USDA Natural Resources Conservation Service

Ecological site F152BY008TX
Acid Baygall

Last updated: 9/22/2023
Accessed: 12/17/2025

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.

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): 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 Acid Baygall ecological site has very deep, somewhat poorly drained soils influenced by their acid nature. The soil is classified as a spodosol, characterized by large amounts of organic matter and an extremely low pH. The acidic environment causes a unique plant community to form.

Associated sites

F152BY007TX	**Poorly Drained Loamy Upland** Soils do not have a spodic horizon, and are poorly drained.
F152BY009TX	**Sandy Terrace** Soils do not have a spodic horizon, are sandy throughout, and are on a higher landscape position.
F152BY010TX	**Terrace** Soils do not have a spodic horizon and are on a higher landscape position.

Table 1. Dominant plant species

Tree	(1) *Nyssa sylvatica* (2) *Magnolia virginiana*
Shrub	(1) *Ilex coriacea* (2) *Cyrilla racemiflora*
Herbaceous	(1) *Woodwardia areolata*

Physiographic features

The ecological site occurs on relict bars on terrace risers. Slope is 0 to 1 percent. Elevation ranges from 26 to 151 feet. Water table depths fluctuate throughout the year. From November to May, the depth to the top of the water table will be 22 inches. The water table will deepen during the warmer months of the year.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Terrace > Bar

Runoff class	Low
Flooding frequency	None
Ponding frequency	None
Elevation	26–151 ft
Slope	0–1%
Water table depth	22 in
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)	249 days
Freeze-free period (average)	289 days
Precipitation total (average)	63 in

Climate stations used

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

- (10) WILDWOOD [USC00419754], Kountze, TX

Influencing water features

These soils are saturated by a water table with a depth from 22 inches from November to May.

Wetland description

The associated soils for this site are mounds are non-hydric. The intermound areas are depressional and are wet for long periods. Onsite investigation is required to determine the local conditions.

Soil features

The site consists of very deep, moderately slowly permeable soils formed in sandy and loamy alluvium of the Quarternary age. The Babco series is the representative soil and is classified as a coarse-loamy, siliceous, semiactive, thermic Oxyaquic Alorthod. The soil is highly unique in being a spodosol. Spodosols are characterized by a subsurface accumulation of humus complexed with aluminum and iron. They are highly acidic, with a pH as low as 3.5. The upper horizons are comprised of loamy fine sands and the lower horizons are fine sandy loams.

Table 4. Representative soil features

Parent material	(1) Alluvium–igneous, metamorphic and sedimentary rock
Surface texture	(1) Loamy fine sand
Family particle size	(1) Coarse-loamy
Drainage class	Moderately well drained
Permeability class	Moderately slow
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-60in)	7–10 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0–2 mmhos/cm
Sodium adsorption ratio (0-60in)	0–2

Soil reaction (1:1 water) (0-60in)	3.5–5
Subsurface fragment volume <=3" (Depth not specified)	0%
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 – 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 Acid Baygalls were Large Gallberry Thickets. 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. Tornados 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

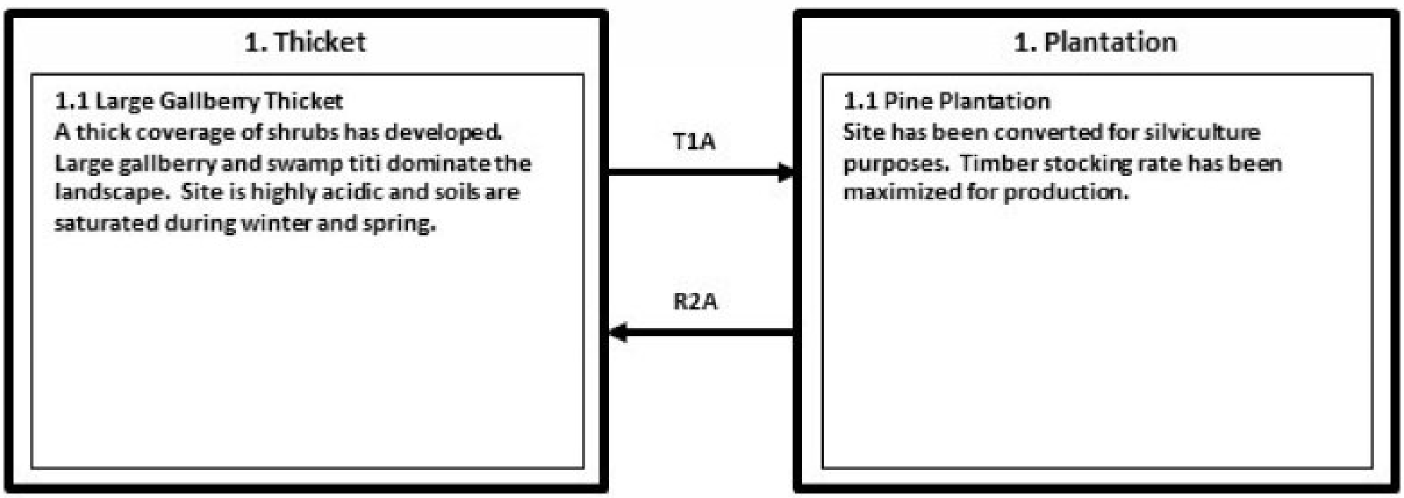

Figure 6. Diagram

Code	Practice
T1A	Clearcut, Site preparation, Tree planting
R2A	Remove unwanted overstory, allow shrub layer to regenerate

Figure 7. Legend

State 1
Thicket

The Acid Baygall is a Large Gallberry thicket. The largest factor to plant development is the acidic nature of the soils. Only species that can handle a pH near 3.5 can persist. The seasonally high water table also attracts species that can survive in a wet environment. Because of this wetness and the fire-retardant shrubs, fire is usually non-existent. The exception is when the surrounding, pine-dominated uplands burn into the thicket.

