USDA Natural Resources Conservation Service

Ecological site F152BY001TX
Depressional

Last updated: 9/22/2023
Accessed: 05/10/2025

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.

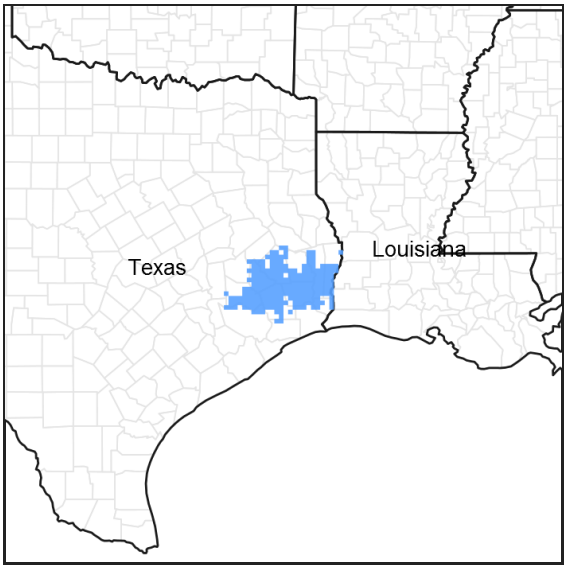


Figure 1. Mapped extent

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 Depressional ecological site has very deep, very poorly or poorly drained soils that are ponded to 0.5 feet from November to May. The depressions occur as isolated system on uplands and terraces. Their isolation and inundation of water form their hydrophytic plant communities.

Associated sites

F152BY010TX	**Terrace** Soils have better drainage and on terrace position.
F152BY005TX	**Seasonally Wet Loamy Upland** Soils are on a slightly higher landform.
F152BY006TX	**Well Drained Loamy Upland** Soils are well drained and on higher landform.
F152BY007TX	**Poorly Drained Loamy Upland** Soils have better drainage and on slightly higher landform.

Similar sites

F152BY011TX	**Swamp** Soils are ponded almost year-round and on a lower landform.
F152BY007TX	**Poorly Drained Loamy Upland** Soils have better drainage and on slightly higher landform.

Table 1. Dominant plant species

Tree	(1) *Nyssa sylvatica* (2) *Quercus nigra*
Shrub	(1) *Smilax laurifolia*
Herbaceous	(1) *Carex cherokeensis*

Physiographic features

The ecological site includes areas on flat to nearly level depressions on uplands and terraces. Slope is 0 to 1 percent, but mainly 0.5 percent. Elevation ranges from 10 to 150 feet. Water table depth fluctuates throughout the year. From November to May, the depth to the top of water table will be 0 to 63 inches. The water table will deepen during the warmer months of the year. The sites are typically ponded from November to May and have aquic conditions during that time.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Depression
Runoff class	Negligible
Flooding duration	Brief (2 to 7 days)
Flooding frequency	None to frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	None to frequent
Elevation	10–150 ft
Slope	0–1%
Ponding depth	0–12 in
Water table depth	0–63 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) DE RIDDER [USC00162367], Deridder, LA
- (2) OBERLIN FIRE TWR [USC00166938], Oberlin, LA
- (3) ORANGE 9 N [USC00416680], Orange, TX
- (4) LIBERTY [USC00415196], Liberty, TX
- (5) LUMBERTON [USC00415435], Silsbee, TX
- (6) TOWN BLUFF DAM [USC00419101], Jasper, TX
- (7) ELIZABETH [USC00162800], Oakdale, LA
- (8) CLEVELAND [USC00411810], Cleveland, TX
- (9) WILDWOOD [USC00419754], Kountze, TX
- (10) DE QUINCY [USC00162361], Dequincy, LA

Influencing water features

Water collects in the upland depressions by rainfall and drainage instead of overflow flooding like bottomland systems. The Depressionals typically pond water from November to May.

Wetland description

This site has hydric soils. Onsite investigation is necessary to determine exact local conditions.

