14900

Gulf and Atlantic Coastal Plain Tidal Marsh Systems

BpS Model/Description Version: Aug. 2020

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Vegetation Type

Herbaceous Wetland

Map Zones

36

Geographic Range

Southeast Texas from Galveston Bay to Rio Grande Delta, as far inland as tidal influence.

Biophysical Site Description

This biophysical setting (BpS) occurs on the Coastal Plains of Texas. Synonyms of this BpS are coastal marsh and saltmarsh. Elevation ranges are generally from 0-2m above sea level, and are located along bay shorelines, river and tidal deltas. Soils range from sandy along the back-island areas to silts and clays within sheltered lagoons and shorelines. Vegetated marshes are situated in broad bands in the northern portion of map zone (MZ)36, becoming narrow fringe habitats along the south-central portions, then limited to freshwater drainage areas in the Laguna Madre system.

Vegetation Description

Plant zonation is driven by elevation and salinity gradients. Intertidal marshes with salinities averaging 25-35 ppt are composed of predominantly monotypic stands of smooth cordgrass (*Spartina alterniflora*), grading into unvegetated flats with glasswort (*Salicornia* spp.) in the more hypersaline soils around Laguna Madre. Mid-marsh species include marshhay cordgrass (*Spartina patens*) occurring in salinities 10-25 ppt and tolerating irregularly inundation. This zone can be quite expansive around river mouths, but are limited in spatial coverage south of Guadalupe delta. Other intermediate species may predominate in areas of concentrated freshwater inflow, such as seashore paspalum (*Paspalum vaginatum*) and Olney bulrush (*Schoenoplectus americanus*). High marsh zones exhibit the highest species diversity, including grasses such as saltgrass (*Distichlis spicata*), shoregrass (*Monanthochloe littoralis*), and seashore dropseed (*Sporobolus virgnicus*) and forbs such as sea ox-eye daisy (*Leucanthemum vulgare*), camphor daisy (*Rayjacksonia phyllocephala*), and sumpweed (*Cyclachaena xanthifolia*). Recently, minor amounts of black mangroves (*Avicennia germinans*) have become established in the mid-marsh zones of higher salinity bays in the mid and lower portions of the zone.

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| SPAL | *Spartina alterniflora* | Smooth cordgrass |
| SPPA | *Spartina patens* | Saltmeadow cordgrass |
| SCAM6 | *Schoenoplectus americanus* | Chairmaker's bulrush |
| PAVA | *Paspalum vaginatum* | Seashore paspalum |
| DISP | *Distichlis spicata* | Inland saltgrass |
| BOFR | *Borrichia frutescens* | Bushy seaside tansy |

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

Disturbance Description

The area is subject to infrequent wildfire either from lightning to frequent anthropogenic fire in the mid-marsh areas. Ignition fires may occur from lightning in the intertidal zone, although it probably has low spread due to high fuel moisture. Flooding from tropical storms does not have a major impact on this system, unless high waters are sustained through coastal flooding from high rainfall levels in the watershed.

Herbivory from native ungulates and waterfowl were additional disturbance factors that can set back productivity more than species composition changes. Geese are predominant grazers in the intermediate and brackish zones where tubers of Olney bulrush are prevalent. Repetitive goose eatouts in the same location may result in formation of open water habitat. In areas that burn during drier conditions, saltgrass may colonize the area and ameliorate soil salinity through shading and facilitate regrowth of more competitive species.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 27 | 100 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) |  |  |  |  |
| All Fires | 27 | 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

This BpS ranges in relative coverage as being abundant along the northern portions of the mapzone to being restricted to narrow fringes in the south central areas, as related to decreases in rainfall and increase in evapotranspiration from north to south. Historical estimates of coastal marsh in Texas in 1955 totaled 387,000ac; whereas in 1992 about 356,000ac remain.

Adjacency or Identification Concerns

This BpS grades into BpS1437 (Texas Coast Dune and Deep Sand Grassland) or estuarine waters. The western edge is bordered by either BpS 1486 (Texas-Louisiana Saline Coastal Prairie), BpS 1434 (Texas-Louisiana Coastal Prairie) or BpS 1338 (Central Texas Coastal Fringe Forest and Woodland).

