

# Ecological site R150AY527TX Clayey Bottomland

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#### **General information**

**Provisional**. A provisional ecological site description has undergone quality control and quality assurance review. It contains a working state and transition model and enough information to identify the ecological site.



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): 150A-Gulf Coast Prairies

MLRA 150A is in the West Gulf Coastal Plain Section of the Coastal Plain Province of the Atlantic Plain in Texas (83 percent) and Louisiana (17 percent). It makes up about 16,365 square miles (42,410 square kilometers). It is characterized by nearly level plains that have low local relief and are dissected by rivers and streams that flow toward the Gulf of Mexico. Elevation ranges from sea level to about 165 feet (0 to 50 meters) along the interior margin. It includes the towns of Crowley, Eunice, and Lake Charles, Louisiana, and Beaumont, Houston, Bay City, Victoria, Corpus Christi, Robstown, and Kingsville, Texas. Interstates 10 and 45 are in the northeastern part of the area, and Interstate 37 is in the southwestern part. U.S. Highways 90 and 190 are in the eastern part, in Louisiana. U.S. Highway 77 passes through Kingsville, Texas. The Attwater Prairie Chicken National Wildlife Refuge and the Fannin Battleground State Historic Site are in the part of the area in Texas.

## **Classification relationships**

USDA-Natural Resources Conservation Service, 2006. -Major Land Resource Area (MLRA) 150A

## **Ecological site concept**

The Clayey Bottomland site has very deep, clayey surface textured soils that occur on flood plains. The areas can be flooded and ponded for lengthy durations throughout the year. This site is not similar in soils, landscape positions or vegetation to any other sites in MLRA 150A.

# **Associated sites**

R150AY526TX	<b>Southern Blackland</b> The Southern Blackland ecological site shows an intact grass community with small clumped dispersal of woody species. The soils are very deep, richly black in color, and characterized by their shrink-swell nature. The sites are widely distributed across the uplands in areas with mean annual precipitation from 32 to 41 inches.
R150AY740TX	<b>Northern Blackland</b> This ecological site shows an intact grass community with small clumped dispersal of woody species. The soils are very deep, richly black in color, and characterized by their shrink-swell nature. The sites are widely distributed across the uplands and terraces in areas with greater than 48 inches of mean annual rainfall
R150AY541TX	<b>Sandy Bottomland</b> The ecological site has very deep, somewhat excessively drained soils that are occasionally or frequently flooded. Flooding may occur at any time during the year but the winter and spring months are the most common. Due to the position on the landscape and coarse-textured soils, these sites drain quicker and do not stay flooded as long as the loamy and clayey bottomlands sites. The drainage patterns and sandy soils create their unique plant community.
R150AY534TX	Loamy Bottomland Loamy Bottomland is on floodplains and is on the lowest setting on the landscape. The soils formed in loamy alluvium. The hazard of flooding occurs on these sites.

#### Table 1. Dominant plant species

Tree	(1) Ulmus crassifolia (2) Celtis
Shrub	Not specified
Herbaceous	<ul><li>(1) Elymus virginicus</li><li>(2) Sorghastrum nutans</li></ul>

## **Physiographic features**

The site formed in thick alkaline clayey alluvial sediments on the flood plains draining the Coastal Plain and the Coast Prairie. The bottomlands are along the lower Brazos and Colorado Rivers. Slope is dominantly less than 1 percent but ranges to 5 percent. Elevation ranges from 10 to 150 feet. The site floods rarely to occasionally for brief or long durations, except where protected. Runoff ranges from low to high.

#### Table 2. Representative physiographic features

Landforms	(1) River valley > Flood plain
Runoff class	High to very high
Flooding duration	Brief (2 to 7 days) to long (7 to 30 days)
Flooding frequency	Rare to frequent
Ponding duration	Very long (more than 30 days)
Ponding frequency	None
Elevation	3–46 m
Slope	0–3%
Ponding depth	0–61 cm
Water table depth	61–152 cm

# **Climatic features**

The climate of MLRA 150A is humid subtropical with mild winters. The average annual precipitation in the northern two-thirds of this area is 45 to 63 inches. It is 28 inches at the extreme southern tip of the area and 30 to 45 inches in the southwestern third of the area. The precipitation is fairly evenly distributed, but it is slightly higher in late summer and midsummer in the western part of the area and slightly higher in winter in the eastern part. Rainfall typically occurs as moderate intensity, tropical storms that produce large amounts of rain during the winter. The average annual temperature is 66 to 72 degrees F. The freeze-free period averages 325 days and ranges from 290 to 365 days, increasing in length to the southwest.

232-264 days
346-365 days
889-1,397 mm
217-365 days
226-365 days
813-1,473 mm
259 days
339 days
1,168 mm

#### Table 3. Representative climatic features

## **Climate stations used**

- (1) KINGSVILLE NAAS [USW00012928], Kingsville, TX
- (2) ROBSTOWN [USC00417677], Robstown, TX
- (3) C C BOTANICAL GARDENS [USC00412013], Corpus Christi, TX
- (4) BEEVILLE CHASE NAAS [USW00012925], Beeville, TX
- (5) REFUGIO 2 NW [USC00417533], Refugio, TX
- (6) VICTORIA FIRE DEPT #5 [USC00419361], Victoria, TX
- (7) PORT LAVACA [USC00417183], Port Lavaca, TX
- (8) BAY CITY WTR WKS [USC00410569], Bay City, TX
- (9) EL CAMPO [USC00412786], El Campo, TX
- (10) COLUMBUS [USC00411911], Columbus, TX
- (11) ANGLETON 2 W [USC00410257], Angleton, TX
- (12) THOMPSONS 3 WSW [USC00418996], Richmond, TX
- (13) HOUSTON HOOKS MEM AP [USW00053910], Tomball, TX
- (14) HOUSTON-PORT [USC00414326], Houston, TX
- (15) ALVIN [USC00410204], Alvin, TX
- (16) HOUSTON SAN JACINTO DA [USC00414328], Houston, TX
- (17) ANAHUAC [USC00410235], Anahuac, TX
- (18) BEAUMONT RSCH CTR [USC00410613], Beaumont, TX
- (19) PORT ARTHUR SE TX AP [USW00012917], Port Arthur, TX

## Influencing water features

Clayey bottomlands are on floodplains. Flooding occurs at anytime of the year. Floodwater originates from areas upstream and from surrounding higher landforms that drain into the floodplain. Some areas may be inundated for several weeks.