Soil features

The soils of this site are characterized by very deep, very poorly or poorly drained soils formed from loamy alluvium. The soils typically have loam or silty loam surface textures and clay loam or silty clay loam subsurface textures. Water saturation is to be expected during parts of the year and the profile will have gleyed coloring starting as high as the A horizon. Soils within this ecological site include Caneyhead, Jayhawker, and Lelavale. The series fall within the Typic Glossaqualf taxonomic class, with the exception of Jayhawker, which is a Typic Paleaquult.

Table 4. Representative soil features

Parent material	(1) Fluviomarine deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Silt loam (2) Loam
Family particle size	(1) Fine-silty (2) Coarse-silty
Drainage class	Poorly drained to very poorly drained
Permeability class	Slow to very slow
Soil depth	80 in
Surface fragment cover <=3"	0%

Surface fragment cover >3"	0%
Available water capacity (0-60in)	10–12 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0–2 mmhos/cm
Sodium adsorption ratio (0-60in)	0–6
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 Depressional ecological site was Blackgum/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.

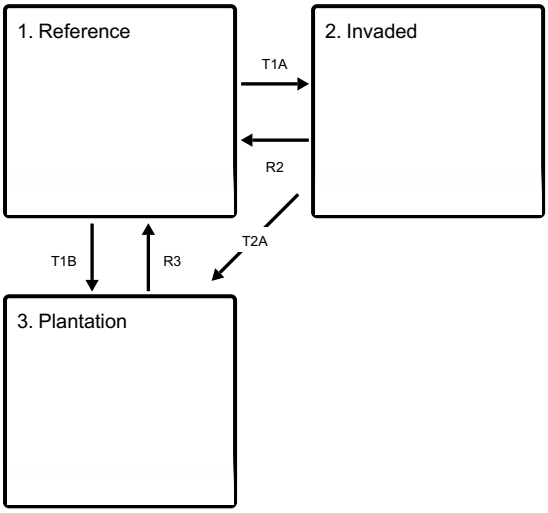
Fire Regimes – Fire was a natural and important disturbance throughout the region. Fire occurred naturally from lightning strikes, by Native Americans for game movement, and eventually early European settlers. Fires throughout the Flatwoods occurred at two different times. Early in the year, they would 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. 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

Ecosystem states



T1A - Introduction of Chinese tallow and/or other non-native

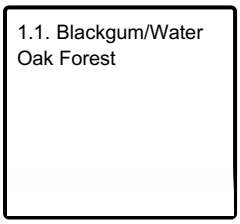
T1B - Native vegetation has been cleared and replaced with desirable timber species.

R2 - Mechanical and chemical control of Chinese tallow

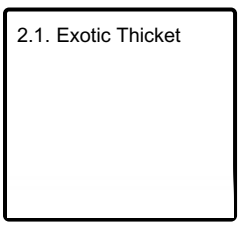
T2A - Existing vegetation cleared and replaced with desirable timber species.

R3 - Selective harvest combined with reintroduction of native species.

State 1 submodel, plant communities



State 2 submodel, plant communities



State 3 submodel, plant communities

3.1. Pine/Hardwood Plantation

State 1
Reference

The Depressional ecological site is a Blackgum/Water Oak Forest. The deep silty soils are very poorly and drained and typically pond water during a portion of the year, primarily November through May. The sites generally do not let much light to the forest floor having canopy covers over 85 percent. Basal areas can range depending on stand age, but are commonly between 75 and 95 square feet per acre. Fire is not usually a factor and burn only during persistent droughts or the peripheries when the surrounding uplands burn. Instead, the ponding of water forms the makeup of the plant communities.

Dominant plant species

- blackgum (*Nyssa sylvatica*), tree
- water oak (*Quercus nigra*), tree

Community 1.1
Blackgum/Water Oak Forest

The overstory can have a myriad of species, but blackgum and water oak are almost always present. Other common overstory trees include red maple (*Acer rubrum*), sweetgum (*Liquidambar styraciflua*), and loblolly pine. American holly (*Ilex opaca*) and willow oak (*Quercus phellos*) are not as common but may be present. The midstory and understory can be variable depending on the time of year and degree of ponding. Swamp cyrilla (*Cyrilla racemiflora*) and wax myrtle (*Morella cerifera*) are present, with dwarf palmetto (*Sabal minor*) being especially common. The understory is dominated by sedges (Carex sp.) and rushes (Juncus sp.), with Cherokee sedge (Carex cheokeensis) the most prevalent.

