

Ecological site F152BY013TX

Poorly Drained Loamy Bottomland

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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.

MLRA notes

Major Land Resource Area (MLRA): 152B–Western Gulf Coast Flatwoods

Major Land Resource Area (MLRA) 152B, Western Gulf Coast Flatwoods, is in eastern Texas and western Louisiana. Locally termed the Flatwoods, the area is dominated by coniferous forest covering 5,681 square miles (14,714 square kilometers). The region is a hugely diverse transition zone between the northern and eastern mixed forests and southern and western coastal prairies and grasslands.

Classification relationships

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

Ecological site concept

The Poorly Drained Loamy Bottomland ecological site has very deep, somewhat poorly drained soils that are frequently flooded. The site is typically flooded for brief to long periods during normal rainfall years. They will stay flooded starting in November and ending in May. The loamy-textured soils combined with the flooding frequency form the plant community.

Associated sites

F152BY004TX	Clayey Flat Soils are clayey throughout and on a higher landform.
F152BY005TX	Seasonally Wet Loamy Upland Soils are on a higher landform.
F152BY007TX	Poorly Drained Loamy Upland Soils are on a higher landform.
F152BY012TX	Well Drained Bottomland Soils are better drained.
F152BY014TX	Poorly Drained Clayey Bottomland Soils are clayey throughout.

F152BY011TX	Swamp Soils are in a lower depressional landform that remains ponded after flood events.
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Similar sites

F152BY014TX	Poorly Drained Clayey Bottomland Soils are clayey throughout.
F152BY011TX	Swamp Soils are semi-permanently ponded.
F152BY012TX	Well Drained Bottomland Soils are better drained.

Table 1. Dominant plant species

Tree	(1) <i>Quercus phellos</i> (2) <i>Quercus nigra</i>
Shrub	(1) <i>Ilex decidua</i>
Herbaceous	(1) <i>Carex</i> (2) <i>Cyperus</i>

Physiographic features

The ecological site includes areas on flood plains. Slope is 0 to 1 percent. Elevation ranges from 20 to 150 feet. Water table depth fluctuates throughout the year. From December to June, the depth to the top of the water table will be 0 to 9 inches. These months will also flood longer. The water table will deepen during the warmer months of the year and flooding times will be shorter.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Flood plain
Runoff class	Negligible to high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Frequent
Ponding frequency	None

Elevation	10 – 50 m
Slope	0 %
Water table depth	0 – 20 cm
Aspect	Aspect is not a significant factor

Climatic features

The Western Gulf Coast Flatwoods (MLRA 152B) is within the humid subtropical climate zone. The region boasts one of the highest rainfall averages in the southern United States, over 60 inches (152 centimeters) annually. This is due to the gulf currents that carry humid air to the region, where it condenses and precipitates. Rainfall averages are fairly consistent month by month, ranging from the lowest of 3.5 inches (8.9 centimeters) in March and the highest of 5.6 inches (14.3 centimeters) in June.

The area is prone to severe thunderstorms and tornadoes when the proper conditions exist, generally in the springtime. Sometimes excessive rainfall occurs, leading to flooding. Hurricanes also strike the region, generally in late summer or early fall. These extreme weather events can be quite destructive, toppling trees, and serves to naturally reset the vegetation to primary succession. The higher humidity of the region amplifies the feeling of heat during the summer. Prolonged droughts and snowfall events are rare.

Table 3 Representative climatic features

Frost-free period (average)	250 days
Freeze-free period (average)	290 days
Precipitation total (average)	1,600 mm

- (1) DE QUINCY [USC00162361], Dequincy, LA
- (2) LIBERTY [USC00415196], Liberty, TX
- (3) LUMBERTON [USC00415435], Silsbee, TX
- (4) TOWN BLUFF DAM [USC00419101], Jasper, TX
- (5) CLEVELAND [USC00411810], Cleveland, TX
- (6) ORANGE 9 N [USC00416680], Orange, TX
- (7) WILDWOOD [USC00419754], Kountze, TX
- (8) DE RIDDER [USC00162367], Deridder, LA
- (9) ELIZABETH [USC00162800], Oakdale, LA
- (10) OBERLIN FIRE TWR [USC00166938], Oberlin, LA

Influencing water features

The site supports hydrophytic vegetation and the soils are hydric as long as natural flooding has not been manipulated. Onsite delineations are required as some mapped areas and locations on the peripheries may not fall within the United States Army Corps of Engineers (USACOE) definition of a wetland.

