USDA Natural Resources Conservation Service

Ecological site F152BY005TX
Seasonally Wet Loamy Upland

Last updated: 9/22/2023
Accessed: 05/12/2025

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.

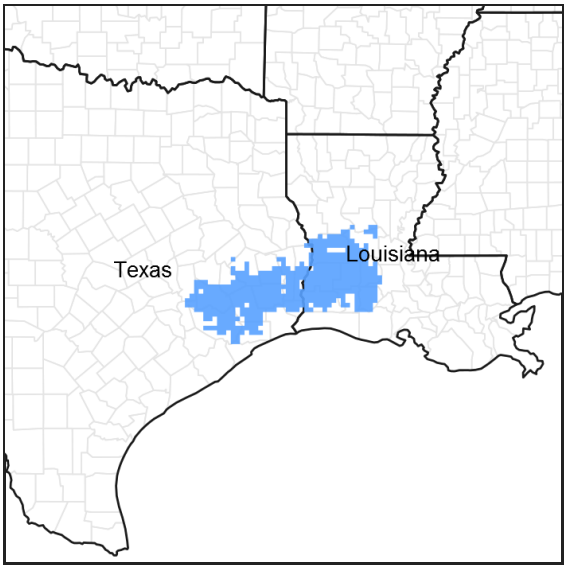


Figure 1. Mapped extent

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 Seasonally Wet Loamy Upland ecological site has very deep loamy, moderately well to somewhat poorly drained soils influenced by seasonal wetness. The sites do not flood or pond, but instead have a fluctuating water table. From winter into late spring, the soils will be saturated to a depth as high as 12 inches below the surface. The deep loamy soils and the seasonally high water table combine to form the plant community.

Associated sites

F152BY001TX	**Depressional** Soils are on a lower landform and are ponded during portions of the year.
F152BY002TX	**Sodic Flats** Soils have high salt concentrations and bioturbation.
F152BY004TX	**Clayey Flat** Soils are comprised of shrink-swell clays.
F152BY006TX	**Well Drained Loamy Upland** Soils are well drained and on a higher landform.
F152BY007TX	**Poorly Drained Loamy Upland** Soils are poorly drained.
F152BY013TX	**Poorly Drained Loamy Bottomland** Soils are on a lower landform and flood for extended periods.
F152BY014TX	**Poorly Drained Clayey Bottomland** Soils are clayey, on a lower landform, and flood for extended periods.

Similar sites

F152BY006TX	**Well Drained Loamy Upland** Soils are well drained and on a higher landform.
F152BY007TX	**Poorly Drained Loamy Upland** Soils are poorly drained.
F152BY004TX	**Clayey Flat** Soils are comprised of shrink-swell clays.

Table 1. Dominant plant species

Tree	(1) *Pinus palustris* (2) *Pinus taeda*
Shrub	(1) *Ilex vomitoria*
Herbaceous	(1) *Schizachyrium scoparium* (2) *Dichanthelium aciculare*

Physiographic features

The ecological site includes areas on flats on uplands. Slope ranges from 0 to 2 percent. Elevation ranges from 15 to 151 feet. Water table depth fluctuates throughout the year. From December to April, the depth to the top of the water table will be 12 to 24 inches. The water table will deepen during the warmer months of the year.

Table 2. Representative physiographic features

Landforms	(1) Coastal plain > Flat (2) Coastal plain > Interfluve
Runoff class	Low to high
Flooding frequency	None
Ponding frequency	None
Elevation	10–151 ft
Slope	0–2%
Water table depth	12–24 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) ELIZABETH [USC00162800], Oakdale, LA
- (2) CLEVELAND [USC00411810], Cleveland, TX
- (3) LIBERTY [USC00415196], Liberty, TX
- (4) LUMBERTON [USC00415435], Silsbee, TX
- (5) TOWN BLUFF DAM [USC00419101], Jasper, TX
- (6) DE QUINCY [USC00162361], Dequincy, 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

While no ponding or flooding occurs, the soils within the ecological site have a seasonally high water table.

Wetland description

The soils associated with this site are non-hydric. Some sites may have small areas of hydric soils. These are usually located in depressions or in low areas that remain wet for long periods. Onsite investigation is necessary to determine exact local conditions.

Soil features

The soils consist of very deep, moderately well to somewhat poorly drained soils formed in loamy fluviomarine deposits. The representative soils series are Aldine, Batson, Kirbyville, Plumgrove, Splendora, and Texla. The soils range in taxonomic classification, from Glossudalfs to Paleudalfs to Paleudults, but all are in the same subgroup of Oxyaquic. Oxyaquic refers to soils that are saturated but not reduced, nor having redoximorphic features.

