

13840

Mississippi Delta Maritime Forest

BpS Model/Description Version: Aug. 2020

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Modelers		Reviewers	
Keith Fisher	keith_fisher@tnc.org	None	None
None	None	None	None
None	None	None	None

Vegetation Type

Forest and Woodland

Map Zones

98

Geographic Range

East Gulf Coastal Plain Maritime Forest occurs on barrier islands and coastal zones along the northern Gulf of Mexico from the Florida Panhandle west to the mouth of the Mississippi River in Louisiana (NatureServe 2006).

Biophysical Site Description

This biophysical setting (BpS) occurs on stable dune and swale topography in somewhat more protected environments generally landward of the foredune, and transitional backdune zones of coastal beaches and barrier islands along the northern Gulf of Mexico. The system typically includes a series of stabilized dunes and interdunal swales oriented parallel to the coastline. Soils are primarily wind- and wave-deposited, well-drained, quartz sands of Appalachian origin (Drehle 1973, Johnson and Barbour 1990) that have been stabilized long enough to support trees and shrubs. As the forest establishes, soil temperature fluctuations moderate and humus begins to build up over the well-drained sands, contributing to moisture retention and more mesic conditions (FNAI 1990). Soil moisture is typically higher in swales.

Vegetation Description

Johnson and Barbour (1990) describe the vegetation of St. Vincent Island as representative of north gulf coastal systems. In this description maritime forest occurs on a series of ridges and swales landward of the primary dune and coastal grassland. The ridges are vegetated by a mix of low salt spray pruned oaks including myrtle oak (*Quercus myrtifolia*) and sand live oak (*Q. geminata*), rosemary (*Ceratiola ericoides*), saw palmetto (*Serenoa repens*), wax myrtle (*Morella cerifera*), woody goldenrod (*Chrysoma pauciflosculosa*) and false rosemary (*Conradina canescens*). Swales are vegetated by pine flatwoods communities with an overstory of slash pine (*Pinus elliotii*), and an understory of gallberry (*Ilex glabra*), saw palmetto, wax myrtle and fetterbush (*Lyonia lucida*).

Huffman and Platt (2004) describe similar vegetation on Little St. George Island. They found scrub oaks (*Quercus chapmanii*, *Quercus myrtifolia*), conradina (*Conradina canescens*) and rosemary (*Ceratiola ericoides*) associated with slash pine on the dry dune ridges. The swales included an overstory of slash pine with a diverse herbaceous groundcover including muhly grass (*Muhlenbergia filipes*) and sawgrass (*Cladium jamaicense*). On larger coastal flats, mesic

pine savannas included a well-developed herbaceous groundcover flora similar to mainland flatwoods with an abundance of saw palmetto (*Serenoa repens*), wiregrass (*Aristida beyrichiana*) and ericaceous shrubs (*Vaccinium myrsinites*).

NatureServe (2006) indicates this system encompasses a mosaic of woody vegetation present on barrier islands and near-coastal strands including forests and/or shrublands. Major associations include:

- Sand pine (*Pinus clausa*) / myrtle oak / sand live oak / false rosemary woodland
- Slash Pine / yaupon holly (*Ilex vomitoria*) / saw palmetto / wax myrtle woodland
- Slash pine / saw palmetto gallberry / wax myrtle / yaupon holly woodland
- Slash pine / saltmeadow cordgrass (*Spartina patens*) / black rush (*Juncus roemerianus*) / switchgrass (*Panicum virgatum*) woodland
- Live oak (*Quercus virginiana*) / sand pine / pignut hickory (*Carya glabra*) / sand hickory (*C. pallida*) / saw palmetto forest
- Live oak / sparkleberry (*Vaccinium arboreum*) / yaupon holly forest
- Live oak / slash pine / sabal palm (*Sabal palmetto*) / red bay (*Persea borbonia*) / beautyberry (*Callicarpa americana*) forest.

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
QUMY	<i>Quercus myrtifolia</i>	Myrtle oak
QUGE2	<i>Quercus geminata</i>	Sand live oak
CEER3	<i>Ceratiola ericoides</i>	Sand heath
PIEL	<i>Pinus elliotii</i>	Slash pine
SERE2	<i>Serenoa repens</i>	Saw palmetto
MOCE2	<i>Morella cerifera</i>	Wax myrtle
ARBE7	<i>Aristida beyrichiana</i>	Beyrich threeawn
MUHLE	<i>Muhlenbergia</i>	Muhly

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

Disturbance Description

Maritime forest systems remain subject to periodic severe physical stresses, although less than coastal dune and grassland systems. Vegetation structure and composition are influenced by salt spray and extreme disturbance events such as hurricanes, erosion, accretion, and sand burial. The most heavily salt-influenced examples may appear pruned or sculpted (NatureServe 2006).

Hurricanes frequently make landfall in the northern Gulf of Mexico and have a significant impact on coastal systems. Even when they do not make landfall in the region, the storm surge and wave action generated by an off-shore storm can have a significant impact. A total of 112 hurricanes made landfall from Wakulla County, Florida to Hancock County, Mississippi during the period 1926 to 2005 (Jarrell et al. 1992 with updates). From the period 1851 to 2004, 36 major hurricanes (Category 3 or higher) made landfall along the Gulf Coast from Louisiana to the Florida Panhandle (Blake et al. 2005). Hurricane associated storm surges can overwash the dune system and cause significant erosion and/or sand burial of maritime forests. Personal observations along coastal areas of the Florida panhandle region in 2005 revealed large areas of vegetation extending several hundred yards inland that were killed or significantly impacted by salt water inundation.

The role of fire in this system is poorly documented. Most of this system occurs on narrow barrier islands along the northern Gulf of Mexico. Florida Natural Areas Inventory (1990) indicates that the mesic conditions and insular locations of well-developed Maritime Hammock communities inhibit natural fires, which occur no more frequently than once every 26-100yrs. Liu et. al. (2003), in their study of sediment cores from Little Lake, Alabama, suggested that wildfires have been common in the coastal ecosystems in Alabama, however, they offered no frequency estimates. They did suggest a correlation between hurricanes and fire. This correlation was also supported by Meyers and van Lear (1998) who suggest that hurricane-fire interactions once played a major role in the development of ecosystems in the southern US, influencing their composition, structure, and pattern on the landscape. Huffman and Platt (2004) in their dendrochronological study of fire scars on slash pines on Little St. George Island indicate that from 1866 to 1904, the mean fire return interval was four years and most fires occurred during the growing season (generally April through July). This was prior to significant human activity on the island. They could not locate any trees that established prior to 1853 on the island and postulated that many were destroyed by a hurricane in 1851, or a fire following the hurricane.

The following fire return interval estimates were based on the Huffman and Platt study and the return interval in similar ecological systems on the mainland. Pine-dominated swales and flats most likely burned more frequently than the oak/rosemary dominated ridges. Fires were primarily light surface fires occurring every four years during the growing season. More intense replacement fires may have occurred following hurricanes, when more fuel was available because of storm damage. There is little fuel to sustain surface fires in the oak/rosemary dominated ridges. Fires in this vegetation type are typically replacement fires that burn through the shrub crowns. The return interval here was estimated at 25-100yrs, and may have occurred following a hurricane or other intense storm related event when more fuel was available and fire intensity was higher.

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement	127	3	25	150
Moderate (Mixed)				
Low (Surface)	4	97	3	5
All Fires	4	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 system is restricted primarily to linear coastal barrier islands along the northeastern Gulf of Mexico coast. The width of this linear system is unknown. The Gulf coast of Florida (including the peninsular region), Alabama and Mississippi includes ~630 linear miles of barrier island (US Army Corps of Engineers 2002).

Disturbances, particularly large storms, can affect a high percentage of this system at one time. The impact of fire on this system is poorly documented.

Adjacency or Identification Concerns

Shrub-dominated portions of this system may also be called coastal strand. Tree-dominated portions may also be called coastal or maritime hammock. Pine-dominated sections may be called pine flatwoods.

Coastal development and alterations including real estate development, beach armoring, beach re-nourishment, and erosion are a significant threat to this ecological system. Morton et al. (2004) indicates sizable portions of the gulf shoreline are eroding at average long-term rates as high as 1-3m/yr, despite beach armoring and re-nourishment efforts.

Issues or Problems

Limited information describing the frequency of fire or fire effects on this system could be located, particularly on the scrub dominated dune ridges.

Native Uncharacteristic Conditions

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	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	A	A	A	A	A	B	B	B	B	B
Shrub	0.5-1.0	A	A	A	A	A	B	B	B	B	B
Shrub	1.0-3.0	A	A	A	A	A	B	B	B	B	B
Shrub	>3.0	A	A	A	A	A	B	B	B	B	B
Tree	0-5	C	C	C	C	C	B	B	B	B	B
Tree	5-10	C	C	C	C	C	E	E	E	E	E
Tree	10-25	D	D	D	D	D	E	E	E	E	E
Tree	25-50	D	D	D	D	D	E	E	E	E	E
Tree	>50	D	D	D	D	D	E	E	E	E	E

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	22	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
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Class C**47****Mid Development 1 - Open**

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEL	<i>Pinus elliottii</i>	Slash pine	Upper
SERE2	<i>Serenoa repens</i>	Saw palmetto	Low-Mid
ARBE7	<i>Aristida beyrichiana</i>	Beyrich threeawn	Lower
ILGL	<i>Ilex glabra</i>	Inkberry	Low-Mid

Description

This class includes trees in the swales and larger coastal flats with an understory of scattered shrubs and grasses or other herbs. Canopy closure is generally between 30-50%. The stand experiences a light surface fire which maintains an open, diverse understory of scattered low shrubs and grasses. Replacement fires may occur typically following a hurricane. Hurricanes and other wind/weather related disturbances may impact this class several times per century, either through sand burial, overwash, or erosion. Chronic weather-related disturbances help maintain the open nature of the stand and were not considered a distinct disturbance event.

Maximum Tree Size Class

Pole 5-9" DBH

Class D**19****Late Development 1 - Open**

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
PIEL	<i>Pinus elliottii</i>	Slash pine	Upper
SERE2	<i>Serenoa repens</i>	Saw palmetto	Low-Mid
ARBE7	<i>Aristida beyrichiana</i>	Beyrich threeawn	Lower
ILGL	<i>Ilex glabra</i>	Inkberry	Low-Mid

Description

This class includes older trees in the swales and larger coastal flats with an understory of scattered shrubs and grasses or other herbs. Canopy closure is generally between 30-50%. The stand experiences a light surface fire which maintains an open, diverse understory of scattered low shrubs and grasses. Replacement fires typically follow a hurricane. Hurricanes and other wind/weather related disturbances may impact this class several times per century, either through sand burial, overwash, or erosion.

Maximum Tree Size Class

Medium 9-21"DBH

Class E**4****Late Development 1 - Closed**

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUGE2	Quercus geminata	Sand live oak	Upper
CAGL8	Carya glabra	Pignut hickory	Upper
SERE2	Serenoa repens	Saw palmetto	Low-Mid
ILVO	Ilex vomitoria	Yaupon	Low-Mid

Description

This class represents an advanced stage of the oak dominated scrub association that occurs in areas protected from coastal influences and fire. Trees are older and have developed a dense, almost continuous canopy. Canopy closure is generally >75%. Other tree species may occur in the canopy including pignut hickory, red bay and sabal palm. Understory vegetation may include saw palmetto, yaupon holly, beautyberry, sparkleberry and others. The ground cover vegetation is poorly developed.

Surface fires generally do not occur or cause little effect in this association because very little fine fuel is available. Replacement fires may occur typically following a hurricane that increases the amount of fuel available. Hurricanes may have the greatest impact to this association. Category 4 or 5 storms several times per century may return the stand to class A. More frequent but less intense storms may snap off or down older trees.

Maximum Tree Size Class

Large 21-33"DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	15
Mid1:OPN	16	Late1:OPN	60
Mid1:CLS	16	Late1:CLS	40
Late1:CLS	41	Late1:CLS	999
Late1:OPN	61	Late1:OPN	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
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.01	100	Yes	0
Replacement Fire	Early1:ALL	Early1:ALL	0.01	100	Yes	0
Surface Fire	Early1:ALL	Early1:ALL	0.25	4	No	0
Alternative Succession	Early1:ALL	Mid1:CLS	0.5	2	Yes	0
Replacement Fire	Mid1:OPN	Early1:ALL	0.007	143	Yes	0
Wind or Weather or	Mid1:OPN	Early1:ALL	0.01	100	Yes	0

Stress						
Surface Fire	Mid1:OPN	Mid1:OPN	0.25	4	No	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Replacement Fire	Mid1:CLS	Early1:ALL	0.01	100	Yes	0
Replacement Fire	Late1:OPN	Early1:ALL	0.007	143	Yes	0
Wind or Weather or Stress	Late1:OPN	Early1:ALL	0.01	100	Yes	0
Wind or Weather or Stress	Late1:OPN	Mid1:OPN	0.02	50	Yes	0
Surface Fire	Late1:OPN	Late1:OPN	0.25	4	No	0
Replacement Fire	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.01	100	Yes	0
Wind or Weather or Stress	Late1:CLS	Mid1:CLS	0.05	20	Yes	0

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