Wetland description

The soils associated with this site are hydric. Some sites may have small areas that are non-hydric. These small areas are typically on better drained levees. Onsite investigation is needed to determine local conditions.

Soil features

The soils consist of very deep, poorly drained soils that formed in loamy alluvial deposits of the Holocene age. Kian, Pluck, and Sourlake are the representative soil series. All three have slightly different taxonomic classifications, but all are within the endoaquept great group. The soils belong to the inceptisol soil order, meaning they have weak horizon development and are generally separated by changes in color. This is due to the addition and removal of soil as the site floods. Also due to flooding, prolonged intervals without access to air cause the soil to have a gleyed, or grey, color. The gleyed horizon can be found within 6 to 27 inches.

Table 4. Representative soil features

Parent material	(1) Alluvium – igneous, metamorphic and sedimentary rock
Surface texture	(1) Fine sandy loam (2) Loam
Family particle size	(1) Fine-loamy (2) Coarse-loamy
Drainage class	Poorly drained
Permeability class	Slow to very slow
Soil depth	200 cm
Surface fragment cover <=3"	Not specified
Surface fragment cover >3"	Not specified
Available water capacity (0-152.4cm)	20.32 – 30.48 cm
Calcium carbonate equivalent (0-152.4cm)	Not specified
Electrical conductivity (0-152.4cm)	Not specified
Sodium adsorption ratio (0-152.4cm)	Not specified

Soil reaction (1:1 water) (0-152.4cm)	3.5 – 10
Subsurface fragment volume <=3" (Depth not specified)	Not specified
Subsurface fragment volume >3" (Depth not specified)	Not specified

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 – In southeastern Texas and southwestern Louisiana the transition from coastal grasslands to the large expanse of coniferous forest has been deemed the “Flatwoods”. As the name suggests, the region is relatively flat and, with many transitional areas, highly diverse in flora and fauna. Historically, the area was covered by pines with mixed hardwoods, sparse shrubs, and a diverse understory of grasses and forbs. Fire and drainage patterns play a significant role in shaping the plant communities and their development. Fire suppression, drainage alterations, and land conversion have reduced the amount of historical communities in existence today.

Background – Prior to settlement by the Europeans, the reference state for the Poorly Drained Loamy Bottomlands were Willow Oak/Water Oak Forests. Remnants of this presumed historic plant community still exist where natural conditions are intact. Evidence of the reference state is found in accounts of early historic explorers to the area, historic forest and biological survey teams, as well as recent ecological studies in the last 30 years. The age of this community varies, and has a diverse flora.

Settlement Management – As human settlement increased throughout the area, so did the increase in logging and grazing by domestic livestock. The logging became so extensive that by the 1930's most of the region had been cut-over. Replanting trees to historic communities was not common and early foresters began planting loblolly pine (*Pinus taeda*) for its quick growth. As more people colonized they began suppressing fire, which allowed dense thickets of shrubs to replace the herbaceous understory.

Current Management and State – Today much of the historic forest is gone, replaced by pine plantations, crops, and pastures. The areas that were not converted have been fire-suppressed so long that loblolly pine and fire intolerant hardwoods populate the overstory structure. Currently, federally-managed properties are the best place to view the remnant sites (National Park Service, U.S. Fish and Wildlife Service, etc.). Some private individuals have begun restoring communities through selective tree planting and retention of communities that remain. Other restoration efforts include mimicking natural-disturbance regimes through gap-phase regeneration on plantation sites.