Table 4. Representative soil features

Parent material	(1) Fluviomarine deposits–igneous, metamorphic and sedimentary rock
Surface texture	(1) Very fine sandy loam (2) Fine sandy loam (3) Silt loam

Family particle size	(1) Fine-loamy (2) Fine-silty
Drainage class	Somewhat poorly drained to moderately well drained
Permeability class	Very slow to moderate
Soil depth	80 in
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-60in)	9–12 in
Calcium carbonate equivalent (0-60in)	0%
Electrical conductivity (0-60in)	0–2 mmhos/cm
Sodium adsorption ratio (0-60in)	0–4
Soil reaction (1:1 water) (0-60in)	3.5–6.5
Subsurface fragment volume <=3" (10-60in)	0–6%
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 Seasonally Wet Loamy Uplands ecological site was Longleaf Pine/Loblolly Pine Woodlands. 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 woodland 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

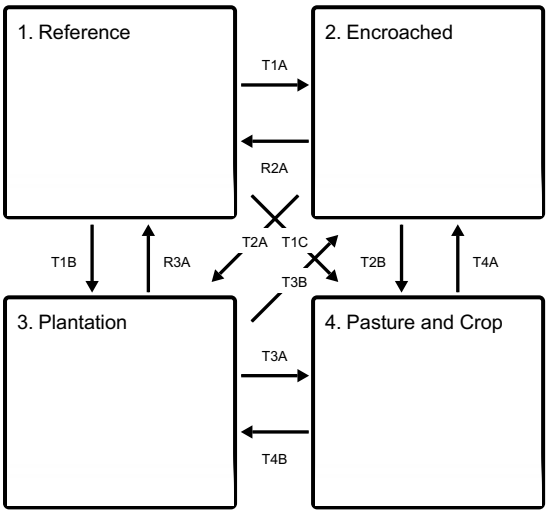
sites.

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 - Absence of disturbance and natural regeneration over time

T1B - Merchantable timber is harvested by clearcut and site is planted to a monoculture of pine trees

T1C - Removal of native vegetation and introduction of improved forage species or annual crops

R2A - Reduction of overstory canopy using fire and selective thinning

T2A - Merchantable timber is harvested by clearcut and site is planted to a monoculture of pine trees

T2B - Merchantable timber is harvested by clearcut and site is planted with improved forage species or annual crops

R3A - Selective harvest combined with reintroduction of natural disturbances and native species

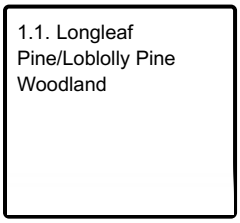
T3B - Absence of natural/anthropogenic disturbance and natural regeneration over time

T3A - Timber is harvested by clearcut and site is planted with improved forage species or annual crops

T4A - Lack of natural/anthropogenic disturbance and natural regeneration over time

T4B - Site is planted to a monoculture of pine trees

State 1 submodel, plant communities



State 2 submodel, plant communities

2.1. Pine/Hardwood Forest

State 3 submodel, plant communities

3.1. Plantation

State 4 submodel, plant communities

4.1. Planted Pasture and Row Crop

State 1
Reference

The Seasonally Wet Loamy Uplands is a Longleaf Pine/Loblolly Pine Woodland. The loamy soils provide an excellent medium to support plant growth. The fluctuating water table makes the site unique from other loamy upland sites. The plants have to overcome wet conditions throughout a part of the year, usually November through May. A moderate overstory canopy cover exists from 60 to 80 percent. Basal areas are high from 85 to over 115 square feet per acre. Even though the soils are affected by a water table, fire is still an important factor. Fire is frequent and probably occurs every 3 to 5 years.

Dominant plant species

- longleaf pine (*Pinus palustris*), tree
- loblolly pine (*Pinus taeda*), tree

Community 1.1
Longleaf Pine/Loblolly Pine Woodland

The overstory is dominated by pine species, comprised of longleaf pine and loblolly pine, with little else. Black

hickory (*Carya tomentosa*) and white oak (*Quercus alba*) may be present, but not in large amounts. Midstory shrub species are sparse, but American beautyberry (*Callicarpa americana*), yaupon (*Ilex vomitoria*), and wax myrtle (*Morella cerifera*) may be present. The herbaceous understory is dense and diverse. Little bluestem (*Schizachyrium scoparium*) and needleleaf rosette grass (*Dichanthelium aciculare*) are dominant, while big bluestem (Andropogon geradii), beaked panicgrass (*Panicum anceps*), and other panicgrasses (Panicum sp.) are common.

State 2
Encroached

A long-term lack of fire and management has caused the community to cross a threshold resulting in the Encroached State (2). The crossing of this threshold represents a closure in the overstory canopy, which limits the productivity of the ground layer. The limited ground layer does not provide enough fuel to harbor a burn with the intensity found in State 1. Fire-intolerant hardwoods have become part of the overstory. The overstory trees are overstocked and limit the growth of neighboring species. The overstocking reduces tree growth and causes stress, making them vulnerable to attacks from insects and/or diseases. Longleaf recruitment may be nonexistent due to lack of light and bare ground. Loblolly pine will especially take advantage of the current conditions. The plant communities will stay in this constant state and continue to age without disturbance or intervention.

