LANDFIRE Biophysical Setting Model

Biophysical Setting **3614370** **Central and Upper Texas Coast Dune and Coastal Grassland**

☐ *This BPS is lumped with:*
☐ *This BPS is split into multiple models:*

General Information

Contributors (also see the Comments field) **Date** 5/15/2007

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Vegetation Type
Upland Grassland/Herbaceous

General Model Sources
☑ Literature
☑ Local Data
☑ Expert Estimate

Dominant Species
SCHIZ4
SCLI11
PANIC
SPSP
UNPA
SPPA
ANVI2
PAPL3

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

Geographic Range

This BpS is located along the Gulf Coast and inland varying distances from 0-10 miles inland and ranging from Padre Island north to Galveston Bay. To the north this type is bordered by high salt marshes and fresh water marshes. To the south and west it also joins with the desert grasslands.

Biophysical Site Description

The three communities that are found in burn units are the sand dunes, barrier flat and tidal flats communities. The sand dune community is relatively sparsely vegetated. Its close proximity to the Gulf allows for greater impacts of salt spray on the vegetation. Also the higher dune elevations limit root access to soil moisture. The lee side of the dune complexes has more plant species and greater growth. Common species include seaoats (Uniola paniculata), goat-foot morning glory (Ipomoea spp.) and partridge pea (Chamaecrista fasciculata).

The barrier flat community is the most common, represented on over 50% of the island. This vegetative community is bordered by the Gulf dunes on the east and the bay marsh and tidal flats on the west. This country is flat with small undulating tertiary dunes, interspersed with freshwater and brackish swales and ponds. Common species include saltmeadow cordgrass (Spartina patens), gulfdune paspalum (Paspalum monostachyum) and seacoast bluestem (Schizachyrium scoparium var. littorale). Scattered honey mesquite (Prosopis glandulosa) and yucca (Yucca spp.) are found, as well as dense areas of eastern baccharis (Baccharis halimifolia) and Macartney rose (Rosa bracteata). These latter two species are the focus of control/eradication management programs.

**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.

The tidal flat community interdigitate along the serrated bay shoreline. This community is made up of more salt tolerant species, as this zone can be regularly inundated during high tide events. The common species found here include saltgrass (Distichlis spicata), seaside tansy (Borrichia spp.) and Gulf cordgrass. This cordgrass contains oil and waxes which can cause an increase in fire behavior.

Vegetation Description

This type has many of the same vegetation elements of tallgrass prairie but also has a number of additional species, including some tropical grasses. A wide variety of plant species have been identified in this type. The forb community tends to be richer in the coastal prairie than in true tallgrass prairie. The species composition is dominated by little bluestem (Schizachyrium scoparium), sea coast bluestem, several Panicums and sacahuista, also known as Gulf cordgrass. Other important species include bushy bluestem (Andropogon glomeratus), other bluestems such as split-beard (A. ternarius), broomsedge bluestem (A. virginicus), silver bluestem (Bothriochloa saccharoides), various Sporobolus 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), buffalo grass (Buchloe dactyloides) and threeawns (Aristida spp.). Several grass-likes that are important include sedges (Carex spp.), spikerushes (Eleocharis spp.) and bulrushes (Scirpus spp.). Conspicuous forbs include the genera Ratibida, Rudbeckia, Liatris and Sagittaria.

Disturbance Description

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). Likely, this type has one of the most frequent fire regimes in North America. Annual burning was described in references to historic accounts (Stewart 1951, Chamrad and Dodd 1973, Stewart 2002:141-144) and in one instance reference was made to burning twice (summer and winter) in the same year (Lehmann 1965:133). These references do not indicate every acre was burned every year but likely some considerable area was burned every year with most of the type being burned at least biannually and some areas burned twice in a given year. Lehmann (1965) also notes accounts about the patches of unburned vegetation and relative green-up compared to burned areas. Fire was likely possible during most seasons and dependant on the availability of dry fine fuels sufficient to carry a fire. Ovieda y Valdez in 1534 cite the use of fire in the area surrounding Corpus Christi. Spanish settlers had learned from Native Americans about the importance of fire, and applied it to clear brush and to stimulate new growth in grasses (Stewart 2002). Fire has long been an important ecological process along the Texas Gulf Coast, whether through lightning or human-caused ignitions. On Matagorda Island the conditions often exist for lightning fires. Prior to suppression, these fires likely covered thousands of acres in the past. Early fire suppression and grazing reduced fire frequency and the ecological role of fire, contributing to vegetation changes on broad scales. In general, the vegetation change was from more abundant grasses and forbs to increased woody species. Development of levees and the intracoastal changed the influences of these events and required events of greater magnitude (category 5) to achieve the salt water inundation flood events that historically occurred under tropical storm pressure. High tide events occur on intervals of 20yrs bringing salt water inundation and setting the seral stage back to class A early seral stage.

Adjacency or Identification Concerns

This habitat type is adjacent to coastal marshes and may transition to coastal prairies. It is associated with barrier islands that are susceptible to the greatest impacts from hurricanes and wind events. It is distinguished from the South Texas Dunes by referencing the Barrier Island system that exists from Padre Island north to Galveston Bay. Deep sands that are susceptible to high wind events and hurricanes

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delineate this habitat type from the more interior coastal marshes and prairies although the grass and herbaceous species identified here are similar to the marsh and prairie systems.