Community 1.1
Large Gallberry Thicket

The overstory canopy is dominated by blackgum (*Nyssa sylvatica*) and sweetbay (*Magnolia virginiana*). The canopy may also contain red maple (*Acer rubrum*) and laurel oak (*Quercus laurifolia*). This ecological site is especially dominated by the shrub layer, forming the thicket. Large gallbery and swamp titi dominate but other species are also common. Typically, the shrub canopy is so thick, little grows on the forest floor. Ferns are the most common understory plant type, with netted chainfern (*Woodwardia areolata*) being the most prevalent. Smallfruit spike rush (*Eleocharis microcarpa*) is the most common grass/grass-like species found, in conjunction with slender woodoats (*Chasmanthium laxum*).

Table 5. Canopy structure (% cover)

Height Above Ground (Ft)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.5	–	0-5%	0-5%	–
>0.5 <= 1	–	0-10%	0-5%	–
>1 <= 2	–	5-15%	–	–
>2 <= 4.5	–	5-20%	–	–
>4.5 <= 13	0-35%	50-80%	–	–
>13 <= 40	35-75%	0-10%	–	–
>40 <= 80	0-25%	–	–	–
>80 <= 120	–	–	–	–
>120	–	–	–	–

State 2
Plantation

The Plantation State is a result of conversion activities. The landowner has maximized silviculture production by planting a monoculture of pine species, usually loblolly pine.

Community 2.1
Pine Plantation

In the immediate years following the initial tree planting, the understory community will resemble the reference state (State 1). During this early growth period, the landowner will typically remove unwanted hardwoods and mow the herbaceous plants to reduce competition with the planted pine trees. As the overstory canopy closes, less understory management is required due to sunlight restrictions at the ground layer.

Transition T 1-2
State 1 to 2

The transition is due to the land manager maximizing silviculture potential. Merchantable timber is harvested by clearcut. Then, the site is prepared and planted to a monoculture of pine trees.

Restoration pathway R 2-1
State 2 to 1

This restoration pathway can be accomplished by removing the unwanted overstory species. The understory shrub layer will more-than-likely redevelops without assistance. But, if the desired reference species are not reestablishing, the land manager may have plant species. Since the site is highly unique, it may be difficult to find commercial species available.

Additional community tables

Table 6. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
red maple	ACRU	*Acer rubrum*	Native	–	–	–	–
blackgum	NYSY	*Nyssa sylvatica*	Native	–	–	–	–
sweetbay	MAVI2	*Magnolia virginiana*	Native	–	–	–	–
laurel oak	QULA3	*Quercus laurifolia*	Native	–	–	–	–

Table 7. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
smallfruit spikerush	ELMI2	*Eleocharis microcarpa*	Native	–	–
slender woodoats	CHLA6	*Chasmanthium laxum*	Native	–	–
Fern/fern ally					
netted chainfern	WOAR	*Woodwardia areolata*	Native	–	–
cinnamon fern	OSCI	*Osmunda cinnamomea*	Native	–	–
royal fern	OSRE	*Osmunda regalis*	Native	–	–
Shrub/Subshrub					
wax myrtle	MOCE2	*Morella cerifera*	Native	–	–
swamp titi	CYRA	*Cyrilla racemiflora*	Native	–	–
large gallberry	ILCO	*Ilex coriacea*	Native	–	–
southern bayberry	MOCA7	*Morella caroliniensis*	Native	–	–
swamp bay	PEPA37	*Persea palustris*	Native	–	–
Vine/Liana					
laurel greenbrier	SMLA	*Smilax laurifolia*	Native	–	–
Nonvascular					
sphagnum	SPHAG2	*Sphagnum*	–	–	–

Wood products

These soils occur in the Woodland Suitability Group 4w9. They have a low to moderate potential for woodland management, both pine and hardwood. The 50-year site index for loblolly pine averages between 70 and 75 feet (approximately 50 to 53 feet on a 25-year curve). The site index for bottomland oaks averages approximately 60 feet. The yield from an unmanaged, natural stand of loblolly pine, over a 50-year period, is approximately 130 board feet (Doyle Rule), 1.04 tons, or 50 cubic feet per acre per year. Management can substantially increase this yield. Access and equipment operability on these soils is poor for much of the year due to a high water table. Harvesting and other operations may need to be suspended during such periods, when rutting will occur. Wetness also makes these soils poorly suited for log landings and roads. Low strength makes them moderately suited for road construction material. Raising and crowning the road surface may be necessary. Site preparation operations should be limited to the dry months and planting should be planned for the drier part of the planting season. The use of herbicides for site preparation should be a consideration due to the poor drainage and high water tables on these soils. Applications should not be made during wet periods. Wetness may cause a moderate loss in pine seedling survival.

Type locality

Location 1: Hardin County, TX	
UTM zone	N
UTM northing	30.5286389
UTM easting	-94.345888
General legal description	Big Thicket National Forest – Turkey Creek Unit

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Contributors

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Acknowledgments

Thanks to all involved during the preparation, sampling, and reviewing of the Flatwoods project. Thanks to Josh Berry, Dennis Brezina, Kenny Hall, Jason Hohlt, Stacey Kloesel, Ricky Lambert, Cody Langston, Mark Moseley, Ramiro Molina, Mike Oliver, Alan Peer, Sara Russell, Don Sabo, Mary Webb-Marek, and Jon Wiedenfeld for all their help.

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	09/21/2021
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):**

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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):**

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:**