Community 2.1
Pine/Hardwood Forest

The understory plant layer only contains remnants of the reference community and possibly no reference community indicator species. Shade-tolerant grasses, such as longleaf woodoats (*Chasmanthium sessiliflorum*), forbs, and greenbriers (Smilax sp.) may be the only ground-layer species. Because the site lacks the diversity of the reference state, the wildlife diversity will be limited to generalist species, species requiring a closed canopy, and those seeking refuge.

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
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 pine trees. As the overstory canopy closes, less understory management is required due to sunlight restrictions to the ground layer.

State 4

Pasture and Crop

The Pasture and Crop 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 4.1
Planted Pasture and Row Crop

Typical introduced pasture grass species include bahiagrass (*Paspalum notatum*) and different varieties of bermudagrass (*Cynodon dactylon*). 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. Many farmers use herbicides to reduce unwanted plant competition which yields a plant community unrepresentative of the reference (State 1) or subsequent vegetative states.

Transition T1A
State 1 to 2

The transition from State 1 to State 2 is a result of time and long periods (greater than 10 years) of no fire and/or forest management practices. Without fire to suppress tree seedlings, biomass and diversity is lost from the grass and forb layers of the system.

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 trees.

Transition T1C
State 1 to 4

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 an improved grass or row crops.

Restoration pathway R2A
State 2 to 1

Restoration of this community to the reference state begins with a selective timber harvest. Removing unwanted trees opens up the canopy, allowing sunlight penetration to the ground. Years of overstory growth have limited the fuel necessary to have an effective fire. Time will be needed to encourage understory growth. Once the herbaceous layer has established, more frequent than natural burns (1 to 2 years) may be required to suppress the woody vegetation.

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 is prepared and planted to a monoculture of pine trees.

Transition T2B
State 2 to 4

The transition is due to the land manager maximizing agricultural potential. Merchantable timber is harvested by clearcut. Then, the site is prepared and planted to either an improved grass or row crops.

Restoration pathway R3A
State 3 to 1

When restoring a plantation, the land manager can either clearcut the timber, prepares the site, and plants trees. 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 forest. The benefit is a slow progression of restoration instead of starting from primary succession.

Transition T3B
State 3 to 2

This community transition is caused by neglecting the plantation understory. Without fire, mowing, or herbicides, unwanted understory saplings can begin to grow into the overstory.

Transition T3A
State 3 to 4

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 an improved grass or row crops.

Transition T4A
State 4 to 2

This community transition is caused by neglecting crop or pasture. Without continuation of agricultural management, first-successional herbaceous plants will occupy the ground layer, followed by shrubs, and eventually shade-loving, fire-intolerant overstory species.

Transition T4B
State 4 to 3

The transition is due to the land manager maximizing silviculture production. The site prepared and planted to a monoculture of pine trees.

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							
black hickory	CATE9	*Carya texana*	Native	–	–	–	–
longleaf pine	PIPA2	*Pinus palustris*	Native	–	–	–	–
loblolly pine	PITA	*Pinus taeda*	Native	–	–	–	–
white oak	QUAL	*Quercus alba*	Native	–	–	–	–

Table 6. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (Ft)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
big bluestem	ANGE	*Andropogon gerardii*	Native	–	–
needleleaf rosette grass	DIAC	*Dichanthelium aciculare*	Native	–	–
beaked panicgrass	PAAN	*Panicum anceps*	Native	–	–
panicgrass	PANIC	*Panicum*	Native	–	–
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	–
Forb/Herb					
Nuttall's wild indigo	BANU2	*Baptisia nuttalliana*	Native	–	–
ticktrefoil	DESMO	*Desmodium*	Native	–	–
eryngo	ERYNG	*Eryngium*	Native	–	–
St. Andrew's cross	HYHY	*Hypericum hypericoides*	Native	–	–
blazing star	LIATR	*Liatris*	Native	–	–
fourvalve mimosa	MIQU2	*Mimosa quadrivalvis*	Native	–	–
anisescented goldenrod	SOOD	*Solidago odora*	Native	–	–
greenbrier	SMILA2	*Smilax*	Native	–	–
Shrub/Subshrub					
wax myrtle	MOCE2	*Morella cerifera*	Native	–	–
hophornbeam	OSVI	*Ostrya virginiana*	Native	–	–
American beautyberry	CAAM2	*Callicarpa americana*	Native	–	–
yaupon	ILVO	*Ilex vomitoria*	Native	–	–
Tree					
loblolly pine	PITA	*Pinus taeda*	Native	–	–
longleaf pine	PIPA2	*Pinus palustris*	Native	–	–
white oak	QUAL	*Quercus alba*	Native	–	–
black hickory	CATE9	*Carya texana*	Native	–	–

