

Ecological site F131BY006AR Clayey 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 Clayey Floodplain ecological site has clay-textured, very deep, somewhat poorly to poorly drained soils that are prone to flooding. Sites can flood for prolonged periods, especially during the winter and early spring.

Associated sites

F131BY005AR	Wet Clay Bottomland Sites are wetter and have prolonged ponding.
F131BY003AR	Loamy Flood Plain Sites on same landform, but have loamy textures.
F131BY004AR	Clay Cap Flood Plain Sites on similar landforms, but have clayey surface textures over loamy subsurface textures.
F131BY002AR	Sandy Flood Plain Sites are in a similar landscape position, except soils are sandy-textured.

Similar sites

F131CY005LA	Clayey Flood Plain Site is very similar, except in a different MLRA.
F131DY002AR	Clayey Flood Plain Site is very similar, except in a different MLRA.

Table 1. Dominant plant species

Tree	(1) <i>Quercus lyrata</i> (2) <i>Carya aquatica</i>
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

These level to nearly level soils are on floodplains and slack water areas along the Arkansas and Red Rivers and their former channels. They are saturated late in winter and early in spring. Slopes range from 0 to 5 percent, but are mainly 0 to 1 percent.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain
Runoff class	Negligible to very high
Flooding duration	Long (7 to 30 days)
Flooding frequency	None to frequent
Elevation	15–76 m
Slope	0–5%
Water table depth	15–46 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) KEO [USC00033862], England, AR
- (2) BASTROP [USC00160537], Bastrop, LA
- (3) MONROE RGNL AP [USW00013942], Monroe, LA
- (4) MONROE ULM [USC00166314], Monroe, LA
- (5) PORTLAND [USC00035866], Portland, AR
- (6) COLUMBIA LOCK [USC00161979], Columbia, LA
- (7) DERMOTT 3 NE [USC00031962], Dermott, AR
- (8) DUMAS [USC00032148], Dumas, AR
- (9) ROHWER 2 NNE [USC00036253], Pickens, AR
- (10) RAYVILLE [USC00167691], Rayville, LA

Influencing water features

The ecological site occurs on floodplains and is influenced by proximity to the Arkansas and Red Rivers

Wetland description

Also, all of the soils correlated to this site are considered hydric, but onsite delineations are needed to confirm wetland status according to the United State Army Corps of Engineers.

Soil features

The ecological site consists of very deep, somewhat poorly to poorly drained, very slowly permeable to impermeable soils that formed in clayey alluvium. The soils have high clay content with high shrink-swell potential. Soils correlated to this site include: Alligator, Desha, Forestdale, Perry, and Portland.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Clay (2) Silty clay (3) Silty clay loam
Family particle size	(1) Clayey
Drainage class	Somewhat poorly drained to poorly 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)	10.16–17.78 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0

Soil reaction (1:1 water) (0-101.6cm)	4.5–8.4
Subsurface fragment volume <=3" (Depth not specified)	0–5%
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.

