USDA Natural Resources Conservation Service

Ecological site F133BY010TX
Very Deep Sandy Upland

Accessed: 05/17/2024

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.

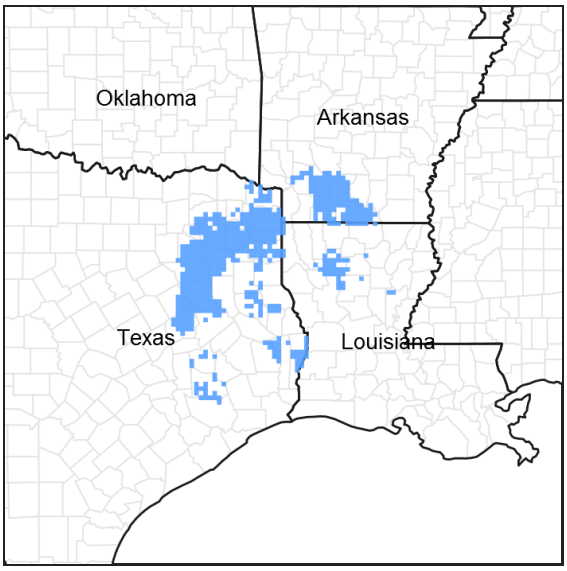


Figure 1. Mapped extent

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): 133B–Western Coastal Plain

Major Land Resource Area (MLRA) 133B, Western Coastal Plain is in eastern Texas, western Louisiana, and the southwest corner of Arkansas. The area is dominated by coniferous forest covering 45,450 square miles (29,088,000 acres). The region is a hugely diverse transition zone between the eastern deciduous forests and the central grasslands to the west.

Classification relationships

-NatureServe, 2002
- CEGL008566 – West Gulf Coastal Plain Xeric Post Oak Woodland

Soil Survey Staff, 2011
- Woodland Suitability Group 4s3

USDA-Natural Resources Conservation Service, 2006.
-Major Land Resource Area (MLRA) 133B

Van Kley et. Al., 2007
- 231Eg.11.1.10 – Shortleaf Pine-(Longleaf Pine)-Bluejack Oak/Tragia Grossarenic Dry Uplands

Ecological site concept

The Very Deep Sandy Uplands site has deep sandy soils greater than 80 inches with little horizon development. The upland landscape, coupled with properties associated with the depth of the sand, forms its unique plant community.

Associated sites

F133BY008TX	**Northern Deep Sandy Upland** Sites have subtle clay percent increases in the subsurface. Vegetation is more robust.
F133BY009TX	**Southern Deep Sandy Upland** Site have subtle clay increases in the subsurface. Vegetation is more robust.

Similar sites

F133BY011TX	**Deep Sandy Terrace** Sites are on a lower terrace landscape position.
F133BY008TX	**Northern Deep Sandy Upland** Sites have subtle clay increases in the subsurface. Vegetation is more robust.
F133BY009TX	**Southern Deep Sandy Upland** Sites have subtle clay increases in the subsurface. Vegetation is more robust.

Table 1. Dominant plant species

Tree	(1) *Quercus stellata* (2) *Pinus echinata*
Shrub	Not specified
Herbaceous	(1) *Aristida purpurascens* (2) *Yucca louisianensis*

Physiographic features

The ecological site includes areas of flat to steep soils on uplands. Slopes range from 0 to 25 percent, but are usually between 1 and 8 percent. Elevation ranges from 165 to 685 feet. The topography of the area includes summits and sideslopes.