Fire Regimes – Fire was a natural and important disturbance throughout the region. Fire occurred naturally from lightning strikes, by Native Americans for game movement, and eventually early European settlers. Fires throughout the Flatwoods occurred at two different times. Early in the year, they would occur during late winter and early spring, removing senescent vegetation, recycling nutrients and minerals, and spurring new plant growth. Late summer and early fall fires occurred as well, but with a different community effect. Summer fires burned hotter and with more intensity, greatly suppressing the shrub canopy layer. The summer fires also shifted the ecological site transitional state by decreasing grass densities and increasing forb densities. The topography, fuel loads, and other conditions caused patchy burns throughout the region resulting in mosaic patterns of plant communities and a heterogeneous landscape.

Disturbance Regimes – Extreme weather events occur occasionally throughout the region. Tornadoes uproot trees and open canopies in the spring months. In the late summer and early fall, hurricanes or tropical depressions can make landfall, dumping excessive amounts of rain and toppling trees with high winds. Another cause of large canopy openings is the effects of the southern pine beetle (*Dendroctonus frontalis*). Starting in the late 1950's, beetle outbreaks have occurred every 6 to 9 years (although a major attack has not occurred in some time); usually when the trees are stressed due to multiple environmental factors.

State and transition model

Additional community tables

Table 5. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 6. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height M	Canopy Cover (%)	Diameter Cm	Basal Area (square M/hectare)
Tree							
sweetgum	LIST2	<i>Liquidambar styraciflua</i>	Native	–	–	–	–
blackgum	NYSY	<i>Nyssa sylvatica</i>	Native	–	–	–	–
bald cypress	TADI2	<i>Taxodium distichum</i>	Native	–	–	–	–
willow oak	QUPH	<i>Quercus phellos</i>	Native	–	–	–	–
water oak	QUNI	<i>Quercus nigra</i>	Native	–	–	–	–

Table 7. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (m)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
sedge	CAREX	<i>Carex</i>	Native	–	–
flatsedge	CYPER	<i>Cyperus</i>	Native	–	–
rush	JUNCU	<i>Juncus</i>	Native	–	–
Forb/Herb					
hydrocotyle	HYDRO2	<i>Hydrocotyle</i>	Native	–	–
lizard's tail	SACE	<i>Saururus cernuus</i>	Native	–	–
Shrub/Subshrub					
possumhaw	ILDE	<i>Ilex decidua</i>	Native	–	–
Tree					
red maple	ACRU	<i>Acer rubrum</i>	Native	–	–
hophornbeam	OSVI	<i>Ostrya virginiana</i>	Native	–	–
Vine/Liana					
peppervine	NEAR5	<i>Nekemias arborea</i>	Native	–	–
greenbrier	SMILA2	<i>Smilax</i>	Native	–	–
Alabama supplejack	BESC	<i>Berchemia scandens</i>	Native	–	–

Table 8. Community 2.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Table 9. Community 3.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production ()	Foliar Cover (%)
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Wood products

These soils occur in the Woodland Suitability Group 2w6 and have a high potential for hardwood management. The 50-year site index for bottomland oaks averages 90 feet and ranges from 80 to 100 feet, depending on drainage. Although management can substantially increase yield, it should also include attention to streamside management zone considerations to protect water quality. Access and equipment operability on these soils is poor for long periods due to flooding and wetness. Harvesting and other operations may need to be suspended during these periods. Rutting during these operations can be severe due to the low strength of these soils. Flooding also makes these soils poorly suited for log landings and roads. Road construction should be limited. Planting will be made difficult due to wetness and the sticky nature of these soils. Site preparation operations should be limited to the dry months and planting should be planned for the drier part of the planting season. Use of herbicides for site preparation must also take into consideration the possibility for flooding to prevent the possible contamination of surface waters.

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

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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)	
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Contact for lead author	
Date	09/21/2021
Approved by	
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:
