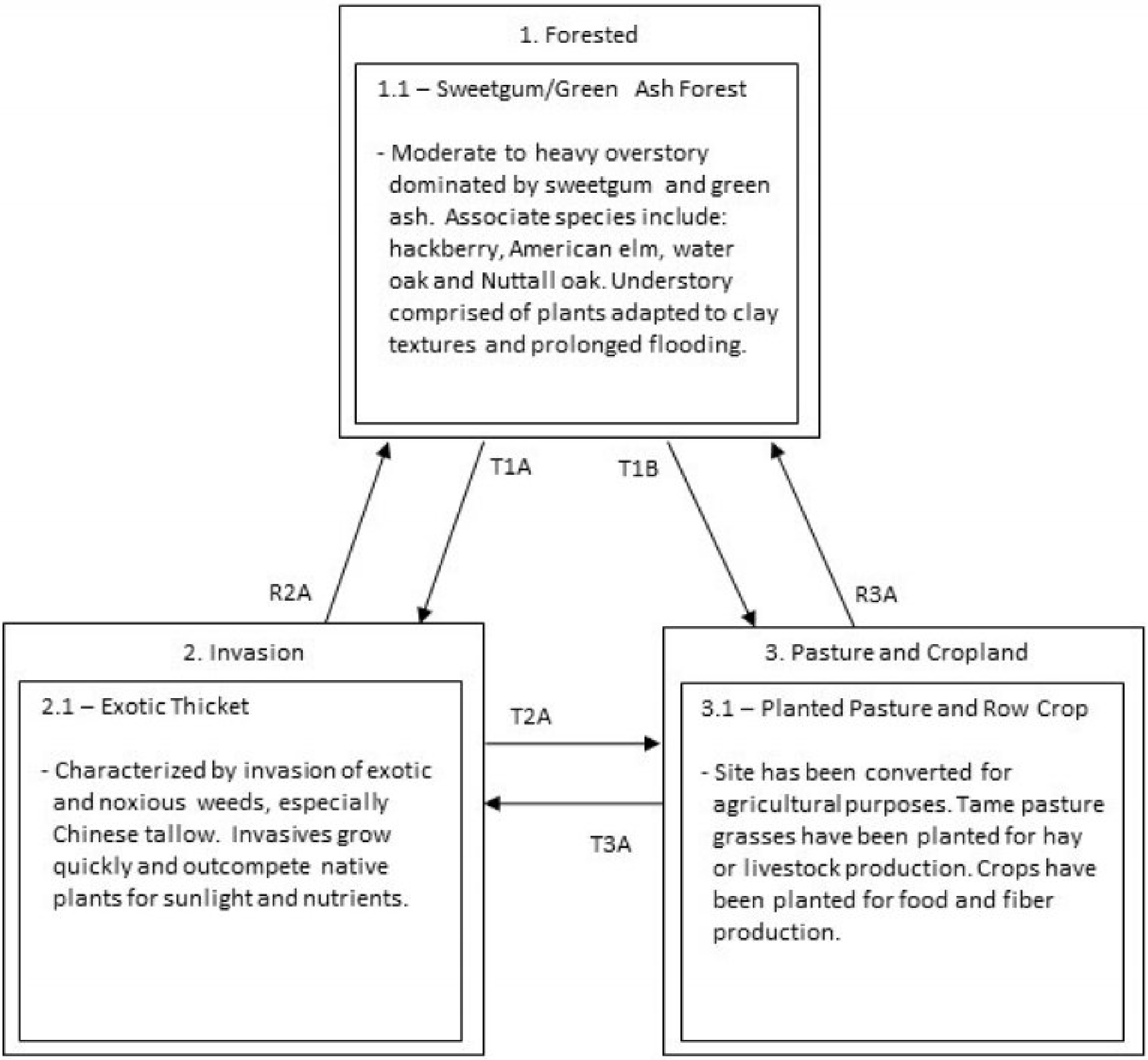
Biological Resources - This area once consisted entirely of bottomland hardwood deciduous forest and mixed hardwood and cypress swamps pocked with areas of prairies on the terraces. The major tree species in the native plant communities in the areas of bottomland hardwoods formerly were and currently 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 bluesetm (*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 5. STM

State 1
Forest

The Clay Cap Floodplain derives the name from clay-textured surface soils over loamy subsurface soils. The dominant overstory species found on the sites are sweetgum and green ash. Flooding occurs periodically throughout the site and is the main natural disturbance. Species occupying the area are adapted to the unique soil conditions as well as seasonal inundation for varying durations. Treefall from windthrow is common and creates an uneven-aged forest with many different-aged species occupying the canopy.

Dominant plant species

- sweetgum (*Liquidambar styraciflua*), tree
- green ash (*Fraxinus pennsylvanica*), tree

Community 1.1
Sweetgum/Green Ash Forest

Besides the dominant sweetgum and green ash, other common overstory species include: hackberry (*Celtis laevigata*), American elm (*Ulmus americana*), water oak, and Nuttall oak. Other common species include: box elder (*Acer negundo*), winged elm (*Ulmus alata*), red maple, and sycamore (Plantanus occidentalis). Understory species include: swamp dogwood (*Cornus foemina*), hawthorns (Crategus sp.), and red mulberry (*Morus rubra*). 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*), tree

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 chemicals 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 hyrdoperiod 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.

Louisiana Natural Heritage Program. 2009. The Natural Communities of Louisiana. Baton Rouge, LA, U.S.A. Data current as of August 2009.

NatureServe. 2013. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 12 July 2013.

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.

Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2003. State and transition modeling: An ecological process approach. Journal of Range Management 56:106-113.

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	11/08/2021
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:**

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:**