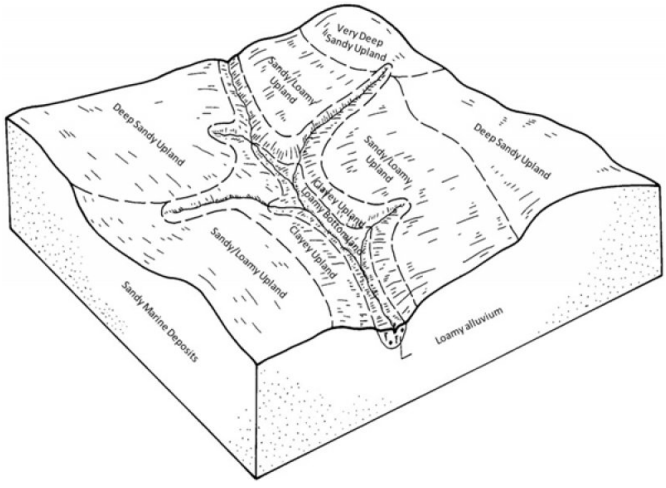


Figure 2. Very Deep Sandy Upland Block Diagram

Table 2. Representative physiographic features

Landforms	(1) Coastal plain (2) Interfluve
Flooding frequency	None
Ponding frequency	None
Elevation	50–209 m
Slope	0–25%
Aspect	Aspect is not a significant factor

Climatic features

The climate of the Western Coastal Plain (MLRA 133B) is humid subtropical with hot summers and mild winters. Canadian air masses that move southward across Texas and Louisiana over the Gulf of Mexico in winter produce cool, cloudy, rainy weather with only rare cold waves that moderate in one or two days. Precipitation is distributed fairly even throughout the year and is most often in the form of slow and gentle rains.

Spring weather can be variable. March is relatively dry while thunderstorm activities increase in April and May. Occasional slow-moving thunderstorms or other weather disturbances may dump excessive amounts of precipitation on the area. Fall has moderate temperatures. Fall experiences an increase of precipitation and frequently has periods of mild, dry, sunny weather. Heavy rain may occur early in the fall because of tropical disturbances, which move westward from the gulf. Tropical storms are a threat to the area in the summer and fall but severe storms are rare. Prolonged droughts and snowfall are rare.

The total annual precipitation ranges from 39 inches in the western part of the region to 60 inches in the eastern part of the region. Approximately 50 percent of the rainfall occurs between April and September, which includes the growing season for most crops. Thunderstorms occur on about 50 days each year and most occur during the summer.

The average relative humidity in mid-afternoon is about 60 percent. Humidity is higher at night and the average at dawn is about 90 percent. The sun shines 70 percent of the time in summer and 50 percent in winter. The prevailing wind is from the south-southeast. Average wind-speed is highest at 11 miles per hour in spring.

Table 3. Representative climatic features

Frost-free period (average)	218 days
Freeze-free period (average)	250 days
Precipitation total (average)	1,321 mm

Climate stations used

- (1) ATLANTA [USC00410408], Atlanta, TX
- (2) MARSHALL [USC00415618], Marshall, TX
- (3) MINEOLA 8 ENE [USC00415956], Mineola, TX
- (4) NACOGDOCHES [USC00416177], Nacogdoches, TX
- (5) TYLER [USC00419207], Tyler, TX
- (6) MAGNOLIA [USC00034548], Magnolia, AR
- (7) ATHENS [USC00410404], Athens, TX
- (8) JEFFERSON [USC00414577], Jefferson, TX
- (9) EL DORADO S AR RGNL AP [USW00093992], El Dorado, AR

Influencing water features

The soils are comprised of deep sands and are very permeable. Water drains through quickly and therefore does not have an influence on the site. Rather, lack of water is the most influential.

Soil features

The soils of this site are deep and characterized by sands throughout the entire soil profile, measured to 80 inches. Being entisols, below the A horizon, the B horizons are not well developed. They are instead characterized mainly by a change in color, not the typical clay accumulations of most other upland soils throughout the MLRA. The Tonkawa series is a representative soil and consists of very deep, excessively drained, permeable soils that formed in sandy residuum from Southern Coastal Plain marine deposits of the Carizzo Sand, Queen City Sand, and Sparta Sand Formations. The series is classified as a Thermic, coated Typic Quartzipsamment. Other soils are included within the ecological site and all are defined by deep sands throughout all horizons. Besides the Tonkawa series, Darden and Duffern are included in the Very Deep Sandy Upland ecological site.