Native Uncharacteristic Conditions

Transitional species following disturbance may inhabit the area for the first year following the event. Ragweed (Ambrosia spp.) is often common during this transition period.

Scale Description

Issues/Problems

Comments

For MZ36 this model was developed from the Rapid Assessment model R5BSSA (Bluestem - Saccahuista) by Ron Masters, Susanne Hickey and Judy Teague and reviewed by Douglas Zollner. Descriptive changes to the description and quantitative changes to the model resulted in a change in modelership for MZ36.

Rapid Assessment: For the Rapid Assessment Lee Elliott (TNC) also assisted with the model development. Live oak savanna and saline prairie communities were combined in this PNVG. Alternative succession was used to account for the small percentage of the landscape that would contain live oak savanna. For class C, grazing in combination with drought (wind/weather/stress) moves a small percentage of class C to class E, through reduced competition between oak and grass. Drought in class E can reduce a small percentage of the oaks thus pushing those areas to class B.

Vegetation Classes

Class A **35 %**

Early Development 1 All Structure

Upper Layer Lifeform

- [x] Herbaceous
- [ ] Shrub
- [ ] Tree

Fuel Model

3

Indicator Species and Canopy Position

SCHIZ4
Upper
SCLI11
Upper
PANIC
Upper
SPSP
Upper

Structure Data (for upper layer lifeform)

	Min	*Max*
Cover	0 %	50 %
Height	Herb 0m	Herb 0.5m
Tree Size Class		

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

0-1yrs. 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. Vegetation in this stage is sparse with fuel loading from 0.5-2 tons/acre. Fire can carry through fuels within six months post burn but will burn with greatly reduced intensity due to lack of old decadent and dead fuels.

Replacement fire was modeled with a three year MFRI and wind/weather/stress representing high tide events were modeled with a 20yr return interval. Replacement fire is used in the model to indicate that fires typically top-kill >75% of the upper canopy.

**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.

Class B **40 %**

Mid Development 1 Closed

Upper Layer Lifeform

- [x] Herbaceous
- [ ] Shrub
- [ ] Tree

Fuel Model

3

Indicator Species and Canopy Position

SCHIZ4
Upper
SCLI11
Upper
PANIC
Upper
SPSP
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	51 %	90 %
Height	Herb 0.6m	Herb >1.1m
Tree Size Class		

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

2-3yrs. Mixed forb and grass community either somewhat recovered from inundation with water or continuing post burn development. Can be somewhat forb dominated. Most diverse stage with fuel loading ranging from 2-6 tons/acre. Fire will carry through fuels more readily as the early succesional plants offer dried vegetation for a more viable fuel bed.

Replacement fire was modeled with a three year MFRI and wind/weather/stress representing high tide events were modeled with a 20yr return interval. Replacement fire is used in the model to indicate that fires typically top-kill >75% of the upper canopy.

The primary distinction between class B and class C is that class B will have higher plant diversity and less dense canopy. Class C may have less plant diversity and will have a denser more decadent canopy as time since fire increases.

Class C **25 %**

Late Development 1 Closed

Upper Layer Lifeform

- [x] Herbaceous
- [ ] Shrub
- [ ] Tree

Fuel Model

3

Indicator Species and Canopy Position

RATIB
Upper
RUDBE
Upper
SCHIZ4
Upper
SCLI11
Upper

Structure Data (for upper layer lifeform)

	Min	Max
Cover	91 %	100 %
Height	Herb 0.6m	Herb >1.1m
Tree Size Class		

- [ ] Upper layer lifeform differs from dominant lifeform.

Description

4yrs+. Forb dominated site with cordgrass, bluestem, marshhay and seaoats. Diversity of species decreases with maturity of this stand and tons per acre of fuel loading is found between 4-10 tons/acre. Fire will carry rapidly through fuels as there is an abundance of dried decadent fuels to offer a continuous fuel bed. Fire eliminates these decadent fuels and cycles nutrients.

Replacement fire was modeled with a three year MFRI and wind/weather/stress representing high tide events were modeled with a 20yr return interval. Replacement fire is used in the model to indicate that fires typically top-kill >75% of the upper canopy.

**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.

Class D **0 %**

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Class E **0 %**

[Not Used] [Not Used]

Upper Layer Lifeform

☐ Herbaceous
☐ Shrub
☐ Tree

Fuel Model

Indicator Species and Canopy Position

Structure Data (for upper layer lifeform)

	Min	Max
Cover	%	%
Height		
Tree Size Class		

☐ Upper layer lifeform differs from dominant lifeform.

Description

Disturbances

Fire Regime Group:** **II**

Historical Fire Size (acres)

Avg 100000
Min 0
Max 300000

Sources of Fire Regime Data

☑ Literature
☐ Local Data
☑ Expert Estimate

Fire Intervals

	Avg FI	Min FI	Max FI	Probability	Percent of All Fires
Replacement	3	1	3	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.

Additional Disturbances Modeled

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

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