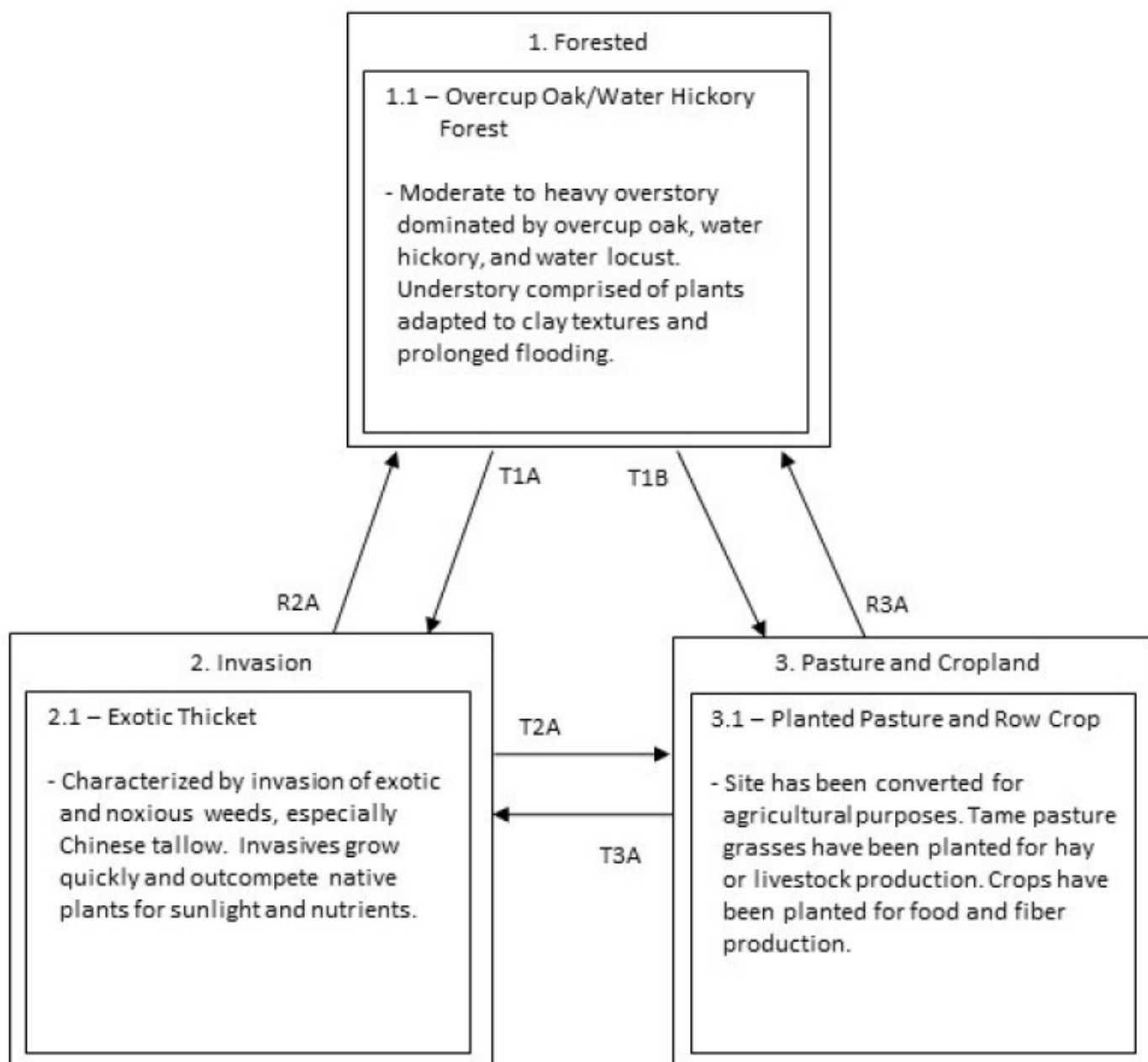
Biological Resources - This area once consisted entirely of bottomland hardwood deciduous forest and mixed hardwood and cypress swamps pocked with areas of prairies on the terraces. The major tree species in the native plant communities in the areas of bottomland hardwoods formerly were and currently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

overcup oak (*Quercus lyrata*), water hickory (*Carya aquatica*), and water locust (*Gleditsia aquatic*). Flooding is common, varying from brief durations to long durations depending on micro-relief, size of precipitation events, and current saturation of the soil. 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

- overcup oak (*Quercus lyrata*), tree
- water hickory (*Carya aquatica*), tree

Community 1.1

Overcup Oak/Water Hickory Forest

Besides the co-dominants overcup oak and water hickory, associate species may include: green ash, hackberry (*Celtis laevigata*), swamp dogwood (*Cornus foemina*), and swamp privet (*Forestiera acuminata*). Buttonbush is a common understory shrub. 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*), 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

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 hydriod period 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

This site description was developed as part of the provisional ecological site initiative using historic soil survey manuscripts, available range site descriptions, and low intensity field sampling.

Other references

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Contributors

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Approval

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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)	
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:**