Wood products

These soils occur in the Woodland Suitability Group 1w8 and 2w8. They have a very high potential for woodland management, both pine and hardwood. The 50-year site index for loblolly pine ranges from 85 to 105 feet (approximately 57 to 72 feet on a 25-year curve). For bottomland oaks it averages 80 to 95 feet. The yield from an unmanaged, natural stand of loblolly pine, over a 50-year period, is approximately 330 to 460 board feet (Doyle Rule), 2.64 to 3.68 tons, or 90 to 115 cubic feet per acre per year. Management can substantially increase this yield. Access and equipment operability on these soils is fair during wet periods. Harvesting and other operations may need to be suspended during such periods, but this should cause no difficulty in long range operations. Wetness will also cause some slight problems on these soils for log landings and roads. Raising and crowning the road surface may be necessary. Some problems with rutting may occur during wet periods. 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 take into consideration the slow drainage and high water table on these soils. Applications should be not be made during wet periods.

Type locality

Location 1: Newton County, TX	
UTM zone	N
UTM northing	30.639225

UTM easting	-93.832236
General legal description	E.O. Siecke State Forest

Other references

Ajilvsgi, G. 2003. Wildflowers of Texas. Revised edition. Shearer Publishing, Fredericksburg, TX.
Ajilvsgi, G. 1979. Wildflowers of the Big Thicket. Texas A&M University Press, College Station, TX.
Allen, J. A., B. D. Keeland, J. A. Stanturf, and A. F. Kennedy Jr. 2001. A guide to bottomland hardwood restoration. Technical report, USGS/BRD/ITR-2000-0011.
Bray, W. L. 1904. Forest resources of Texas. Bureau of Forestry Bulletin 47, Government Printing Office, Washington D.C.
Diggs, G. M., B. L. Lipscomb, M. D. Reed, and R. J. O'Kennon. 2006. Illustrated flora of East Texas. Second edition. Botanical Research Institute of Texas & Austin College, Fort Worth, TX.
Jones, S. D., J. K. Wipff, and P. M. Montgomery. 1997. Vascular plants of Texas: a comprehensive checklist including synonymy, bibliography, and index. University of Texas Press, Austin.
Liu, C., P. A. Harcombe, and I. S. Elsik. 1990. Fire study report, including Roy E. Larsen Preserve species list. Summer 1990. Department of Ecology and Evolutionary Biology, Rice University, Houston, TX.
Marks, P. L., and P. A. Harcombe. 1981. Forest Vegetation of the Big Thicket, southeast Texas. Ecological Monographs 51:287-305.
Matos, J. A. 1985. Roy E. Larsen Sandylands Sanctuary vascular plant species list. Master thesis, Stephen F. Austin University, Nacogdoches, TX.
NatureServe. 2002. International classification of ecological communities: Terrestrial vegetation of the United States. National forests in Texas final report. NatureServe, Arlington, VA.
Nixon, E. S. 2000. Trees, shrubs & woody vines of East Texas. Second edition. Bruce Lyndon Cunningham Productions, Nacogdoches, TX.
Randall, J. M., and J. Marinelli. 1996. Invasive plants: weeds of the global garden. Volume 149. Brooklyn Botanic Garden, Brooklyn, NY.
Stanturf, J. A., S. H. Schoenholtz, C. J. Schweitzer, and J. P. Shepard. 2001. Achieving restoration success: Myths in bottomland hardwood forests. Restoration Ecology, 9:189-200.
Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2003. State and transition modeling: An ecological process approach. Journal of Range Management 56:106-113.
Soil Survey Staff, Natural Resources Conservation Service, United States Department of Agriculture. Soil Survey Geographic (SSURGO) Database.
Truett, J. C. 1984. Land of bears and honey: A natural history of East Texas. The University of Texas Press, Austin, TX.
Van Kley, J. E., R. L. Turner, L. S. Smith, and R. E. Evans. 2007. Ecological classification system for the national forests and adjacent areas of the West Gulf Coastal Plain. Second approximation. Stephen F. Austin University and The Nature Conservancy, Nacogdoches, TX.
USDA-NRCS Ag Handbook 296 (2006).
Vines, R. A. 1960. Trees, shrubs, and woody vines of the Southwest. University of Texas Press, Austin, TX.
Watson, G. E. 2006. Big Thicket Plant Ecology. Third Edition. University of North Texas Press, Denton, TX.

Contributors

Tyson Hart

Approval

Bryan Christensen, 9/22/2023

Acknowledgments

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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	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):**

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:**