Issues or Problems

There is very little historical data about this system prior to 1950. The construction of the Gulf Intracoastal Waterway was initiated in the 1940s, and effectively resulted in conversion of coastal marsh to deepwater habitat, or upland (deposition of dredged material). Additional changes to bay circulation may have caused conversion of coastal marsh to unvegetated flats.

Reductions of fresh flows from upstream reservoir construction has increased bay salinities and reduced nutrient and sediment pulses in the estuarine systems. This impact has not been quantitatively evaluated on coastal marshes.

Brazilian peppertree (*Schinus terebinthifolius*) is one exotic species that has invaded high marsh habitats in intermediate soil salinities.

Native Uncharacteristic Conditions

In areas where freshwater inflows are concentrated, cattail (*Typha* spp.) can establish in coastal marshes and is difficult to eradicate.

Comments

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 | B | B | B | B | B |
| Herb | 0.5-1.0 | A | A | A | A | A | B | B | B | B | B |
| Herb | >1.0 | A | A | A | A | A | B | B | B | B | B |
| Shrub | 0-0.5 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 0.5-1.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | 1.0-3.0 | B | B | B | B | B | B | B | B | B | B |
| Shrub | >3.0 | B | B | B | B | B | B | B | B | B | B |
| 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 | UN | UN | UN | UN | UN | UN | UN | UN | UN | UN |
| Tree | >50 | UN | UN | 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 8 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SPAL | Spartina alterniflora | Smooth cordgrass | Upper |
| DISP | Distichlis spicata | Inland saltgrass | Upper |
| BOFR | Borrichia frutescens | Bushy seaside tansy | Upper |
| SPPA | Spartina patens | Saltmeadow cordgrass | Low-Mid |

Description

This grassland class is post disturbance (replacement fire) characterized by open semi-canopy in areas with normal fire frequency. A higher proportion of vegetation will include saltgrass, the primary colonizing grass species after disturbance occurs.

This condition is characterized by lower seral stage plant communities. Heavy herbivory following the fire can increase coverage by saltgrass. Continual herbivory can result in unvegetated flats or open water ponds.

*Maximum Tree Size Class*  
None

Class B 92 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SPAL | Spartina alterniflora | Smooth cordgrass | Upper |
| SPPA | Spartina patens | Saltmeadow cordgrass | Upper |
| BOFR | Borrichia frutescens | Bushy seaside tansy | Upper |
| DISP | Distichlis spicata | Inland saltgrass | Middle |

Description

This grassland class is characterized by a semi-closed canopy. Replacement fires are rare and are more likely to occur in the mid-marsh (marshhay cordgrass and chairmaker's bulrush) vegetation zone. This fire regime infrequently impacts either the low marsh (smooth cordgrass) or high marsh (sea ox-eye daisy) vegetation zones.

*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** |
| Native Grazing | Early1:ALL | Early1:ALL | 0.1 | 10 | Yes | 0 |
| Optional 1 | Mid1:CLS | Early1:ALL | 0.01 | 100 | Yes | 0 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.03 | 33 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.04 | 25 | Yes | 0 |

Optional Disturbances

Optional 1: hurricane flooding

References

Moulton, Daniel W., T.E. Dahl and D.M. Dall. 1997. Texas Coastal Wetlands: Status and Trends, Mid-1950’s to Early 1990’s. USDI Fish and Wildlife Service. Albuquerque, NM, 32 pp.

NatureServe. 2007. International Ecological Classification Standard: Terrestrial Ecological Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of 10 February 2007.

Smith, E.H. 1996. Coastal marshes. In: Tunnell, J.W., Q.R. Dokken, E.H. Smith, and K. Withers (eds.) Current Status and Historical Trends of the Estuarine Living Resources within the Corpus Christi Bay National Estuary Program Study Area, Volume 1, CCBNEP-06A, Corpus Christi Bay National Estuary Program, Corpus Christi, Texas. 543 pp.