Table 4. Representative soil features

Parent material	(1) Marine deposits–sandstone and shale
Surface texture	(1) Fine sand
Family particle size	(1) Sandy
Drainage class	Excessively drained
Permeability class	Rapid to very rapid
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0%
Available water capacity (0-101.6cm)	4.06–7.11 cm
Calcium carbonate equivalent (0-101.6cm)	0%
Electrical conductivity (0-101.6cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-101.6cm)	0
Soil reaction (1:1 water) (0-101.6cm)	3.5–6
Subsurface fragment volume <=3" (Depth not specified)	0–2%
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 – Southern Arkansas, western Louisiana, and eastern Texas have been deemed the Pineywoods because of the vast expanse of pine trees. The region represents the western edge of the southern coniferous belt. Historically, the area was covered by pines with mixed hardwoods, sparse shrubs, and a diverse understory of grasses and forbs. Fire played a significant role in reducing the woody competition that generally out-competes the herbaceous understory layer. Fire suppression 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 Very Deep Sandy Uplands was a Post Oak/Shortleaf Pine (*Quercus stellata*/*Pinus echinata*) Woodland. Remnants of this presumed historic plant community still exist where natural conditions are replicated through conservation management techniques.

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 understory of grasses and forbs.

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.

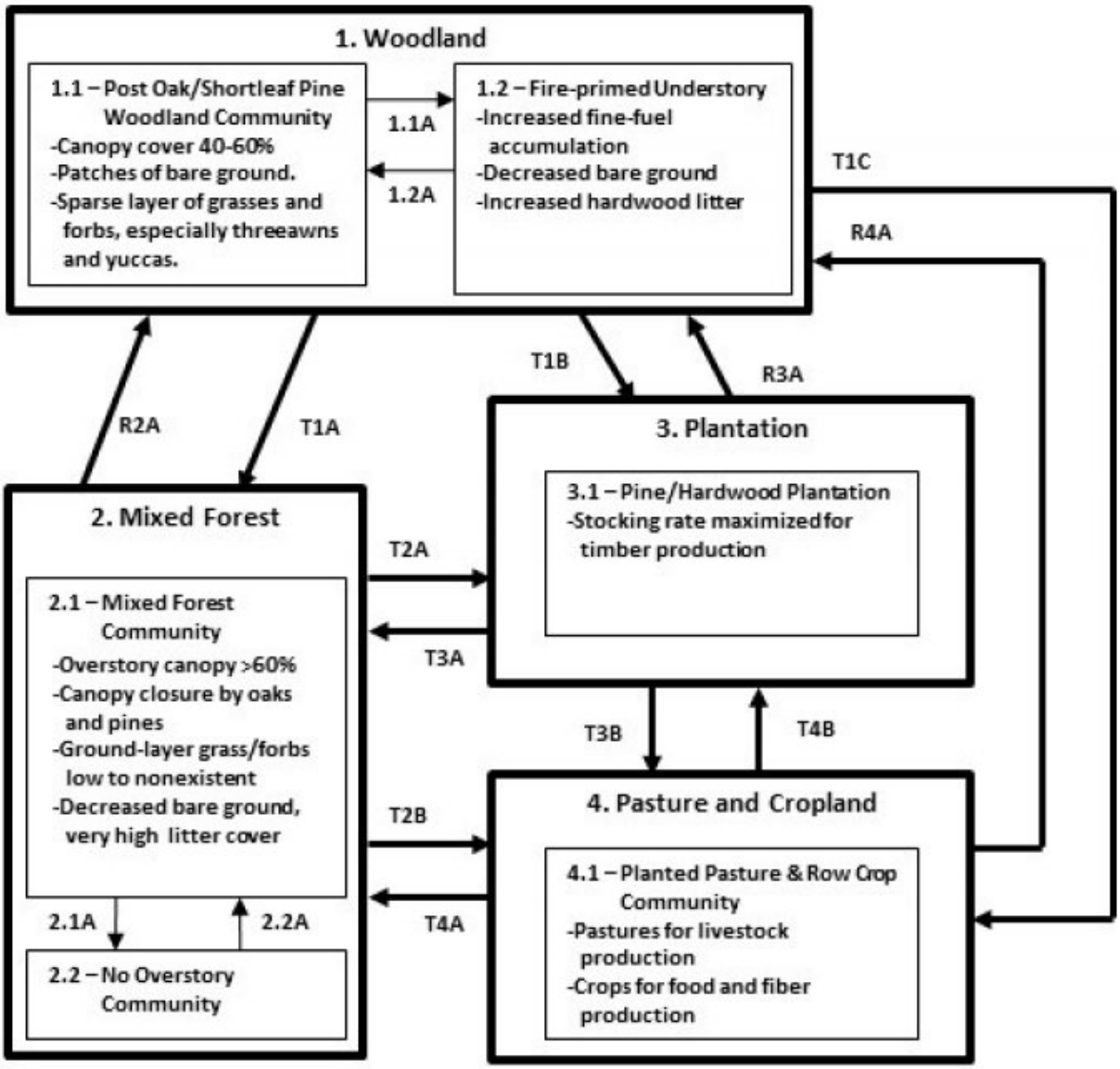
Current Management and State – Today much of the remnant forest is gone, replaced by pine plantations, crops, and pastures. The areas that were not converted have been fire-suppressed so long that loblolly pine and fire intolerant hardwoods populate the overstory structure. Currently, U.S. Forest Service properties are the best place to view the remnant sites. 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 Western Gulf Plain. Fire occurred naturally from lightning strikes and by Native Americans for game movement. The reference community developed with a frequency of fire every 4 to 8 years. Fires usually occurred in early spring, removing senescent vegetation, recycling nutrients and minerals, and spurring new plant growth. Late summer 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 often 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.

