USDA Natural Resources
Conservation Service

Ecological site F131CY001LA
Sandy Flood Plain

Last updated: 9/22/2023
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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): 131C–Red River Alluvium

Major Land Resource Area (MLRA) 131C, the Red River Alluvium, is in Louisiana (86 percent) and Arkansas (14 percent). It makes up about 2,410 square miles. The eastern

half of the city of Shreveport and the towns of Alexandria and Bossier City, Louisiana, are in this MLRA. Interstate 20 crosses this area and intersects Interstate 49 in Shreveport. Interstate 30 crosses the northern tip of the area, in Arkansas. Small areas of the Kisatchie National Forest are along the southwest edge of this MLRA.

Classification relationships

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

Ecological site concept

The Sandy Floodplain is a rapidly-changing ecological site adjacent to streams and rivers. The sandy point bars and splays are influenced by flooding and the meandering water currents. Vegetative species change as flooding adds and removes sediments.

Associated sites

F131CY002LA	**Loamy Flood Plain** Sites on same landform, but have loamy textures.
F131CY003LA	**Clay Cap Flood Plain** Sites on similar landforms, but have clay surface textures over loamy subsurface textures.
F131CY005LA	**Clayey Flood Plain** Landforms are similar, but have clayey-textured soils.

Similar sites

F131BY002AR	**Sandy Flood Plain** Site is very similar, except in different MLRA.

Table 1. Dominant plant species

Tree	(1) *Salix nigra* (2) *Populus deltoides*
Shrub	Not specified
Herbaceous	Not specified

Physiographic features

These soils are on floodplains. Slope ranges from 0 to 5 percent, but is typically less than 2 percent.

Table 2. Representative physiographic features

Landforms	(1) Alluvial plain > Flood plain (2) Alluvial plain > Point bar
Runoff class	Negligible
Flooding duration	Very brief (4 to 48 hours) to brief (2 to 7 days)
Flooding frequency	Frequent
Ponding frequency	None
Elevation	75–400 ft
Slope	0–5%
Water table depth	51–80 in
Aspect	Aspect is not a significant factor

Climatic features

The average annual precipitation is 60 inches, which increases from north to south. Most of the rainfall occurs as frontal storms in spring and early summer. Some high-intensity, convective thunderstorms occur in summer. The total amount of the precipitation that occurs as snow ranges from less than one percent in the southern part of the area to five percent in the northern part. Temperatures range from highs in the low 90's during the summer to lows in the mid 30's during the winter. The frost-free period averages 246 days, while the freeze-free period averages 276 days.

Table 3. Representative climatic features

Frost-free period (average)	246 days
Freeze-free period (average)	276 days
Precipitation total (average)	60 in

Climate stations used

- (1) ALEXANDRIA [USC00160098], Alexandria, LA
- (2) COLFAX [USC00161941], Cloutierville, LA
- (3) LSU DEAN LEE RSCH STN [USC00165630], Alexandria, LA
- (4) RED RIVER RSCH STN [USC00167738], Bossier City, LA
- (5) BUNKIE [USC00161287], Bunkie, LA
- (6) ROBSON [USC00167924], Shreveport, LA
- (7) ALEXANDRIA 5 SSE [USC00160103], Alexandria, LA

Influencing water features

This is found on floodplains of rivers and streams and is commonly influenced by flooding and endosaturation.

Wetland description

The sites are frequently flooded and the soils are considered hydric. Onsite delineations are needed to determine if they meet wetland classification according to the United States Army Corps of Engineers.