## Wetland description

Correlated soils are considered hydric, but onsite delineations are needed to determine if the site meets wetland criteria as outlined by the US Army Corps of Engineers.

# **Soil features**

The soils are poorly drained to moderately well drained and very deep. Permeability is very slow. The surface texture is typically clay. Soil reaction is moderately acid to moderately alkaline. Diagnostic features and horizons include a mollic epipedon, cambic horizon, and vertic features. Soils correlated to this site include: Brazoria, Chicolete, Churnabog, Ganado, Navaca, and Pledger.

Parent material	(1) Alluvium-igneous, metamorphic and sedimentary rock
Surface texture	(1) Clay
Family particle size	<ul><li>(1) Fine</li><li>(2) Very-fine</li></ul>
Drainage class	Poorly drained to moderately well drained
Permeability class	Very slow
Soil depth	203 cm
Surface fragment cover <=3"	0%
Surface fragment cover >3"	0–2%
Available water capacity (0-152.4cm)	17.78–25.4 cm
Calcium carbonate equivalent (0-50.8cm)	0–5%
Electrical conductivity (0-50.8cm)	0–2 mmhos/cm
Sodium adsorption ratio (0-50.8cm)	0-4
Soil reaction (1:1 water) (0-50.8cm)	5.6–7.9
Subsurface fragment volume <=3" (50.8-152.4cm)	0–2%
Subsurface fragment volume >3" (0-152.4cm)	0%

#### Table 4. Representative soil features

## **Ecological dynamics**

The plant community can vary considerably in composition and structure depending on interactions of the flooding regime, fire, grazing, and weather variations. Historically, prior to European settlement, the site would have supported either an open tallgrass savannah of scattered clumps of trees with a canopy cover of up to 20 percent, or a nearly closed canopy forest with relatively sparse understory cover. The difference between the two communities would largely have been a function of the frequency and intensity of fires. Areas that burned frequently would have been more open and is represented by the reference community. Areas protected from fires developed into a forested community. Historically, the savannah communities would have been grazed by free-roaming herds of bison. When present grazing may have been intense, but frequent long periods of rest would permit recovery and development of fuel for fires to constrain development of the woody component. Lightning alone would account for a high frequency of fire, particularly in the late summer, and as Native Americans used fire as a tool to control animal movement and vegetation dynamics.

Flooding exerts a major influence on the plant communities. Flooding is a natural process and creates an active geomorphic surface. High peak flows of flood waters can periodically cause trees to be knocked down and carried downstream which reduces woody canopy cover. Also, floods can deposit sediments on the herbaceous vegetation

and cause disturbance to large patches of the plant community. The longterm flooding and meandering of the river across the floodplain contributes to variation in topography and soil texture. In some places, this causes considerable heterogeneity, while in other locations the floodplain may be very level and homogeneous. The flood regime of many river floodplains that contain this site has been greatly altered in many places by placement of dams on the river and construction of levee systems to retard flooding. Conversely, many areas receive more runoff due to adjacent upland land use and hence may have higher peak flows than under natural conditions.

The reference tallgrass savannah state on has about a 20 percent canopy cover of hackberry (Celtis laevigata), live oak (Quercus virginiana), pecan (Carya illinoinensis), cedar elm (Ulmus crassifolia), and other tree species in the floodplain overstory. Along streambanks and areas where lighted can penetrate, black willow (Salix nigra), cottonwood (Populus deltoides), and sycamore (Platanus occidentalis) occur. A minimal shrub layer exists, and the herbaceous layer consists of a nearly 100 percent cover of tallgrasses including Indiangrass (Sorghastrum nutans), little bluestem (Schizachyrium scoparium), big bluestem (Andropogon gerardii), switchgrass (Panicum virgatum), and eastern gamagrass (Tripsacum dactyloides). A variety of perennial forbs occur as interstitial plants within the grass matrix. In disturbance openings annual forbs are abundant. With disturbance, particularly continuous heavy grazing, the tallgrasses would decrease in abundance and be replaced by less productive midgrasses including bushy bluestem (Andropogon glomeratus), rustyseed paspalum (Panicum langei), Texas wintergrass (Stipa leucotricha), longspike tridens (Tridens strictus), sedges (Carex spp.), and beaked panicum (Panicum anceps). A shift in perennial forbs will occur to western ragweed (Ambrosia psilostachya), rock sneezeweed (Helenium amarum), and others. With reduced cover and biomass of the herbaceous layer, fires will be less intense, if they occur at all, and this would favor increases of shrub, vine, and tree seedlings and saplings. This sequence of changes can be reversed by applying proper grazing management and prescribed fire. Continued reduction of the tall and midgrasses would result in increases of shortgrasses such as carpetgrass (Axonopus affinis), common bermudagrass (Cynodon dactylon), and buffalograss (Buchloe dactyloides).

With continued overgrazing, a threshold will be crossed that shifts the community into a forest trajectory which has a high percentage canopy cover of trees and a midstory of shrubs, vines, and a relatively sparse herbaceous layer. To return across this threshold would require chemical and mechanical woody plant treatments along with prescribed fire and prescribed grazing. In some instances, with overgrazing and lack of fire, savannah state can be invaded by weedy shrubs, forbs, and tree seedlings. This tree/weed/shrub state would have huisache (Acacia smallii), mesquite (*Prosopis glandulosa*), coffee bean (*Sesbania drummondii*), devil weed (Leucosyris spinosa), blood ragweed (*Ambrosia trifida*), and many other species of broad-leaved forbs. Reversal back to the savannah once this threshold is crossed requires brush management, pest management, prescribed fire, and perhaps reseeding if the change has proceeded to the point of loss of most of the original grasses and forbs are lost. Alternatively, the savannah community may be invaded by exotic grasses, such as bermudagrass, smutgrass (*Sporobolus indicus*), and Bahiagrass (*Paspalum notatum*) to produce an invaded grassland state. Brush and pest management and reseeding may be necessary to return to the savannah state.

