13390

West Gulf Coastal Plain Chenier and Upper Texas Coastal Fringe Forest and Woodland

BpS Model/Description Version: Aug. 2020

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| **Modelers** |  | **Reviewers** |  |
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Vegetation Type

Forest and Woodland

Map Zones

36, 37, 98

Geographic Range

This system includes a range of woody vegetation present along the northern Gulf of Mexico, from Louisiana to the upper Texas coast, including shell ridges along the coast and bay margins, coastal salt domes, stranded ancient barrier ridges (Ingleside barrier strandplain) and "chenier" (French for oak) ridges of the chenier plain.

Biophysical Site Description

The vegetation is dependent on fresh water from rain, since the surrounding marsh varies from fresh to oligohaline to brackish and even the open Gulf waters. The slight to modest elevation of the cheniers (from a few centimeters to 3m in height) and soil porosity (mostly coarse sand and shell) facilitates absorption of rainwater into the cheniers. No natural ponds are on the cheniers, though recent surface mining has resulted in numerous deep ponds that may be somewhat freshwater to quite brackish. The cheniers are critically important stopover sites for neotropical trans-Gulf migratory birds, mostly federally protected songbirds. The cheniers present vegetation and arthropod food sources for the birds on both legs of the trans-Gulf migration.

It is heterogeneous in physiognomy, including forests, woodlands and shrublands. The chenier plain is characterized by a prograding coastline replenished by sediments carried to the Gulf initially by the Mississippi and subsequently the Atchafalaya and other rivers. It is void of barrier islands and shoreline, sediments are reworked by waves into beach ridges, sometimes with a substantial shell component. This process has been continuing since the last glacial retreat, and as the coast line progrades, older beach ridges are left as interior ridges surrounded by marsh. These interior beach ridges are referred to as "cheniers" because they were historically dominated by live oak (*Quercus virginiana*). Ridges parallel the coast and are usually three meters above mean sea level. Today, very few remain vegetated by a live oak-dominated forest because many have been cleared for agriculture. Though not confined to coastal areas, salt domes are a distinctive feature along the Gulf Coast of upper Texas and Louisiana where they often form a drastic contrast to the low-lying Coastal Plain sediments surrounding them. Formed by the rise of salt masses which push up overlying strata, salt domes may rise 30m above the surrounding landscape. The natural vegetation of cheniers and salt domes are oak-dominated woodlands and forests. The Ingleside barrier strandplain is a Pleistocene barrier ridge that outcrops discontinuously along the Texas coast. A note on terminology from Barrow et al. (2006). "The word derives from the French 'chene', meaning oak and in that language 'cheniere' is literally an oak grove. It is applied loosely to any grove of trees, predominantly oak in character. Scientifically, the term "chenier" is applied to certain land formations, whose origin and character are quite distinctive, and unlike most land formations in general." The description and model presented here are primarily based on the cheniers of Louisiana.

Vegetation Description

Pre-Columbian vegetation was usually a closed canopy dominated by live oak (*Q. virginiana*) and sugarberry (*Celtis laevigata*) with a general dominance of *Celtis* on the cheniers nearest the coast and *Q. virginiana* on the inland cheniers. Subcanopy species include Hercules’ club (*Zanthoxylum clava-herculis*), green hawthorn (*Crataegus viridis*), and sweet acacia (*Acacia farnesiana*).

BpS Dominant and Indicator Species

|  |  |  |
| --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** |
| QUVI | *Quercus virginiana* | Live oak |
| CELA | *Celtis laevigata* | Sugarberry |
| ZACL | *Zanthoxylum clava-herculis* | Hercules' club |
| CRVI2 | *Crataegus viridis* | Green hawthorn |
| ACFA | *Acacia farnesiana* | Sweet acacia |
| MOCE2 | *Morella cerifera* | Wax myrtle |

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

Disturbance Description

Fires in the adjacent marsh, whether of anthropogenic or lightning origin, probably swept into the cheniers and were carried by the coarse groundcover and leaf litter. It is unlikely that flame heights reached into the canopy. These fuels were probably insufficient to kill the thick-barked, mature *Q. virginiana* found in the canopy but probably damaged or killed *C. laevagata* and other thin-barked dominant or codominant species. Subcanopy, shrub, and herbaceous species, as well as seedlings of the canopy species were probably severely impacted by fire when there was enough fuel to sustain a ground fire. The *rhizomotous C. viridis* and lignotuberous greenbriar (*Smilax* spp.), yaupon (*Ilex vomitoria*), and wax myrtle (*Morella cerifera*) probably survived the surface fires, although the aerial portions may have been killed. Severe hurricanes impact the cheniers. The winds defoliate the vegetation, snap limbs, and may uproot trees. The storm surges carry debris into the cheniers, which may mechanically impact the vegetation as well as deposit salt on the vegetation surfaces and into the soil, essentially poisoning the species that are not resistant to salinity. Loss of vegetation due to fire or tropic weather systems may directly impact the food resources required by trans-Gulf migratory birds.

Fire Frequency

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Severity** | **Avg FI** | **Percent of All Fires** | **Min FI** | **Max FI** |
| Replacement | 87 | 21 |  |  |
| Moderate (Mixed) |  |  |  |  |
| Low (Surface) | 23 | 79 |  |  |
| All Fires | 18 | 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

Cheniers vary in areal extent from less than a hectare for midden forests to more than 100km in length and nearly a kilometer in width for the largest cheniers.

Adjacency or Identification Concerns

Remote sensing identification of the forested cheniers is usually unambiguous since the forested community stands in contrast to the surrounding marsh vegetation. However, natural cheniers share vegetation characteristics with dredge spoil, though spoil is usually deposited in straight, uniform lines immediately adjacent to a channel or road.

Issues or Problems

The aforementioned recent quarrying and resultant loss of land and introduction of brackish pools has resulted in permanent loss of chenier habitat. In addition, cattle grazing and human habitation have resulted in introduction of numerous exotic species, bahiagrass (*Paspalum notatum*), is a common species where cattle graze. Transportation and utilities infrastructure on the cheniers have severely degraded the natural forest. Exotic forest species, especially the Chinese tallow tree (*Triadeca sebiferum*) and cherry laurel (*Prunus laurocerasus*) have become important canopy and subcanopy constituents. These species provide relatively poor sources of food for trans-Gulf migrants. Other ornamental vegetation has been introduced around homesites and may become naturalized on the cheniers.

Modeler noted that this description was based on the cheniers of Louisiana and needed to be reviewed by those familiar with the Texas flora and coastal plant communities, but regional lead was not able to obtain review.

Native Uncharacteristic Conditions

Loblolly pine (*Pinus taeda*), slash pine (*P. elliottii*), and sycamore (*Platanus occidentalis*) introduced around homesites are apparently naturally reseeding.

Comments

A split of Cheniere (oak grove) from Fringe Woodland and Forest was suggested due to differences in vegetation, elevation and proximity to the Gulf.

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 | A | A | A |
| Herb | >1.0 | A | A | A | A | A | A | A | A | A | A |
| 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 | B | B | B | B | B | B | B | B |
| Tree | 5-10 | B | B | B | C | C | C | C | C | C | C |
| Tree | 10-25 | B | B | B | C | C | C | C | C | C | C |
| Tree | 25-50 | B | B | B | C | C | C | C | C | C | C |
| Tree | >50 | B | B | B | C | C | C | C | C | C | C |

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 15 Early Development 1 - All Structures

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| SCHIZ4 | Schizachyrium | Little bluestem | Middle |
| CYDA | Cynodon dactylon | Bermudagrass | Lower |
| LYBE | Lycium berlandieri | Berlandier's wolfberry | Upper |
| PANO2 | Paspalum notatum | Bahiagrass | None |

Description

This class consists of the chenier devoid of forest vegetation. Grasses will dominate the early successional/regenerative chenier, maybe due to extreme fire or hurricane conditions. In either case, all canopy, subcanopy, and shrubs species may be killed. Regeneration may depend entirely on the seedbank or transport from off-site if a storm surge of sufficient magnitude, duration and salinity impacts the chenier. Lesser impacts from lower-intensity storms or from fires may allow regeneration from subsurface germinative sources (seeds, tubers, rhizomes, etc.). Little bluestem grass (*Schizachyrium scoparium*), bermuda grass (*Cynodon dactylon*), and wolfberry (*Lycium berlandieri*) are common pioneer species. In modern times, the forest has been removed for cattle grazing, for lawns around homes and businesses, and along transportation and utilities rights-of-way.

*Maximum Tree Size Class*  
None

Class B 1 Mid Development 1 - Closed

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUVI | Quercus virginiana | Live oak | Upper |
| CELA | Celtis laevigata | Sugarberry | Upper |
| CRVI2 | Crataegus viridis | Green hawthorn | Mid-Upper |
| MOCE2 | Morella cerifera | Wax myrtle | Middle |

Description

This class consists of regenerating forest and of low-lying areas immediately adjacent to the marsh where frequent flooding or saline conditions limit woody growth. Grazing may retard tree growth and canopy development.

*Maximum Tree Size Class*  
None

Class C 84 Mid Development 1 - Open

Indicator Species

|  |  |  |  |
| --- | --- | --- | --- |
| **Symbol** | **Scientific Name** | **Common Name** | **Canopy Position** |
| QUVI | Quercus virginiana | Live oak | Upper |
| CELA | Celtis laevigata | Sugarberry | Upper |
| ZACL | Zanthoxylum clava-herculis | Hercules' club | Mid-Upper |
| ACFA | Acacia farnesiana | Sweet acacia | Low-Mid |

Description

This class consists of mature forest with a closed canopy and a low-density subcanopy and shrub layer. Herbaceous layer varies from sparse to luxuriant. Grazing may inhibit shrub and herbaceous layers (though not included in the model).

*Maximum Tree Size Class*  
Very Large >33"DBH

Model Parameters

Deterministic Transitions

|  |  |  |  |
| --- | --- | --- | --- |
| **From Class** | **Begins at (yr)** | **Succeeds to** | **After (years)** |
| Early1:ALL | 0 | Early1:ALL | 999 |
| Mid1:OPN | 1 | Mid1:OPN | 999 |
| Mid1:CLS | 1 | 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** |
| Alternative Succession | Early1:ALL | Mid1:CLS | 1 | 1 | Yes | 15 |
| Replacement Fire | Early1:ALL | Early1:ALL | 0.05 | 20 | Yes | 0 |
| Native Grazing | Early1:ALL | Early1:ALL | 0.05 | 20 | No | 0 |
| Replacement Fire | Mid1:OPN | Early1:ALL | 0.005 | 200 | Yes | 0 |
| Wind or Weather or Stress | Mid1:OPN | Early1:ALL | 0.007 | 143 | Yes | 0 |
| Surface Fire | Mid1:OPN | Mid1:OPN | 0.05 | 20 | No | 0 |
| Alternative Succession | Mid1:CLS | Mid1:OPN | 1 | 1 | Yes | 15 |
| Wind or Weather or Stress | Mid1:CLS | Early1:ALL | 0.007 | 143 | Yes | 0 |
| Replacement Fire | Mid1:CLS | Early1:ALL | 0.02 | 50 | Yes | 0 |
| Surface Fire | Mid1:CLS | Mid1:CLS | 0.03 | 33 | No | 0 |

References

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

NatureServe. 2006. International Ecological Classification Standard: Terrestrial Ecological

Classifications. NatureServe Central Databases. Arlington, VA, U.S.A. Data current as of

18 July 2006.