Plant Community Interactions – The deep sandiness of the soils greatly reduces the water-holding capacity of the site. This creates a more droughty environment than the surrounding uplands, decreasing the amount of biomass produced and increasing the amount of bare ground. Reduced fine-fuel litter, coupled with more hardwood litter leaf accumulation, fires do not burn as hot, or frequent (4 to 8 years), as the surrounding ecological sites. All of these factors contribute to the openness of the site, generally 40 to 60 percent canopy cover. The understory is sparse, but indicator species include arrowfeather threeawn (*Aristida purpurascens*) and Gulf Coast yucca (*Yucca louisianensis*). Overstory-canopy trees are stunted as a result of the soil conditions, especially noticeable in the shortleaf pines.

State and transition model



Code	Practice
1.1A	Natural development between fire intervals
1.2A	Fire (4-8 year interval)
T1A, T4A	Fire suppression, No management
T1B, T2A, T4B	Clearcut, Site preparation, Tree planting
T1C, T2B, T3B	Clearcut, Grass/Crop planting
2.1A	Clearcut or Natural disturbance
2.2A	Natural development without fire or management
R2A	Selective timber harvest, Prescribed burns
R3A	Gap-phase regeneration or Clearcut with tree planting
R4A	Tree planting, Mid-story shrub control, Prescribed burns

Figure 7. STM

State 1
Woodland

There are two communities in the Woodland State: Post Oak/Shortleaf Pine Woodland Community (1.1) and the Fire-primed Understory Community (1.2). State 1 has a low overstory cover (40 to 60 percent) of post oak, shortleaf pine, bluejack oak (*Quercus incana*), and blackjack oak (*Quercus marilandica*). The understory is sparsely

vegetated with grasses and forbs. Much of the woodland floor naturally lacks vegetation, and patches of sandy-bare ground are always visible. Saplings and some shrubs are in the area, but make up a small percentage of the mid-story canopy. Natural disturbances of fires, lightning strikes, hurricanes (wind throw), ice events (rare), and beetle infestations aid in maintaining the uneven-age structure. The natural canopy spacing is kept intact by the natural droughtiness and periodic fires ranging from 4 to 8 years. Representative basal areas range from 40 to 60 square feet per acre. The basal area and canopy cover generally increase at a parallel rate.

Community 1.1
Post Oak/Shortleaf Pine Woodland

The Woodland phase (1.1) is the first community in the State 1. Litter accumulation is moderate and understory vegetation is naturally sparse. The overstory canopy is not as dominated by shortleaf pine as the adjacently surrounding sites. Instead, the shortleaf is interspersed with post oak, blackjack oak, bluejack oak, and black hickory (*Carya texana*). The occurrence of either post oak or shortleaf pine in the overstory at any given site is between 10 and 50 percent. Bluejack oak and blackjack oak have established on the sites at 10 to 30 percent, and black hickory ranging from 0 to 10 percent of the overall canopy structure. In most other ecological sites, oak species typically only achieve half the height of pines leading to a two-layer canopy. Conversely, in the Very Deep Sandy Uplands, the pine layer and the oak layer are similar in height. The lack of clay in the soil profile reduces the amount of nutrients that can accumulate in the soil. The pine trees may also have a yellowish tint to their needles resulting from lack of nutrients. Both communities are characterized by a sparse ground layer with large patches of bare ground and litter. Threeawn can occupy much of the ground cover, as they are considered first successional grasses. The lack of nutrients and water holding capactiy make colonization possible by species able to withstand the harsh conditions. Little bluestem (Schizachrium scoparium) and panic-grasses (Dichanthelium sp.) may be common, but not abundant. Indicator plants include Gulf Coast yucca, Texas bullnettle (Cnidosolus texanus), Noseburns (Tragia sp.), plains snakecotton (*Froelichia floridana*), and Louisiana nerveray (*Tetragonotheca ludoviciana*).

Table 5. Ground cover

Tree foliar cover	0-15%
Shrub/vine/liana foliar cover	0-15%
Grass/grasslike foliar cover	20-50%
Forb foliar cover	15-50%
Non-vascular plants	0%
Biological crusts	0%
Litter	15-35%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%

Bare ground	15-35%

Table 6. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	0-5%	0-5%	10-35%	10-35%
>0.15 <= 0.3	3-5%	3-15%	5-25%	5-20%
>0.3 <= 0.6	0-5%	3-15%	5-25%	3-15%
>0.6 <= 1.4	0-3%	0-10%	0-15%	0-10%
>1.4 <= 4	5-25%	0-5%	–	–
>4 <= 12	10-40%	–	–	–
>12 <= 24	10-50%	–	–	–
>24 <= 37	0-10%	–	–	–
>37	–	–	–	–

Community 1.2
Fire-primed Understory

The Fire-primed Understory (1.2) phase has an increased accumulation of previous years' growth of grasses, forbs, and shrubs, increasing the fuel load for fire. Litter has built up, bare ground has lessened, and last year's vegetative growth may still be seen on the ground layer. Under natural conditions, only fire tolerant saplings will grow into the overstory of State 1.

Pathway 1.1A
Community 1.1 to 1.2

Post Oak/Shortleaf Pine Woodland **Fire-primed Understory**

The driver for the community shift is time since the last fire. As post-fire time increases, so does the foliar cover by shrub species. As the grasses and forbs age, their senesced leaves increase fine fuel levels.

Pathway 1.2A
Community 1.2 to 1.1

Fire-primed Understory

Post Oak/Shortleaf Pine Woodland

The driver for the community shift is fire. As fire burns through the understory, it encourages a diverse herbaceous layer while suppressing shrubs and tree seedlings.

State 2
Mixed Forest

There are two communities in the Mixed Forest State (2): the Mixed Forest Community (2.1) and the No Overstory Community (2.2). The Mixed Forest community represents a steady-state for the Very Deep Sandy Uplands. Without fire or management, the site begins to lose the vegetative indicators that make the ecological site unique. The plant communities will stay constant without disturbance or intervention.

Community 2.1
Mixed Forest

The understory dominance state has crossed a threshold in which normal environmental events cannot transition the community back to the State 1. 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. Hardwood litter usually covers the ground, also retarding fire in this state. 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. The canopy closure is usually filled in by species from State 1. Added litter accumulation lessens the impact of the droughty soil at the surface. As more litter occurs, water retention is slightly higher. This helps in the establishment of more overstory species, further closing the canopy. Because the site lacks the diversity of the reference state, the wildlife diversity will be limited to generalist species, species required a closed canopy, and those seeking refuge. This ecological state requires management to restore the reference community. Selective timber harvest to reduce the basal area is the first step to allow the understory to return. More frequent than natural prescribed burns (3 to 5 years) will help suppress the hardwood regeneration, but only after understory fuel levels are adequate. Intense summer fires may also be required. The suppression of overstory seedlings will allow the reference plant community to establish.

Table 7. Ground cover

Tree foliar cover	5-15%
Shrub/vine/liana foliar cover	5-20%
Grass/grasslike foliar cover	0-10%
Forb foliar cover	0-10%

Non-vascular plants	0%
Biological crusts	0%
Litter	50-90%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	5-20%

Table 8. Canopy structure (% cover)

Height Above Ground (M)	Tree	Shrub/Vine	Grass/ Grasslike	Forb
<0.15	0-5%	5-15%	0-10%	0-10%
>0.15 <= 0.3	0-5%	5-10%	0-5%	0-5%
>0.3 <= 0.6	0-5%	5-10%	0-5%	0-5%
>0.6 <= 1.4	10-20%	5-15%	0-3%	0-3%
>1.4 <= 4	10-35%	0-5%	–	–
>4 <= 12	20-60%	–	–	–
>12 <= 24	20-80%	–	–	–
>24 <= 37	0-10%	–	–	–
>37	–	–	–	–

Community 2.2
No Overstory

The No Overstory (2.2) phase is a result of natural environmental disturbances or clearcutting the overstory trees. The plant communities from State 1 may return initially, but if the natural disturbance of fire, or overstory stand management do not occur, the site will transition into the Mixed Forest Community (2.1).

Pathway 2.1A
Community 2.1 to 2.2


Mixed Forest


No Overstory

The driver for the shift is a natural disaster or clearcut situation. Examples of natural disasters include hurricane, wind throw, tornadoes, severe ice storms, or severe fires. Following timber harvest by clearcut, little of the reference state vegetation remains. Primary vegetative succession occurs post clearcut.

Pathway 2.2A
Community 2.2 to 2.1


No Overstory


Mixed Forest

The driver for the community shift is time and lack of fire. Shrubs and tree saplings will not be suppressed without return fire intervals.

State 3
Plantation

The Pine 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 3.1
Pine/Hardwood Plantation

In the immediate years following the initial tree planting, the understory community will resemble 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.

State 4
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 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 State 1 or subsequent vegetative states.

Transition T1A
State 1 to 2

The transition from a Woodland (State 1) to the Mixed Forest (State 2) is a result of time and long periods (greater than 20 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 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 (3 to 5 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 trees.

Transition T2B
State 2 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 R3A
State 3 to 1

This restoration pathway can be accomplished in different ways depending on goals. One option is to create canopy openings by reducing the number of overstory trees. Then, restore the resulting canopy gaps with species from State 1's understory. Restoring the understory may include planting shortleaf pine and oak species found in the reference state. This method keeps the woodland structure intact and slowly changes the species composition.

Transition T3A
State 3 to 2

This community transition is caused by neglecting the plantation understory. Without fire, mowing, or herbicides, the overstory canopy can become very dense.

Transition T3B
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.

Restoration pathway R4A
State 4 to 1

This restoration path can be accomplished by planting a mix of oak and pine species to their natural frequencies (see State 1 Overstory Composition table), trying to attain a 40 to 60 percent mature overstory canopy. 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 is available.

Transition T4A
State 4 to 2

This community transition is caused by neglecting the plantation understory. Without fire, mowing, or herbicides, the brush canopy becomes a dense thicket.

Transition T4B
State 4 to 3

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

Additional community tables

Table 9. Community 1.1 forest overstory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)	Diameter (Cm)	Basal Area (Square M/Hectare)
Tree							
shortleaf pine	PIEC2	*Pinus echinata*	Native	–	10–50	–	–
post oak	QUST	*Quercus stellata*	Native	–	10–50	–	–
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	10–30	–	–
bluejack oak	QUIN	*Quercus incana*	Native	–	10–30	–	–
black hickory	CATE9	*Carya texana*	Native	–	0–10	–	–

Table 10. Community 1.1 forest understory composition

Common Name	Symbol	Scientific Name	Nativity	Height (M)	Canopy Cover (%)
Grass/grass-like (Graminoids)					
arrowfeather threeawn	ARPU8	*Aristida purpurascens*	Native	–	5–35
little bluestem	SCSC	*Schizachyrium scoparium*	Native	–	5–35
needleleaf rosette grass	DIAC	*Dichanthelium aciculare*	Native	–	1–15
variable panicgrass	DICO2	*Dichanthelium commutatum*	Native	–	1–5
red lovegrass	ERSE	*Eragrostis secundiflora*	Native	–	1–5
bearded skeletongrass	GYAM	*Gymnopogon ambiguus*	Native	–	1–5
Forb/Herb					
Gulf Coast yucca	YULO	*Yucca louisianensis*	Native	–	1–10
anisescented goldenrod	SOOD	*Solidago odora*	Native	–	1–10
Texas bullnettle	CNTE	*Cnidoscolus texanus*	Native	–	1–10
Canadian horseweed	COCA5	*Conyza canadensis*	Native	–	1–10
healing croton	CRAR2	*Croton argyranthemus*	Native	–	0–5
sessileleaf ticktrefoil	DESE	*Desmodium sessilifolium*	Native	–	0–3
Louisiana nerveray	TELU	*Tetragonotheca ludoviciana*	Native	–	0–3
Texas dutchman's pipe	ARRE3	*Aristolochia reticulata*	Native	–	0–3
nettleleaf noseburn	TRUR2	*Tragia urticifolia*	Native	–	0–3
plains snakecotton	FRFL	*Froelichia floridana*	Native	–	0–3
St. Andrew's cross	HYHY	*Hypericum hypericoides*	Native	–	0–3
whitemouth dayflower	COER	*Commelina erecta*	Native	–	1–3
erect pricklypear	OPST2	*Opuntia stricta*	Native	–	0–1
Small's noseburn	TRSM	*Tragia smallii*	Native	–	0–1
wavyleaf noseburn	TRUR	*Tragia urens*	Native	–	0–1
soft greeneyes	BEPU2	*Berlandiera pumila*	Native	–	0–1
Reverchon's spiderwort	TRRE	*Tradescantia reverchonii*	Native	–	0–1
Fern/fern ally					
western brackenfern	PTAQ	*Pteridium aquilinum*	Native	–	0–5
Shrub/Subshrub					
American beautyberry	CAAM2	*Callicarpa americana*	Native	–	5–15
winged sumac	RHCO	*Rhus copallinum*	Native	–	3–15
sassafras	SAAL5	*Sassafras albidum*	Native	–	3–15
yaupon	ILVO	*Ilex vomitoria*	Native	–	0–10
farkleberry	VAAR	*Vaccinium arboreum*	Native	–	0–3

farkleberry	VAAR	*Vaccinium arboreum*	Native	–	0–3
Tree					
bluejack oak	QUIN	*Quercus incana*	Native	–	5–20
blackjack oak	QUMA3	*Quercus marilandica*	Native	–	1–5
post oak	QUST	*Quercus stellata*	Native	–	1–5
black hickory	CATE9	*Carya texana*	Native	–	1–5
shortleaf pine	PIEC2	*Pinus echinata*	Native	–	1–3
Vine/Liana					
summer grape	VIAE	*Vitis aestivalis*	Native	–	1–10
muscadine	VIRO3	*Vitis rotundifolia*	Native	–	1–10
cat greenbrier	SMGL	*Smilax glauca*	Native	–	1–5

Animal community

Dove will especially utilize the sites as they forage for seeds on the ground. Dove need the ability to walk around on open ground and find seeds, as compared to other seed-eating birds which can feed directly from the plant. Encouragement of seed-producing grasses and forbs will attract more birds. Turkey and quail will utilize the site to some degree, but in combination with other sites. The grass layer may be too sparse to provide nesting habitat, but the presence of mature oaks will provide roosting areas. As long as the canopy is open a diverse forb layer will create an abundance of insects. The insects provide high-quality protein in their diet, especially for newly hatched chicks.

Deer will utilize the site as the community matures and browse the saplings and desired shrubs. As with most deer habitat, deer utilize a large array of ecological sites throughout their life. Well-managed browse, cover, and natural food sources provide the best habitat.

Migratory song birds and woodpeckers use the site as well. Locations with fire and snags will typically have a higher diversity of birds. Fruits from the shrub species (American beautyberry and yaupon) are readily consumed by birds as well.

Grazing animals primarily use grasses as their food source. While grasses can be in abundance on the Very Deep Sandy Uplands, the sites will have to be specifically managed for grazing to produce enough biomass. Reduction of basal area, below 50 square feet per acre, will create more openings for light to penetrate to the ground layer, therefore allowing more biomass to be produced.

Hydrological functions

Due to the sandy surface layer this soil absorbs nearly all rainfall and under normal conditions there is little runoff. The infiltration adds to aquifers and springs oftentimes occur at the base of the slopes.

Recreational uses

Much of this land is leased for deer hunting purposes. Some areas are used by all-terrain vehicles (ATV), as the sandy surface texture has the same characteristics as sand dunes.

Wood products

These very deep sandy soils have a low to moderate potential for pine management. The 50-year site index for loblolly pine ranges between 65 feet and 75 feet (45 to 50 feet on a 25-year curve), depending on slope and slope position. The higher site indices are found on the lower portions of steep slopes. The yield from a natural, unmanaged stand of loblolly pine, over a 50-year period, is approximately 86 cubic feet per acre per year. Management can substantially increase this yield. Because these soils are loose when dry, access and equipment operability is poor during such periods when rutting is also possible. They are well suited for access and equipment operability during wet periods.

These soils are only moderately suited for roads and log landings on the flatter slopes and poorly suited on slopes exceeding 15 percent. Erosion problems will occur as slopes increase beyond 15 percent. Site preparation methods that minimize soil disturbance should be used. Burning should not be used in site preparation operations. Seedling mortality may be severe, so planting only high quality seedlings is paramount. Proper seedling care along with planting depth and compaction will also be important. Attention should be given to the possible leaching of fertilizers and of chemicals when herbicides are used for site preparation. Choose appropriate chemicals and application methods to prevent the possible contamination of ground water.

Other products

Fruits, nuts, acorns, and seeds of the trees, shrubs, vines, and herbaceous plants are used for food, jellies, and jam. Sand may be used for construction purposes.

Table 11. Representative site productivity

Common Name	Symbol	Site Index Low	Site Index High	CMAI Low	CMAI High	Age Of CMAI	Site Index Curve Code	Site Index Curve Basis	Citation
loblolly pine	*PITA*	65	75	81	91	50	–	–	
shortleaf pine	*PIEC2*	55	65	76	86	50	–	–	

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Contributors

Tyson Hart

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	05/17/2024
Approved by	David Kraft
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):**

---

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):**

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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):**

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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:**