## State and transition model

#### Ecosystem states



- T1B Introduction of non-native species coupled with prolonged, excessive grazing
- R2A Reintroduction of fire and regular disturbance return intervals
- T2A Introduction of non-native species coupled with prolonged, excessive grazing
- T3A Absence of disturbance that reduces woody species and natural regeneration over time

#### State 1 submodel, plant communities



#### State 2 submodel, plant communities



#### State 3 submodel, plant communities

3.1. Invaded Grassland

#### State 1 Reference

The Reference state is considered to be representative of pre-Euro settlement conditions. Historically this state would have supported an open tallgrass savannah with scattered clumps of trees. Wildfire, climate fluctuations, and flooding were important disturbances in the reference state.

#### **Dominant plant species**

- sugarberry (Celtis laevigata), shrub
- Indiangrass (Sorghastrum nutans), grass
- big bluestem (Andropogon gerardii), grass
- little bluestem (Schizachyrium scoparium), grass

#### Community 1.1 Tallgrass Savannah/Wooded Grassland

The reference plant community for this site is a fire-influenced bottomland savannah. Composition of this community includes a 25 to 40 percent canopy of individual trees or clumps of trees. The major tree species are live oak, hackberry, pecan, cedar elm, and black willow. Dominant grasses are Indiangrass, little bluestem, big bluestem, switchgrass, eastern gamagrass, and Florida paspalum (*Paspalum floridanum*). Cool-season species are present in lesser amounts in the more open areas. The major cool-season species present include Canada wildrye (*Elymus canadensis*), Virginia wildrye (*Elymus virginicus*), Texas wintergrass, and sedges. Historically, areas of this community were also dominated by giant cane (*Arundo donax*). Giant cane most likely increased and decreased depending upon grazing and fire events and eventually disappeared under the influence of European settlement. The bottomland community is very productive and has a high diversity of grass, forb, and woody species. Removal of fire tends to promote the increase of woody species, while continuous, heavy overgrazing by livestock leads to the reduction of the tall and midgrasses and increases in shorter grasses as well as unpalatable perennial and

annual forbs. These changes in the herbaceous portion of the community reduce the potential for fires to be effective in woody plant control and woody species tend to increase. There is considerable north-south variation in the composition of this community as well as in the associated communities that can occur on this site. For instance, in the reference tree/tallgrass savannah at the southern end of this MLRA favors species such as four flower trichloris and southwestern bristlegrass (*Setaria scheelei*). The more northern communities will contain water oak (*Quercus nigra*). Mesquite can occur on bottomland sites but is not typically seen throughout the entire region.

#### Table 5. Annual production by plant type

Plant Type	Low (Kg/Hectare)	Representative Value (Kg/Hectare)	High (Kg/Hectare)
Grass/Grasslike	3363	5884	7566
Tree	673	1177	1513
Forb	224	392	504
Shrub/Vine	224	392	504
Total	4484	7845	10087

#### Table 6. Ground cover

Tree foliar cover	7-10%
Shrub/vine/liana foliar cover	7-10%
Grass/grasslike foliar cover	15-20%
Forb foliar cover	0-1%
Non-vascular plants	0%
Biological crusts	0%
Litter	60-70%
Surface fragments >0.25" and <=3"	0%
Surface fragments >3"	0%
Bedrock	0%
Water	0%
Bare ground	10-20%

Figure 9. Plant community growth curve (percent production by month). TX7618, Tallgrass Savannah/Wooded Grassland Community . Primarily warm-season perennial tallgrasses and forbs along with some woody production and limited amounts of perennial forbs..

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1	2	5	10	20	20	3	6	15	10	6	2

## Community 1.2 Midgrass/Tallgrass Savannah/Wooded Grassland

Abusive grazing will result in the tallgrasses being reduced in abundance and replaced by midgrasses and weedy forbs. Along with reduced fire frequency and intensity, woody tree, shrub, and vine seedlings establish and increase. This community would be dominated by little bluestem, purpletop (*Tridens flavus*), Virginia wildrye (*Elymus virginicus*), beaked panicum, rustyseed paspalum (*Paspalum langei*), knotroot bristlegrass (Setaria geniculata), Texas wintergrass, and sedges. The overall canopy of the large overstory trees is approximately 20 to 30 percent. Uncontrolled grazing causes this shift in species composition and production. The cool-season component usually increases somewhat in this community. Seedlings and saplings of tree, shrub, and vine species would be apparent and weedy forbs, including western ragweed and bitter sneezeweed, increase in abundance.

# Community 1.1 to 1.2

Heavy continuous grazing and lack of fire will transition the site to Community 1.2.

# Pathway 1.2A Community 1.2 to 1.1

Prescribed grazing and prescribed burning will transition the site back to Community 1.1.

# State 2 Encroached

The Encroached state is characterized by an increase in long-lived woody plants. Widening of the disturbance return interval has allowed woody plants do dominate the visual aspect of the community, as well as ecological processes. Increasing runoff, reducing infiltration, and changing rates of litter accumulation, nutrient cycling and biomass production.

## **Dominant plant species**

- green ash (Fraxinus pennsylvanica), tree
- live oak (Quercus virginiana), tree
- hackberry (Celtis), shrub
- Indian woodoats (Chasmanthium latifolium), shrub

# Community 2.1 Grassed Woodland

In the absence of fire, any of the savannah communities (1.1 and 1.2) may develop into a nearly closed canopy woodland with live oak, hackberry, cedar elm, pecan, water oak, and green ash (*Fraxinus pennsylvanica*) overstory. A variety of shrubs and vines will occupy the midstory with a fairly open herbaceous layer dominated by shade-tolerant sedges and grasses such as broadleaf uniola (*Chasmanthium latifolium*). Forbs such as white crownbeard (*Verbesina virginica*) would be scattered in the understory. At this point, the canopy is causing light deprivation for the understory and is the controlling factor for understory composition.