Soil features

The Kiomatia series consists of very deep, well drained, rapidly permeable soils that formed in sandy alluvium with thin strata of finer materials. Kiomatia is the only series correlated with the site. The taxonomic classification is sandy, mixed, thermic Typic Udifluvent.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous and sedimentary rock
Surface texture	(1) Loamy fine sand (2) Fine sandy loam
Family particle size	(1) Sandy
Drainage class	Well drained
Permeability class	Rapid
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-40in)	4 in
Calcium carbonate equivalent (0-40in)	0–5%
Electrical conductivity (0-40in)	0 mmhos/cm
Sodium adsorption ratio (0-40in)	0
Soil reaction (1:1 water) (0-40in)	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 - Almost all of the Red River Alluvium (MLRA 131C) is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain. The southern end is in the Mississippi Alluvial Plain Section of the same province and division. 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 have a major effect on soil formation and hydrology. Average elevations start at about 40 feet in the southern part of the area and gradually rise to about 270 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 Red River typically lie above the bedrock. These sediments are sandy to clayey fluvial deposits of Holocene to late Pleistocene age and are many feet thick. In some areas late Pleistocene terrace deposits are within several feet of the present surfaces, but they do not crop out in this MLRA. The geologic history of the area is greatly influenced by a large logjam that formed in the Red River channel in the middle part of the area during the late 18th century and the early 19th century. At the time of its largest extent, the logjam obstructed the river and its tributary outlets for a distance of 160 miles downstream from the Arkansas state boundary. Backwater flooding, reformation of natural levees, and crevasse splays caused by this logjam played a major role in covering large parts of the area with a mantle of recent clayey to sandy material. Destruction of the logjam in the late 1800's resulted in the drainage of many large lakes that had formed.

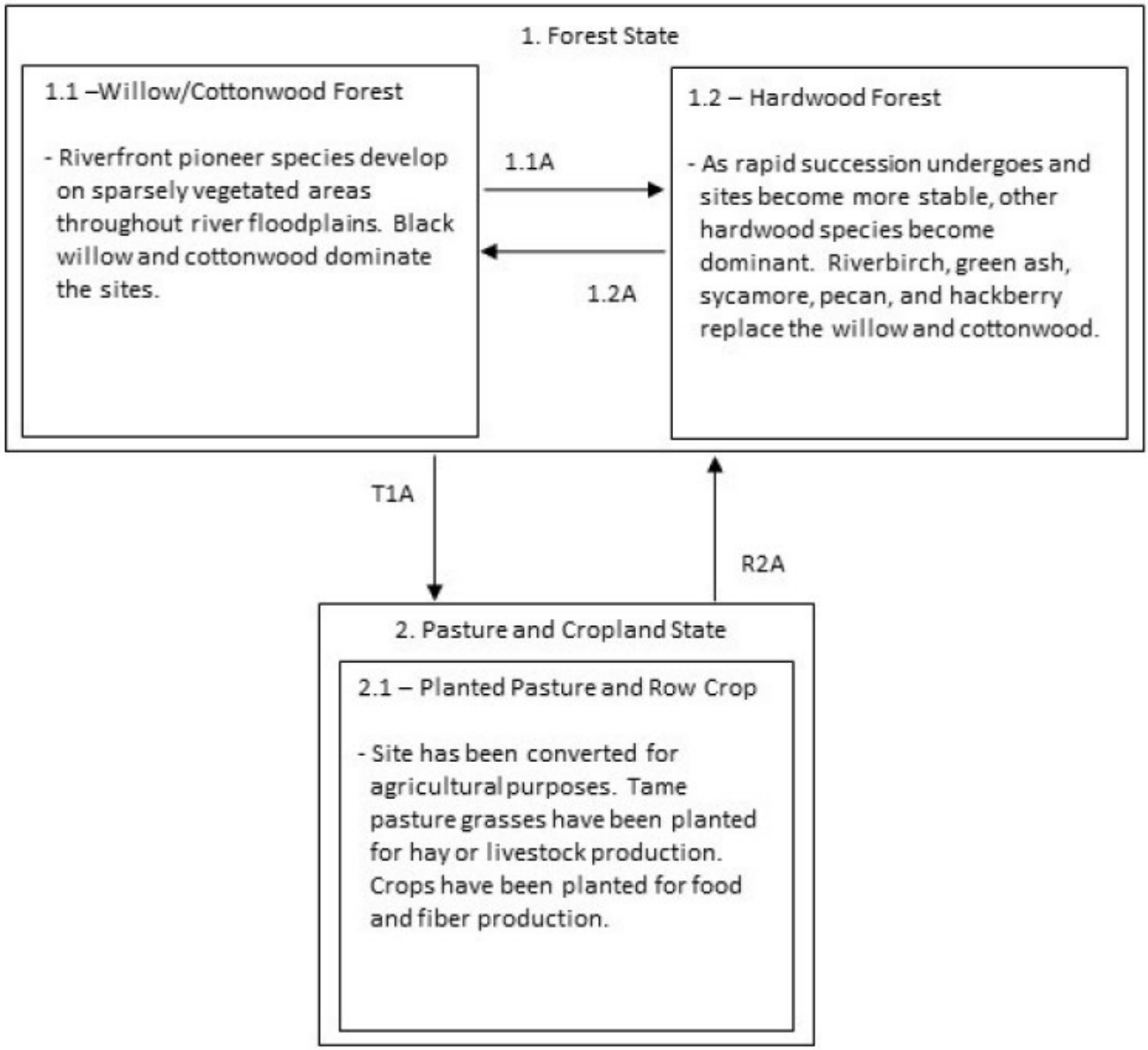
Biological Resources - This area once consisted entirely of bottomland hardwood deciduous forest and mixed hardwood and cypress swamps. The major tree species in the native plant communities in the areas of bottomland hardwoods formerly were and currently are water oak (*Quercus nigra*), Nuttall oak (*Quercus texana*), cherrybark oak (*Quercus pagoda*), pecan (Carya illinoensis), red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), eastern cottonwood (*Populus deltoides*), and hickory (Cary 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.