State 2
Invaded

Chinese tallow (*Triadica sebifera*) is an undesired, invasive species brought to the United States in 1776 (Randall and 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 chemical 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
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, but sometimes slash pine (Pinus ellioti) is planted.

Community 3.1
Pine/Hardwood Plantation

In the immediate years following the initial plantation 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 herbaceous plants to reduce competition with the planted trees. As the overstory canopy closes, less understory management is required due to sunlight restrictions to the ground layer.

Transition T1A
State 1 to 2

The transition from State 1 to State 2 is a result of occupancy by Chinese tallow or other noxious weeds. Invasion can be enhanced by clearing of the overstory. Invasive plants out compete, and eventually choke out, all other native species.

Transition T1B
State 1 to 3

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 or hardwood trees.

Restoration pathway R2
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 silviculture potential. Merchantable timber is harvested by clearcut. Then, the site prepared and planted to a monoculture of pine or hardwood trees.

Restoration pathway R3
State 3 to 1

When restoring a plantation, the land manager can clearcut the timber, prepare the site, and then plant. Otherwise, gap-phase regeneration is possible through selective timber harvests. This involves replanting the desired overstory species in small openings within the current structure of the woodland. The benefit is a slow progression of restoration instead of starting from primary succession.

Additional community tables

Table 5. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)	Diameter (In)	Basal Area (Square Ft/Acre)
Tree							
willow oak	QUPH	*Quercus phellos*	Native	–	–	–	–
red maple	ACRU	*Acer rubrum*	Native	–	–	–	–
American holly	ILOP	*Ilex opaca*	Native	–	–	–	–
loblolly pine	PITA	*Pinus taeda*	Native	–	–	–	–
sweetgum	LIST2	*Liquidambar styraciflua*	Native	–	–	–	–
water oak	QUNI	*Quercus nigra*	Native	–	–	–	–
blackgum	NYSY	*Nyssa sylvatica*	Native	–	–	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
Frank's sedge	CAFR3	*Carex frankii*	Native	–	–
bushy bluestem	ANGL2	*Andropogon glomeratus*	Native	–	–
sedge	CAREX	*Carex*	Native	–	–
grassleaf rush	JUMA4	*Juncus marginatus*	Native	–	–
Cherokee sedge	CACH3	*Carex cherokeensis*	Native	–	–
Forb/Herb					
knotweed	POLYG4	*Polygonum*	Native	–	–
Fern/fern ally					
western brackenfern	PTAQ	*Pteridium aquilinum*	Native	–	–
Shrub/Subshrub					
swamp titi	CYRA	*Cyrilla racemiflora*	Native	–	–
wax myrtle	MOCE2	*Morella cerifera*	Native	–	–
dwarf palmetto	SAMI8	*Sabal minor*	Native	–	–
Vine/Liana					
laurel greenbrier	SMLA	*Smilax laurifolia*	Native	–	–
lanceleaf greenbrier	SMSM	*Smilax smallii*	Native	–	–

Wood products

These soils belong to the 3w9 woodland suitability group. Ponding of water is common during wet months. They have a moderate potential for woodland management, both pine and hardwood. The 50-year site index for loblolly pine averages between 80 and 85 feet (approximately 55 to 57 feet on a 25-year curve), but can range from 75 to 90 feet depending on drainage. The 50-year site index for bottomland oaks can range from 70 to 80 feet. The yield from an unmanaged, natural stand of loblolly pine, over a 50-year period, is approximately 250 board feet (Doyle Rule), 2 tons, or 80 cubic feet per acre per year. Management can substantially increase this yield. Access and equipment operability on these soils is poor during wet periods, when rutting will occur due to saturation of the soil. Harvesting and other operations may need to be suspended during such periods. Wetness also makes these soils poorly suited for log landings and roads. Low strength makes them moderately suited for road construction. Raising and crowning the road bed will be necessary and care must be taken to avoid interrupting the natural drainage. 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 poor drainage and high seasonal water tables on these soils. Wetness may cause a moderate loss in seedling survival. Bedding may be needed.

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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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	09/20/2021
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:**

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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:**