# Community 2.2 Woodland

This site under abusive grazing and absence of fire is heavily wooded with both overstory canopies ranging from 50 to 90 percent. Trees and vines include sugar hackberry, cedar elm, green ash, pecan, and honey locust while vines present include mustang grape, poison ivy, and Virginia creeper. This site may also be invaded by a complex of shrubs and broad-leaved forbs such as huisache, senna bean, yaupon (*llex vomitoria*), seacoast sumpweed (*lva annua*), devil weed, and blood ragweed along with tree seedlings and saplings, particularly hackberry. Devil weed may form large, dense stands in this community. This complex forms a dense thicket that prevents forest development and maintains the site in this weed/shrub/tree sapling community for extended periods of time. There is often a total lack of herbaceous vegetation with only scattered sedges and rushes and the forest floor covered with decaying leaves and rotting woody debris.

# Pathway 2.1A Community 2.1 to 2.2

Abusive grazing, lack of fire, and lack of brush management will cause more unabated growth by trees. The shift is evident when the canopy cover is greater than 50 percent.

# Pathway 2.2A Community 2.2 to 2.1

Prescribed grazing, prescribed burning, and brush management will transition this community back to 2.1.

# State 3 Invaded

This state this characterized by the dominance of non-native species and/or undesirable, grazing tolerant, natives and is the result of many years of excessive grazing pressure. These grasses are long-lived and persistent in the plant community, contributing to the stability of the site.

#### **Dominant plant species**

- Bermudagrass (Cynodon dactylon), other herbaceous
- beardgrass (Bothriochloa), other herbaceous
- Johnsongrass (Sorghum halepense), other herbaceous

# Community 3.1 Invaded Grassland

When savannah communities have been overgrazed for long periods of time the site may be invaded by exotic or native weedy grasses. Common bermudagrass, King Ranch (Bothriochloa ishaemum), Gordo and Kleberg bluestems (*Dichanthium annulatum*), smutgrass, Johnsongrass (*Sorghum halepense*), and carpetgrass are primary invaders. Once they gain dominance, and if heavy grazing is continued, the site will remain in this community almost indefinitely. If grazing pressure is reduced woody species will eventually invade and the community will shift to the tree/weed/shrub state with the invasive grasses in the understory. The site may also be converted to tame grass pastureland by removal of the woody species, plowing and pasture planting. In the pastureland community, continued application of agronomic practices such as prescribed grazing, nutrient management, pest management, and brush control will be needed to maintain it. Native plants, especially switchgrass and eastern gamagrass, can be established and managed as tame pasture or hayland.

# Transition T1A State 1 to 2

Continued heavy overgrazing, lack of fire, and lack of brush management will transition the site to State 2.

# Transition T1B State 1 to 3

When savannah communities have been overgrazed for long periods of time the site may be invaded by exotic or native weedy grasses.

# Restoration pathway R2A State 2 to 1

Prescribed grazing, prescribed fire, and brush management will restore the site to State 1. Overstory canopies need to be below 40 percent to reestablish the reference community.

# Transition T2A State 2 to 3

Invasion of the site by exotic plant species causes the site to transition to State 3.

# Transition T3A State 3 to 2

Controlling exotic grasses by use of chemical, mechanical, or biological means will transition the site back to State 2. Removing exotic species is very difficult with full elimination almost impossible.

# Additional community tables

 Table 7. Community 1.1 plant community composition

Group	Common Name	Symbol	Scientific Name	Annual Production (Kg/Hectare)	Foliar Cover (%)
Grass	/Grasslike				
1	Tall/Midgrasses			2242–5044	
	switchgrass	PAVI2	Panicum virgatum	1121–3363	_
	eastern gamagrass	TRDA3	Tripsacum dactyloides	1121–3363	_
	redtop panicgrass	PARI4	Panicum rigidulum	1121–2242	_
	little bluestem	SCSC	Schizachyrium scoparium	1121–2242	_
	Indiangrass	SONU2	Sorghastrum nutans	1121–2242	_
	big bluestem	ANGE	Andropogon gerardii	1121–2242	_
	Florida paspalum	PAFL4	Paspalum floridanum	1121–2242	_
	vine mesquite	PAOB	Panicum obtusum	560–1121	_
2	Tall/Midgrasses	•	!	673–1513	 
	sedge	CAREX	Carex	224–897	
	Virginia wildrye	ELVI3	Elymus virginicus	224–673	
	beaked panicgrass	PAAN	Panicum anceps	224–673	
	rustyseed paspalum	PALA11	Paspalum langei	112–560	
	southwestern bristlegrass	SESC2	Setaria scheelei	112–560	
	big sandbur	CEMY	Cenchrus myosuroides	112–560	
	multiflower false Rhodes grass	TRPL3	Trichloris pluriflora	112–560	
	Indian woodoats	CHLA5	Chasmanthium latifolium	112–224	_
	purpletop tridens	TRFL2	Tridens flavus	112–224	_
3	Midgrasses	448–1009			
	bushy bluestem	ANGLH	Andropogon glomeratus var. hirsutior	224–336	_
	buffalograss	BODA2	Bouteloua dactyloides	224–336	_
	silver beardgrass	BOLAT	Bothriochloa laguroides ssp. torreyana	224–336	
	Texas wintergrass	NALE3	Nassella leucotricha	224–336	_
	marsh bristlegrass	SEPA10	Setaria parviflora	224–336	_
	white tridens	TRAL2	Tridens albescens	224–336	_
	longspike tridens	TRST2	Tridens strictus	224–336	_
4	Mid/Shortgrasses		•	0–56	
	broomsedge bluestem	ANVI2	Andropogon virginicus	0–56	_
	longleaf woodoats	CHSE2	Chasmanthium sessiliflorum	0–56	_
	jointtail grass	COELO	Coelorachis	0–56	
	twoflower melicgrass	MEMU	Melica mutica	0–56	_
	nimblewill	MUSC	Muhlenbergia schreberi	0–56	-
	longtom	PADE24	Paspalum denticulatum	0–56	_
	panicgrass	PANIC	Panicum	0–56	_
	brownseed paspalum	PAPL3	Paspalum plicatulum	0–56	_
	big sacaton	SPWR2	Sporobolus wrightii	0–56	
Forb	1	1		1	
5	Forbs			224–504	
	wild notunia		Puollia	56 112	

	νιια μειαιτία	NULLL		JU-112	
	hoe nightshade	SOPH	Solanum physalifolium	56–112	-
	amberique-bean	STHE9	Strophostyles helvola	56–112	_
	Baldwin's ironweed	VEBA	Vernonia baldwinii	56–112	
	white crownbeard	VEVI3	Verbesina virginica	56–112	
	big yellow velvetleaf	WIAM	Wissadula amplissima	56–112	_
	Forb, annual	2FA	Forb, annual	56–112	_
	Cuman ragweed	AMPS	Ambrosia psilostachya	56–112	_
	jimsonweed	DAST	Datura stramonium	56–112	_
	velvet bundleflower	DEVE2	Desmanthus velutinus	56–112	-
	Engelmann's daisy	ENPE4	Engelmannia peristenia	56–112	-
	swamp sunflower	HEAN2	Helianthus angustifolius	56–112	-
	lespedeza	LESPE	Lespedeza	56–112	-
	dotted blazing star	LIPU	Liatris punctata	56–112	_
	littleleaf sensitive-briar	MIMI22	Mimosa microphylla	56–112	_
	yellow puff	NELU2	Neptunia lutea	56–112	_
	swamp smartweed	POHY2	Polygonum hydropiperoides	56–112	_
	least snoutbean	RHMI4	Rhynchosia minima	56–112	_
	snoutbean	RHYNC2	Rhynchosia	11–25	_
Shrub	/Vine				
6	Shrubs/Vines			224–504	
	Alabama supplejack	BESC	Berchemia scandens	56–140	_
	trumpet creeper	CARA2	Campsis radicans	56–140	_
	spiny hackberry	CEEH	Celtis ehrenbergiana	56–140	_
	Texas hawthorn	CRTE2	Crataegus texana	56–140	_
	possumhaw	ILDE	llex decidua	56–140	_
	yaupon	ILVO	llex vomitoria	56–140	_
	western white honeysuckle	LOAL	Lonicera albiflora	56–140	_
	honey mesquite	PRGL2	Prosopis glandulosa	56–140	_
	southern dewberry	RUTR	Rubus trivialis	56–140	_
	saw greenbrier	SMBO2	Smilax bona-nox	56–140	_
	coralberry	SYOR	Symphoricarpos orbiculatus	56–140	_
	eastern poison ivy	TORA2	Toxicodendron radicans	56–140	-
	muscadine	VIRO3	Vitis rotundifolia	56–140	_
	grape	VITIS	Vitis	56–140	_
Tree					
7	Trees			673–1513	
	pecan	CAIL2	Carya illinoinensis	112–841	_
	American sycamore	PLOC	Platanus occidentalis	112–841	_
	eastern cottonwood	PODED	Populus deltoides ssp. deltoides	112–841	_
	live oak	QUVI	Quercus virginiana	112–841	_
	black willow	SANI	Salix nigra	112–841	_
	western soapberry	SASAD	Sapindus saponaria var. drummondii	112–841	_
	Amorican alm		Illmus amoricana	110 Q/1	

		บแบนร ลเบษแบลแล	112-041	_
cedar elm	ULCR	Ulmus crassifolia	112–841	-
water oak	QUNI	Quercus nigra	56–280	-
netleaf hackberry	CELAR	Celtis laevigata var. reticulata	56–280	-
knockaway	EHAN	Ehretia anacua	56–280	-
green ash	FRPE	Fraxinus pennsylvanica	56–280	-
honeylocust	GLTR	Gleditsia triacanthos	56–280	-
planertree	PLAQ	Planera aquatica	56–280	_

# **Animal community**

The Coastal Prairie communities support a wide array of animals. Cattle and many species of wildlife make extensive use of the site. White-tailed deer may be found scattered across the prairie and are found in heavier concentrations where woody cover exists. Feral hogs are present and at times abundant. Coyotes are abundant and fill the mammalian predator niche. Rodent populations rise during drier periods and fall during periods of inundation. Attwater's pocket gophers are abundant and have an important impact on the ecology of the site. The badger is present but not abundant in locations at the southern extent of the site. Locally unique species alligators and bullfrogs.

The region is a major flyway for waterfowl and migrating birds. Hundreds of thousands of ducks, geese, and sandhill cranes abound during winter. Two important endangered species occur in the area, the whooping crane and Attwater's prairie chicken. Many other species of avian predators including northern harriers, ferruginous hawks, red-tailed hawks, white-tailed kites, kestrels, and, occasionally, swallow-tailed kites utilize the vast grasslands. Many species of grassland birds use the site, including blue grosbeaks, dickcissels, eastern meadowlarks, several sparrows, including, vesper sparrow, lark sparrow, savannah sparrow, grasshopper sparrow, and Le Conte's sparrow.

# Hydrological functions

Peak rainfall periods occur in May and June from thunderstorms and in September and October from tropical systems. Rainfall events may be high (3 to 5 inches per event) and intense. Extended periods (45 to 60 days) of little to no rainfall during the growing season are common. Because of the flat topography and bottomland landform of this site, erosion is minimal; however, on more sloping aspects (greater than 3 percent), erosion may be very significant.

## Inventory data references

Vegetative data for this site was obtained from existing Range Site Descriptions and SCS-417 data. Extensive field work was done onsite to catalog the plant community. Several range-trained personnel with state and federal agencies and in private enterprise were consulted on the plant communities as well. Personal contact with ranchers and managers was utilized to ascertain the use of plants by both cattle and wildlife.

# Other references

Allain, L., L. Smith, C. Allen, M. Vidrine, and J. B. Grace. 2006. A floristic quality assessment system for the Coastal Prairie of Louisiana. North American Prairie Conference, 19.

Allain, L., M. Vidrine, V. Grafe, C. Allen, and S. Johnson. 2000. Paradise lost: The coastal prairie of Louisiana and Texas. U.S. Fish and Wildlife Service, Layfayette, LA.

Archer, S. 1994. Woody plant encroachment into southwestern grasslands and savannas: rates, patterns and proximate causes. Ecological implications of livestock herbivory in the West, 13-68.

Archer, S. 1995. Herbivore mediation of grass-woody plant interactions. Tropical Grasslands, 29:218-235.

Archer, S. 1995. Tree-grass dynamics in a Prosopis-thornscrub savanna parkland: reconstructing the past and

predicting the future. Ecoscience, 2:83-99.

Archer, S. and F. E. Smeins. 1991. Ecosystem-level processes. Grazing Management: An Ecological Perspective. Edited by R.K. Heischmidt and J.W. Stuth. Timber Press, Portland, OR.

Baen, J. S. 1997. The growing importance and value implications of recreational hunting leases to agricultural land investors. Journal of Real Estate Research, 14:399-414.

Bailey, V. 1905. North American Fauna No. 25: Biological Survey of Texas. United States Department of Agriculture Biological Survey. Government Printing Office, Washington D. C.

Baldwin, H. Q., J. B. Grace, W. C. Barrow, and F. C. Rohwer. 2007. Habitat relationships of birds overwintering in a managed coastal prairie. The Wilson Journal of Ornithology, 119(2):189-198.

Beasom, S. L, G. Proudfoot, and J. Mays. 1994. Characteristics of a live oak-dominated area on the eastern South Texas Sand Plain. In the Caesar Kleberg Wildlife Research Institute Annual Report, 1-2.

Berlandier, J. L. 1980. Journey to Mexico during the years 1826 to 1834: translated. Texas State Historical Associated and the University of Texas. Austin, TX.

Bestelmeyer, B. T., J. R. Brown, K. M. Havstad, R. Alexander, G. Chavez, and J. E. Herrick. 2003. Development and use of state-and-transition models for rangelands. Journal of Range Management, 56(2):114-126.

Bollaert, W. 1956. William Bollaert's Texas. Edited by W. E. Hollon and R. L. Butler. University of Oklahoma Press, Norman, OK.

Bonnell, G. W. 1840. Topographical description of Texas: To which is added, an account of the Indian tribes. Clark, Wing, and Brown, Austin, TX.

Box, T. W. 1960. Herbage production on four range plant communities in South Texas. Journal of Range Management, 13:72-76.

Box, T. W. and A. D. Chamrad. 1966. Plant communities of the Welder Wildlife Refuge.

Briske, B. B, B. T. Bestelmeyer, T. K. Stringham, and P. L. Shaver. 2008. Recommendations for development of resilience-based State-and-Transition Models. Rangeland Ecology and Management, 61:359-367.

Brite, T. R. 1860. Atascosa County. The Texas Almanac for 1861. Richardson and Co., Galveston, TX.

Brown, J. R. and S. Archer. 1999. Shrub invasion of grassland: recruitment is continuous and not regulated by herbaceous biomass or density. Ecology, 80(7):2385-2396.

Chamrad, A. D. and J. D. Dodd. 1972. Prescribed burning and grazing for prairie chicken habitat manipulation in the Texas coastal prairie. Tall Timbers Fire Ecology Conference Proceedings, 12:257-276.

Crawford, J. T. 1912. Correspondence from the British archives concerning Texas, 1837-1846. Edited by E. D. Adams. The Southwestern Historical Quarterly, 15:205-209.

Davis, R. B. and R. L. Spicer. 1965. Status of the practice of brush control in the Rio Grande Plain. Texas Parks and Wildlife Department Bulletin, 46.

Davis, W. B. 1974. The Mammals of Texas. Texas Parks and Wildlife Department Bulletin, 41.

Diamond, D. D. and T. E. Fulbright. 1990. Contemporary plant communities of upland grasslands of the Coastal Sand Plain, Texas. Southwestern Naturalist, 35:385-392.

Dillehay, T. 1974. Late quaternary bison population changes on the Southern Plains. Plains Anthropologist, 19:180-96. Drawe, D. L., A. D. Chamrad, and T. W. Box. 1978. Plant communities of the Welder Wildlife Refuge.

Drawe, D. L. and T. W. Box. 1969. High rates of nitrogen fertilization influence Coastal Prairie range. Journal of Range Management, 22:32-36.

Edward, D. B. 1836. The history of Texas; or, the immigrants, farmers, and politicians guide to the character, climate, soil and production of that country. Geographically arranged from personal observation and experience. J. A. James and Co., Cincinnati, OH.

Everitt, J. H. and M. A. Alaniz. 1980. Fall and winter diets of feral pigs in south Texas. Journal of Range Management, 33:126-129.

Everitt, J. H. and D. L. Drawe. 1993. Trees, shrubs and cacti of South Texas. Texas Tech University Press, Lubbock, TX.

Everitt, J. H., D. L. Drawe, and R. I. Lonard. 1999. Field guide to the broad-leaved herbaceous plants of South Texas used by livestock and wildlife. Texas Tech University Press, Lubbock, TX.

Foster, J. H. 1917. Pre-settlement fire frequency regions of the United States: A first approximation. Tall Timbers Fire Ecology Conference Proceedings, 20.

Foster, W. C. 2010. Spanish Expeditions into Texas 1689-1768. University of Texas Press, Austin, TX.

Frost, C. C. 1995. Presettlement fire regimes in southeastern marshes, peatlands, and swamps. Tall Timbers Fire Ecology Conference Proceedings, 19:39-60.

Frost, C. C. 1998. Presettlement fire frequency regimes of the United States: A first approximation. Fire in ecosystem management: Shifting the paradigm from suppression to prescription. Tall Timbers Fire Ecology Conference Proceedings, 20:70-81.

Fulbright, T. E. and S. L. Beasom. 1987. Long-term effects of mechanical treatment on white-tailed deer browse. Wildlife Society Bulletin, 15:560-564.

Fulbright, T. E., D. D. Diamond, J. Rappole, and J. Norwine. 1990. The Coastal Sand Plain of Southern Texas. Rangelands, 12:337-340.

Fulbright, T. E., J. A. Ortega-Santos, A. Lozano-Cavazos, and L. E. Ramirez-Yanez. 2006. Establishing vegetation on migrating inland sand dunes in Texas. Rangeland Ecology and Management, 59:549-556.

Gould, F. W. 1975. The Grasses of Texas. Texas A&M University Press, College Station, TX.

Grace, J. B., T. M. Anderson, M. D. Smith, E. Seabloom, S. J. Andelman, G. Meche, E. Weiher, L. K. Allain, H. Jutila, M. Sankaran, J. Knops, M. Ritchie, and M. R. Willig. 2007. Does species diversity limit productivity in natural grassland communities? Ecology Letters, 10(8):680-689.

Grace, J. B., L. K. Allain, H. Q. Baldwin, A. G. Billock, W. R. Eddleman, A. M. Given, C. W. Jeske, and R. Moss. 2005. Effects of prescribed fire in the coastal prairies of Texas. USGS Open File Report, 2005-1287.

Grace, J. B., L. Allain, C. Allen. 2000. Factors associated with plant species richness in a coastal tall-grass prairie. Journal of Vegetation Science, 11:443-452.

Graham, D. 2003. Kings of Texas: The 150-year saga of an American ranching empire. John Wiley & Sons, New York, NY.

Hamilton, W. and D. Ueckert. 2005. Rangeland woody plant control: Past, present, and future. Brush management: Past, present, and future, 3-16.

Hansmire, J. A., D. L. Drawe, B. B. Wester, and C. M. Britton. 1988. Effect of winter burns on forbs and grasses of the Texas Coastal Prairie. The Southwestern Naturalist, 33(3):333-338.

Harcombe, P. A. and J. E. Neaville. 1997. Vegetation types of Chambers County, Texas. The Texas Journal of Science, 29:209-234.

Hatch, S. L., J. L. Schuster, and D. L. Drawe. 1999. Grasses of the Texas Gulf Prairies and Marshes. Texas A&M University Press, College Station, TX.

Heitschmidt, R. K. and J. W. Stuth. 1991. Grazing management: An ecological perspective. Timberline Press, Portland, OR.

Hughes, G.U. 1846. Memoir Description of a March of a Division of the United States Army under the Command of Brigadier General John E. Wool, From San Antonio de Bexar, in Texas to Saltillo, in Mexico. Senate Executive Document, 32.

Inglis, J. M. 1964. A history of vegetation of the Rio Grande Plains. Texas Parks and Wildlife Department Bulletin, 45.

Jenkins, J. H. 1973. The Papers of the Texas Revolution, 1835-1836. Presidential Press, Austin, TX.

Johnson, M. C. 1963. Past and present grasslands of southern Texas and northeastern Mexico. Ecology 44(3):456-466.

Joutel, H. 1906. Joutel's journal of La Salle's last voyage, 1686-1687. Edited by H. R. Stiles. Joseph McDonough, Albany, NY.

Kennedy, W. 1841. Texas: The rise, progress, and prospects of the Republic of Texas. Lincoln's Inn, London, England.

Kimmel, F. 2008. Louisiana's Cajun Prairie: An endangered ecosystem. Louisiana Conservationist, 61(3):4-7.

Le Houerou, H. N. and J. Norwine. 1988. The ecoclimatology of South Texas. In Arid lands: today and tomorrow. Edited by E. E. Whitehead, C. F. Hutchinson, B. N. Timmesman, and R. G. Varady, 417-444. Westview Press, Boulder, CO.

Lehman, V. W. 1965. Fire in the range of Attwater's prairie chicken. Tall Timbers Fire Ecology Conference Proceedings, 4:127-143.

Lehman, V. W. 1969. Forgotten Legions: Sheep in the Rio Grande Plain of Texas. Texas Western Press, El Paso, TX.

Lusk, R. M. 1917. A history of Constantine Lodge, No. 13, ancient free, and accepted Masons, Bonham, Texas. Favorite Printing Co., Hilbert, WI.

McDanield, H. F. and N. A. Taylor. 1877. The coming empire, or, two thousand miles in Texas on horseback. A. S. Barnes & Company, New York, NY.

McGinty A. and D. N. Ueckert. 2001. The brush busters success story. Rangelands, 23:3-8.

McLendon, T. 1991. Preliminary description of the vegetation of south Texas exclusive of coastal saline zones. Texas Journal of Science, 43:13-32.

Mutz, J. L., T. J. Greene, C. J. Scifres, and B. H. Koerth. 1985. Response of Pan American balsamscale, soil, and livestock to prescribed burning. Texas Agricultural Experiment Station Bulletin, B-1492.

Norwine, J. 1978. Twentieth-century semiarid climates and climatic fluctuations in Texas and northeastern Mexico. Journal of Arid Environments, 1:313-325.

Norwine, J. and R. Bingham. 1986. Frequency and severity of droughts in South Texas: 1900-1983, 1-17. Livestock and wildlife management during drought. Edited by R. D. Brown. Caesar Kleberg Wildlife Research Institute, Kingsville, TX.

Olmsted, F. L. 1857. A journey through Texas, or a saddle trip on the Southwest frontier: with a statistical appendix. Dix, Edwards, and co., New York, London.

Palmer, G. R., T. E. Fulbright, and G. McBryde. 1995. Inland sand dune reclamation on the Coastal Sand Plain of Southern Texas. Caesar Kleberg Wildlife Research Institute Annual Report, 30-31.