Land use - Land use varies throughout the MLRA, consisting of 37 percent cropland, 20 percent grassland, 31 percent forest, 5 percent urban development, 5 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. Sugarcane is a major crop in the southernmost part of the area. 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
1.1A	Secondary succession of species as site becomes more stable and vegetatively colonized.
1.2A	Site returns to primary succession via long inundation or other natural disturbance.
T1A	Site is prepared and planted to grass or crops.
R2A	Tree planting and return to natural flooding intervals.

Figure 6. STM

State 1
Forest

The Sandy Floodplain is a rapidly-changing state due to its proximity to rivers and streams. Sands and silts are dumped each time the area floods, as evidenced in the soil's weakly formed horizons. The Forest State has two communities, the 1.1 Willow/Cottonwood Forest Community and the 1.2 Hardwood Forest Community.

Community 1.1
Willow/Cottonwood Forest

The Willow/Cottonwood Forest Community represents primary succession and the earliest vegetative colonization of newly formed point bars and splays. Black willow (*Salix nigra*) is the immediate colonizer, while cottonwood (*Populus deltoides*) is a secondary associate. The willows will eventually give way as cottonwoods age and secondary colonizers arrive.

Community 1.2
Hardwood Forest

After the initial colonization by willows and cottonwood, many other hardwoods take root. Cottonwood will remain the primary associate, but consociates include: riverbirch (*Betula nigra*), green ash, American sycamore (*Platanus occidentalis*), pecan, hackberry (*Celtis laevigata*), red maple, swamp privet (Forestiera acuminate), water elm (Planera aquatic), and American elm (Ulmus Americana). The successional sequence largely relies on river and stream meandering. As soils are deposited and removed, the community moves back and forth between 1.1 and 1.2.

Pathway 1.1A
Community 1.1 to 1.2

Secondary succession occurs as willow and cottonwood are replaced by hardwoods. The 1.1 vegetative community stabilizes the site and provides good growing conditions for the community 1.2 plants.

Pathway 1.2A
Community 1.2 to 1.1

Rivers and streams can shift or meander and remove or dump new sediments. These sandy sites have loose horizons and large floods can remove all vegetation. Site returns to community 1.1 by long inundation by flooding or other natural disturbance.

State 2
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.

Community 2.1
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 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

This restoration path can be accomplished by planting a mix of native species to their natural frequencies. Management will be required to control unwanted species by burning, mowing, and/or herbicides. Controlling introduced pasture grasses is difficult, with complete control likely not attainable. The herbaceous understory will take time to develop, but this process can be expedited if adapted plant material seed is available.

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

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	12/18/2020
Approved by	Bryan Christensen
Approval date	
Composition (Indicators 10 and 12) based on	Annual Production

Indicators

1. **Number and extent of rills:**

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2. **Presence of water flow patterns:**

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3. **Number and height of erosional pedestals or terracettes:**

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4. **Bare ground from Ecological Site Description or other studies (rock, litter, lichen, moss, plant canopy are not bare ground):**

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5. **Number of gullies and erosion associated with gullies:**

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6. **Extent of wind scoured, blowouts and/or depositional areas:**

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7. **Amount of litter movement (describe size and distance expected to travel):**

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8. **Soil surface (top few mm) resistance to erosion (stability values are averages - most sites will show a range of values):**

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9. **Soil surface structure and SOM content (include type of structure and A-horizon color and thickness):**

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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):

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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:**
