14340

Texas-Louisiana Coastal Prairie

BpS Model/Description Version: Aug. 2020

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| --- | --- | --- | --- |
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Vegetation Type

Mixed Upland and Wetland

Map Zone

36

Model Splits or Lumps

This Biophysical Setting (BpS) is lumped with 1487.

Geographic Range

This BpS encompasses non-saline tallgrass prairie vegetation ranging along the coast of Louisiana and Texas. This coastal prairie region once covered as much as 9 million acres (Grace 2000). The prairie region of southwestern Louisiana was once extensive (~2.5 million acres) but today is limited to small, remnant parcels (100-1,000ac). Distances from the Gulf Coast and inland varied from 50-150mi (80-240km) from south Texas to Louisiana and the mouth of the Mississippi River. In Texas, this type is bordered by post oak savanna 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 Louisiana, it is bordered to the north and east by Southern Floodplain Forest (Kuchler 1964). This BpS is found in map zone (MZ) 36 in ECOMAP subsection 255D (Cleland et al. 2007).

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 Texas 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.

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 1,000 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-likes 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 pre-settlement conditions.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SCSC | *Schizachyrium scoparium* | Little bluestem |
| ANGE | *Andropogon gerardii* | Big bluestem |
| SONU2 | *Sorghastrum nutans* | Indiangrass |
| PAPL3 | *Paspalum plicatulum* | Brownseed paspalum |
| CHLOR | *Chloris* | Windmill grass |
| PAVIS | *Panicum virgatum var. spissum* | Switchgrass |
| TRACH2 | *Trachypogon* | Crinkleawn grass |
| PASPA2 | *Paspalum* | Crowngrass |

Species names are from the NRCS PLANTS database. Check species codes at http://plants.usda.gov.

Disturbance Description

Fire (lightning and anthropogenic) occurs about 2-5 times every 10yrs. Fires are typically frequent, stand-replacing, and 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 shifted over the landscape in response to an interaction between grazing pressure and fire (Steuter 1986; Fuhlendorf and Engle 2001, 2004). Following this type of 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 (FRI). 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).

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 3 | 100 | 1 | 6 |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 3 | 100 |  |  |

Fire interval is expressed in years for each fire severity class and for all types of fire combined (All Fires). Average FI is the central tendency modeled. Percent of all fires is the percent of all fires modeled in that severity class. Minimum and Maximum FIs show the relative range of fire intervals as estimated by model contributors, if known.

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.

Adjacency or Identification Concerns

In Louisiana (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 Texas, 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 savanna, 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.

Issues or 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 (biannually 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 Macartney rose [*Rosa bracteata*] in the northeast portion of the zone).

Native Uncharacteristic Conditions

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

Comments

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.

Succession Classes

**Mapping Rules**

|  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Upper Layer Lifeform** | **Height (m)** | **Canopy Cover (%)** | | | | | | | | | |
| **0-10** | **11-20** | **21-30** | **31-40** | **41 - 50** | **51-60** | **61-70** | **71-80** | **81-90** | **91-100** |
| Herb | 0-0.5 | A | A | A | A | A | A | A | A | A | A |
| Herb | 0.5-1.0 | A | A | A | A | A | A | A | B | B | B |
| Herb | >1.0 | A | A | A | A | A | A | A | B | B | B |
| Shrub | 0-0.5 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 0.5-1.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | 1.0-3.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Shrub | >3.0 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 0-5 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 5-10 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 10-25 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | 25-50 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | B | B | UN | UN | UN | UN | UN | UN | UN | UN |

Succession class letters A-E are described in the Succession Class Description section. Some classes use a leafform distinction where a qualifier is added to the class letter: Brdl (broadleaf), Con (conifer), or Mix (mixed conifer and broadleaf). UN refers to uncharacteristic native or a combination of height and cover that would not be expected under the reference condition. NP refers to not possible or a combination of height and cover which is not physiologically possible for the species in the BpS.

**Description**

Class A 29 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCSC | Schizachyrium scoparium | Little bluestem | Upper |
| RUDBE | Rudbeckia | Coneflower | Mid-Upper |
| PAPL3 | Paspalum plicatulum | Brownseed paspalum | Upper |
| ANGE | Andropogon gerardii | Big bluestem | Upper |

Description

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 and then a bunchgrass stage. Transitions to Class B the following year. Replacement fire is possible in this class but would rarely occur. 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.

*Maximum Tree Size Class*  
None

Class B 71 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCSC | Schizachyrium scoparium | Little bluestem | Upper |
| ANGE | Andropogon gerardii | Big bluestem | Upper |
| SONU2 | Sorghastrum nutans | Indiangrass | Upper |
| PAPL3 | Paspalum plicatulum | Brownseed paspalum | Upper |

Description

About 2+ years after disturbance there is a mix of live and standing dead herbaceous biomass. Grasses dominate the cover. Native grazing will occur less frequently in this class since more frequently burned areas 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.

Historically, woody plants would have occurred rarely and after very long FRIs (20yrs+) and would likely have been more common in the south and west portion of the zone, proximate to oak savannas 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.

*Maximum Tree Size Class*  
None

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Mid1:CLS | 1 |
| Mid1:CLS | 2 | Mid1:CLS | 999 |

Probabilistic Transitions

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| **Disturbance Type** | **Disturbance occurs In** | **Moves vegetation to** | **Disturbance Probability** | **Return Interval (yrs)** | **Reset Age to New Class Start Age After Disturbance?** | **Years Since Last Disturbance** |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.2 | 5 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.33 | 3 | Yes | 0 |

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