Pickens, B., S. L. King, B. Vermillion, L. M. Smith, and L. Allain. 2009. Conservation Planning for the Coastal Prairie Region of Louisiana. A final report from Louisiana State University to the Louisiana Department of Wildlife and Fisheries and the U.S. Fish and Wildlife Service.

Prichard, D. 1998. Riparian area management: A user guide to assessing proper functioning condition and the supporting science for lotic areas. Bureau of Land Management, Denver, CO.

Rappole, J. H. and G. W. Blacklock. 1994. A field guide: Birds of Texas. Texas A&M University Press, College Station, TX.

Rappole, J. H. and G. W. Blacklock. 1985. Birds of the Texas Coastal Bend: Abundance and distribution. Texas A&M University Press, College Station, TX.

Rhyne, M. Z. 1998. Optimization of wildlife and recreation earnings for private landowners. M. S. Thesis, Texas A&M University-Kingsville, Kingsville, TX.

Schindler, J. R. and T. E. Fulbright. 2003. Roller chopping effects on Tamaulipan scrub community composition. Journal of Range Management, 56:585-590.

Schmidley, D. J. 1983. Texas mammals east of the Balcones Fault zone. Texas A&M University Press. College Station, TX.

Scifres C. J., W. T. Hamilton, J. R. Conner, J. M. Inglis, and G. A. Rasmussen. 1985. Integrated Brush Management Systems for South Texas: Development and Implementation. Texas Agricultural Experiment Station, College Station, TX.

Scifres, C. J. 1975. Systems for improving McCartney rose infested coastal prairie rangeland. Texas Agricultural Experiment Station Bulletin, MP 1225.

Scifres, C. J. and W. T. Hamilton. 1993. Prescribed burning for brushland management: The South Texas example. Texas A&M Press, College Station, TX.

Shelby, C. 1933. Letters of an early American traveler: Mary Austin Holley, her life and her works, 1784-1846. Southwest Press, Dallas, TX.

Siemann, E., and W. E. Rogers. 2007. The role of soil resources in an exotic tree invasion in Texas coastal prairie. Journal of Ecology, 95(4):689-697.

Smith, L. M. 1996. The rare and sensitive natural wetland plant communities of interior Louisiana. Louisiana Natural Heritage Program, Baton Rouge, LA.

Smeins, F. E., D. D. Diamond, and W. Hanselka. 1991. Coastal prairie, 269-290. Ecosystems of the World: Natural Grasslands. Edited by R. T. Coupland. Elsevier Press, Amsterdam, Netherlands.

Stringham, T. K., W. C. Krueger, and P. L. Shaver. 2001. State and transition modeling: An ecological process approach. Journal of Range Management, 56(2):106-113.

Stutzenbaker, C. D. 1999. Aquatic and wetland plants of the Western Gulf Coast. University of Texas Press, Austin, TX.

Tharp, B. C. 1926. Structure of Texas vegetation east of the 98th meridian. University of Texas Bulletin, 2606.

Urbatsch, L. 2000. Chinese tallow tree Triadica sebifera (L.) Small. USDA-NRCS, National Plant Center, Baton Rouge, LA.

Van't Hul, J. T., R. S. Lutz, and N. E. Mathews. 1997. Impact of prescribed burning on vegetation and bird abundance on Matagorda Island, Texas. Journal of Range Management, 50:346-360.

Vidrine, M. F. 2010. The Cajun Prairie: A natural history. Cajun Prairie Habitat Preservation Society, Eunice, LA.

Vines, R. A. 1984. Trees of Central Texas. University of Texas Press, Austin, TX.

Vines, R. A. 1977. Trees of Eastern Texas. University of Texas Press, Austin, TX.

Warren, W. S. 1998. The La Salle Expedition to Texas: The journal of Henry Joutel, 1684-1687. Edited by W. C. Foster. Texas State Historical Association, Austin, TX.

Wade, D. D., B. L. Brock, P. H. Brose, J. B. Grace, G. A. Hoch, and W. A. Patterson III. 2000. Fire in Eastern ecosystems. Wildland fire in ecosystems: effects of fire on flora. Edited by. J. K. Brown and J. Kaplers. United States Forest Service, Rocky Mountain Research Station, Ogden, UT.

Weaver, J. E. and F. E. Clements. 1938. Plant ecology. McGraw-Hill, New York, NY.

Whittaker, R. H., L. E. Gilbert, and J. H. Connell. 1979. Analysis of a two-phase pattern in a mesquite grassland, Texas. Journal of Ecology, 67:935-52.

Wilbarger, J. W. 1889. Indian depredation in Texas. CreateSpace Independent Publishing Platform, Scotts Valley, CA.

Williams, L. R. and G. N Cameron. 1985. Effects of removal of pocket gophers on a Texas coastal prairie. The American Midland Naturalist Journal, 115:216-224.

Woodin, M. C., M. K. Skoruppa, and G. C. Hickman. 2000. Surveys of night birds along the Rio Grande in Webb County, Texas. Final Report, U.S. Fish and Wildlife Service, Corpus Christi, TX.

Wright, H.A. and A.W. Bailey. 1982. Fire Ecology: United States and Southern Canada. John Wiley & Sons, Inc., Hoboken, NJ.

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# Approval

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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	05/04/2024
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):

- 11. Presence and thickness of compaction layer (usually none; describe soil profile features which may be mistaken for compaction on this site):
- 12. Functional/Structural Groups (list in order of descending dominance by above-ground annual-production or live foliar cover using symbols: >>, >, = to indicate much greater than, greater than, and equal to):

Dominant:

Sub-dominant:

Other:

Additional:

- 13. Amount of plant mortality and decadence (include which functional groups are expected to show mortality or decadence):
- 14. Average percent litter cover (%) and depth ( in):
- 15. Expected annual annual-production (this is TOTAL above-ground annual-production, not just forage annualproduction):
- 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: