

LANDFIRE Biophysical Setting Model

Biophysical Setting 3614340

Texas-Louisiana Coastal Prairie

☒ This BPS is lumped with: 1487

☐ This BPS is split into multiple models: BpS 1487 is systematically lumped with BpS 1434 because BpS 1487 is too fine for mapping and modeling.

General Information

Contributors (also see the Comments field)

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Vegetation Type

Upland
Grassland/Herbaceous

Dominant Species

SCSC
ANGE

Map Zone

36

Model Zone

☐ Alaska
☐ California
☐
☐ Great Basin
☐ Great Lakes
☐ Hawaii
☐ Northeast
☐ Northern Plains
☐ N-Cent. Rockies
☐
☐ Pacific Northwest
☒ South Central
☐ Southeast
☐ S. Appalachians
☐ Southwest

General Model Sources

☐ Literature
☒ Local Data
☒ Expert Estimate

SONU2
PAPL3
CHLOR
PAVIS
TRACH2
PASPA2

Geographic Range

This BpS encompasses non-saline tallgrass prairie vegetation ranging along the coast of LA and TX. This coastal prairie region once covered as much as 9 million acres (Grace 2000). The prairie region of southwestern LA was once extensive (~ 2.5 million acres) but today is limited to small, remnant parcels (100-1000ac). Distances from the Gulf Coast and inland varied from 50-150 miles (80-240km) from south TX to LA and the mouth of the Mississippi River. In TX, this type is bordered by post oak savannah in the north and west, crosstimbers southern pine forest and woodland in the northeast, Tamaulipan thornscrub in the southwest and saline coastal prairie along the Gulf Coast. In LA, it is bordered to the north and east by Southern Floodplain Forest (Kuchler 1964). This BpS is found in MZ36 in ECOMAP subsection 255D.

Biophysical Site Description

This BpS is found on vertisols and alfisols which developed over Pleistocene terraces flanking the Gulf Coast. It is often characterized by a ridge-and-swale or mound-and-intermound microtopography and encompasses both upland and wetland plant communities. This type is dissected by numerous rivers and streams which result in highly variable species composition (Johnston 1963, Diamond and Smeins 1985, Drawe 1994).

A topographic and moisture gradient exists as one progresses inland and out of floodplains. Along the TX coast, a strong moisture gradient occurs from northeast to southwest, affecting species composition, structure and productivity. The diversity of embedded edaphic conditions and wetlands within the general type is important and interacted with fire to determine species distributions.

****Fire Regime Groups are:** I: 0-35 year frequency, surface severity; II: 0-35 year frequency, replacement severity; III: 35-100+ year frequency, mixed severity; IV: 35-100+ year frequency, replacement severity; V: 200+ year frequency, replacement severity.

Vegetation Description

Upland dominants include little bluestem (*Schizachyrium scoparium*), brownseed paspalum (*Paspalum plicatulum*), Indiangrass (*Sorghastrum nutans*) and big bluestem (*Andropogon gerardii*). Wetland dominants in undisturbed occurrences include switchgrass (*Panicum virgatum*) and eastern gamagrass (*Tripsacum dactyloides*); disturbed occurrences may be dominated by bushy bluestem (*Andropogon glomeratus*). This type has many of the same vegetation elements of tallgrass prairie but also has a number of additional species, including some tropical grasses. Nearly 1000 plant species have been identified in this type. The forb community tends to be richer in the coastal prairie than in true tallgrass prairie. This type is highly variable in species composition because of the dissected nature of the terrain and topography caused by numerous rivers and creeks and its proximity to other community types as described in the geographic range section (Johnston 1963, Diamond and Smeins 1985, Drawe 1994). Other important species include bushy bluestem, other bluestems such as split-beard (*Andropogon ternarius*), broomsedge bluestem (*A. virginicus*), silver bluestem (*Bothriochloa saccharoides*), various *Sporobolus* spp., *Chloris* spp and several tropical grasses of the genera *Heteropogon*, *Paspalum*, *Trachypogon* and the previously mentioned *Panicum*. Secondary species vary in importance regionally depending on topography and soil moisture relations and include sideoats grama (*Bouteloua curtipendula*), buffalograss (*Buchloe dactyloides*) and threeawns (*Aristida* spp.). Several grass-like that are important include sedges (*Carex* spp.), spikerush (*Eleocharis* spp.) and *Scirpus* spp. Conspicuous forbs include the genera *Ratibida* (prairie coneflower), *Rudbeckia* (coneflower), *Liatris* (blazing-stars) and *Sagittaria* (arrowhead). Shrubs that occurred infrequently include honey mesquite (*Prosopis glandulosa*) and various oaks (*Quercus* spp). Eastern baccharis (*Baccharis halimifolia*) and wax myrtle (*Morella cerifera*) are more important to the east in the saline coastal prairie. Woody plants did increase with absence of fire, but present day woody invasion happens much more rapidly than during presettlement conditions.

Disturbance Description

Fire (lightning and anthropogenic) occurs about 2-5 times every 10yrs. This type is fire regime group II, with frequent replacement fires, both lightning and anthropogenic in origin (Stewart 1951, Lehmann 1965, Drawe 1980, Stewart 2002, Jurney et al. 2004). Fire was dependent on the availability of dry fine fuels sufficient to carry a fire. Both native grazing and wet/dry periods would have dictated whether sufficient dry, fine fuels were present to carry fire. Historic accounts from the 1800s depict large burns, but the terrain is dissected by numerous rivers and creeks bordered by trees (Lehmann 1965, Drawe 1994). Therefore this landscape matrix strongly influenced the probable size of burn.

A problem with much of the literature on fire in prairies, and therefore a caution, is that it does not include interaction with herbivory (Engle and Bidwell 2001). Bison (*Bison bison*) were historically an important source of disturbance that increased heterogeneity of patches on the landscape. Wild horses were established early on and large herds were noted by early explorers in the southwestern part of this type (Stewart 2002). Pronghorn (*Antilocapra americana*) historically occurred in the southwestern most part of this type (Nelson 1925) where rainfall amounts dropped considerably. Although historical accounts of large groups (1000s) of bison do occur, bison herds were of smaller size and more dispersed in this system than herds of the central Great Plains. Bison grazing affects fire patterns and thus the landscape patterns in tallgrass prairie (Risser 1990) and assuredly this system as well. Bison and other grazing/browsing wildlife species preferentially seek out the new growth of recently burned areas affecting patch composition (e.g., Coppedge and Shaw 1998, Jackson 1965, Risser 1990, Steuter 1986, Fuhlendorf and Engle 2004). Burning causes earlier green-up and increased nutrient content of native grasses and is preferentially selected by grazing animals (Lehmann 1965, Oefinger and Scifres 1977). Typically following green-up, fire is followed by intensive bison grazing pressure to the point that structural classes

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shifted over the landscape in response to an interaction between grazing pressure and fire (Steuter 1986; Fuhlendorf and Engle 2001, 2004). Following this type disturbance the patches are dominated with forbs and likely do not have sufficient fine fuel to carry fire in for a year or more. This model depicts a landscape composed of a continuously shifting mosaic of patches over a 2-5yr fire return interval. This mosaic landscape provided habitat for a suite of grassland wildlife species. Frequent fire is essential to control woody dynamics with varying edaphic and moisture conditions (Denevan 1992, Lehmann 1965, Stewart 1951, 2002).

Adjacency or Identification Concerns

In LA (MZ37), this system grades coastward into marshes of the chenier plain and inland into West Gulf Coastal Plain Wetland Longleaf Savanna and Flatwoods (CES203.191). In TX, this system generally grades coastward into a saline prairie or salt marsh system and inland into West Gulf Coastal Plain Wetland Longleaf Savanna and Flatwoods (CES203.191) (northeast portion of MZ36), oak savannah or Tamaulipan thornscrub vegetation (south and west portion of MZ36). Relatively undisturbed natural depressions (potholes) occurring within the upland matrix units of this system are included in West Gulf Coastal Plain Texas-Louisiana Coastal Prairie Pondshore (CES203.541; BpS 1487). This type can be differentiated from Texas-Louisiana saline coastal prairie by species dominance, but varying disturbance regimes can change species dominance in both of these types and may make it more difficult to distinguish between the two types. Much of the Texas-Louisiana coastal prairie type has been lost to cultivation, urban/suburban sprawl and recent woody plant invasion.

Native Uncharacteristic Conditions

Overgrazing, fire-exclusion and associated native woody encroachment (mesquite and huisache).

Scale Description

Burned and unburned patches varied greatly in size from small burns to large, landscape level burns (100,000ac+). Frequency of fire was also highly variable, ranging from annual fires to 20yr+ fire intervals, creating significant structural variation on the landscape.

Issues/Problems

Some estimates state that 99% of coastal prairie has been lost through conversion to other uses and environmental degradation due to the interruption of important ecological processes, such as fire/grazing, needed to maintain this system.

Some of the early post-European settlement literature refers to a very frequent fire frequency (bi-annually in some cases); however, this was likely restricted to a relatively short period of time following settlement and is not representative of the historic fire regime (Stewart 1951, Lehmann 1965:133, Chamrad and Dodd 1973, Stewart 2002:141-144).

Recent (last 50yrs) woody plant invasion, by both native and exotic species has occurred in this type and has greatly changed the structure of this type as well as disturbance regime. Some authorities state that historic woody invasion occurred from riparian areas dissecting the prairies, but species composition of the current woody invaders would indicate that this is not entirely accurate. Almost all woody invaders currently found in this type are upland species, and are either native species moving in from the adjacent Tamaulipan thornscrub region (mesquite [*Prosopis glandulosa*] and huisache [*Amblyolepis setigera*] in the southwest portion of the zone) or recently introduced exotic species (Chinese tallow [*Triadica sebifera*] and McCartney rose [*Rosa bracteata*] in the northeast portion of the zone).

Comments

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MZ36 model developed from the MZ37 model for the same BpS by Chris Harper (charper@tnc.org), Ron Masters (rmasters@ttrs.org) and Patrick Walther (Patrick_Walther@fws.gov). Substantial changes resulted in a change in modelership for MZ36. Suggested reviewers for this type include: Fred Smeins (Texas A&M), David Diamond (Missouri), Wayne Hanselka (Texas Cooperative Extension, Corpus Christi) and Lynn Drawe (Welder Wildlife Foundation, Sinton, TX). David Diamond provided review for MZ36.

Vegetation Classes

Class A 30 %

Early Development 1 All Structure

Upper Layer Lifeform

- ☒ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

3

Indicator Species and Canopy Position

SCSC
 Upper
 RUDBE
 Mid-Upper
 PAPL3
 Upper
 ANGE
 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	31 %	100 %
Height	Herb 0m	Herb 0.5m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

0- 1yrs. Open. Burned in last year. 'sweet' regrowth that may occasionally be grazed (local intensive grazing). Cover of bare ground, forbs and annuals will be higher in this open box. Post fire community that is short duration (often weeks-depending on time of burning) before transitioning into one of the other community stages. Succession post inundation with water proceeds in a different manner through a sedge then bunchgrass stage. Transitions to class B the following year. Replacement fire is possible in this class, but would rarely occur (prob. = 0.20). Native grazing most often occurred in this class since the regrowth is the ideal food source for nutrition.

NOTE: Although ecologically very important grazing is not included in this model because it would be closely associated (spatially and temporally) with burned patches.

Class B 70 %

Mid Development 1 Closed

Upper Layer Lifeform

- ☒ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

3

Indicator Species and Canopy Position

SCSC
 Upper
 ANGE
 Upper
 SONU2
 Upper
 PAPL3
 Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	71 %	100 %
Height	Herb 0.6m	Herb >1.1m
Tree Size Class	None	

☐ Upper layer lifeform differs from dominant lifeform.

Description

Closed. Two years plus with disturbance. Mix of live and standing dead herbaceous biomass. Cover dominated by grasses. This class remains in class B until replacement fire takes it to class A (every 2-5yrs). Native grazing will occur less frequently in this class since burned areas (class A) would be preferred.

This class is tallgrass dominated, with forbs declining in abundance as time since disturbance increases. Tillering and overall plant vigor is reduced by mulching effect from accumulation of ungrazed, unburned plant litter as time since disturbance increases as well.

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Historically, woody plants would have occurred rarely and after very long fire return intervals (20yrs+) and would likely have been more common in the south and west portion of the zone, proximate to oak savannahs and Tamaulipan thornscrub. Woody plants would most likely have occurred in areas where fire didn't occur as frequently due to inadequate fuel loading and high fuel moisture.

Composition of micro-depressions in this prairie system would have varied over time based on wet-dry cycles. These depressions often contained both typical upland dominant grasses as well as "wetland vegetation" such as various sedge species.

Class C 0 %

[Not Used] [Not Used]

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	%	%
<i>Height</i>		
<i>Tree Size Class</i>		

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class D 0 %

[Not Used] [Not Used]

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	%	%
<i>Height</i>		
<i>Tree Size Class</i>		

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class E 0 %

[Not Used] [Not Used]

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	<i>Min</i>	<i>Max</i>
<i>Cover</i>	%	%
<i>Height</i>		
<i>Tree Size Class</i>		

Upper Layer Lifeform

- ☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

☐ Upper layer lifeform differs from dominant lifeform.

Description

Disturbances

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Fire Regime Group:** II

Historical Fire Size (acres)

Avg

Min

Max

Sources of Fire Regime Data

- ☐ Literature
☐ Local Data
☒ Expert Estimate

Additional Disturbances Modeled

- ☐ Insects/Disease ☐ Native Grazing ☐ Other (optional 1)
☐ Wind/Weather/Stress ☐ Competition ☐ Other (optional 2)

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	3	1	6	0.33333	100
Mixed					
Surface					
All Fires	3			0.33335	

Fire Intervals (FI):

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is central tendency modeled. Minimum and maximum show the relative range of fire intervals, if known. Probability is the inverse of fire interval in years and is used in reference condition modeling. Percent of all fires is the percent of all fires in that severity class.

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