

13370

Southeast Florida Coastal Strand and Maritime Hammock

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Vegetation Type

Forest and Woodland

Map Zones

56

Geographic Range

This Biophysical Setting (BpS) occurs as occurs as a narrow band of hardwood forest and shrubland along the Atlantic coast of southeastern Florida (approximately Volusia County southward) (NatureServe 2006).

Biophysical Site Description

This BpS is found on stabilized, old coastal dunes, often with substantial shell components. Coastal strand communities are considered to be ecotonal between beach dunes and more inland maritime hammocks, and occur immediately inland of dunes (FNAI 1990, Johnson & Muller 1993a and b).

Vegetation Description

The maritime hammock vegetation is characterized by hardwood species with tropical affinities. The northern extent of this type is dominated by *Quercus virginiana* and *Sabal palmetto*, and is limited by periodic freezes and cold tolerance of tropical constituent species, such as *Guapira discolor* and *Exothea paniculata* (Johnson and Muller 1993a and b, NatureServe 2006). Other species may include *Ardisia escallonioides*, *Myrcianthes fragrans*, *Zanthoxylum fagara*, *Eugenia axillaris*, and *Psychotria nervosa*. Farther south, the canopy includes more tropical species, including *Sideroxylon foetidissimum*, *Guapira discolor*, and *Simarouba glauca*. *Sabal palmetto* is an important component throughout the range of this community (Johnson and Barbour 1990, Johnson and Muller 1993a and b).

The shrubby coastal strand vegetation is dominated by *Serenoa repens*, *Coccoloba uvifera*, *Sideroxylon tenax*, *Myrcianthes fragrans*, and dwarfed *Quercus virginiana*. In the southern portion of this range, the coastal strand communities also include tropical species such as *Eugenia foetida* and *Pithecellobium keyense* (Johnson & Barbour 1990, Johnson & Muller 1993a and b).

This system may be distinguished from southwest Florida coastal strand and maritime hammock (BpS 1336) by geographic location, presence of certain indicator species lacking from southwest type (*Guapira discolor* and *Exothea paniculata*) and relatively harsher coastal exposure. It is distinguished from coastal strand and maritime hammocks further north which contain temperate

species including *Persea borbonia*, *Magnolia grandiflora*, and *Juniperus virginiana* var. *silicicola* (Johnson and Muller 1993a and b).

BpS Dominant and Indicator Species

Symbol	Scientific Name	Common Name
QUVI	<i>Quercus virginiana</i>	Live oak
SERE2	<i>Serenoa repens</i>	Saw palmetto
SAPA	<i>Sabal palmetto</i>	Cabbage palmetto
MYFR	<i>Myrcianthes fragrans</i>	Twinberry
COUV	<i>Coccoloba uvifera</i>	Seagrape
GUDI	<i>Guapira discolor</i>	Beefree
EXPA	<i>Exothea paniculata</i>	Butterbough

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

Disturbance Description

Maritime hammock communities experienced relatively infrequent, light surface fires, with a fire return interval generally no more than 26-100yrs. The major source of disturbance in southeast Florida maritime hammocks was hurricanes and associated wind/weather events (FNAI 1990).

Maritime hammocks are relatively stable communities, as long as the canopy remains intact and the underlying landform is stable (FNAI 1990). Surface fires may help to maintain the open understory, and although *Serenoa* is flammable, its short stature generally prevents fire from being carried into the crown. Thus, crown fires are extremely rare, if non-existent (Davison & Bratton 1988).

Evidence indicates that other factors such as salt spray and storm overwash may control successional dynamics.

Coastal strand communities are considered ecotonal, and historically burned more frequently than maritime hammocks, possibly every 4-5yrs (Austin and Coleman-Marais 1977). However, there is some disagreement on this point. The low stature of strand is due to its being a recovery stage after storm destruction and salt spray pruning. Fire is not needed to explain coastal strands. On the east coast where the 1977 Austin and Coleman-Marais study was done, fire would have to come from the mainland (i.e., through a maritime hammock) and fight a strong headwind off the ocean (i.e., the prevailing easterlies) in order to burn strand which doesn't seem as though it would have happened very frequently (Johnson, personal communication).

In the absence of fire, it is likely that coastal strand communities will eventually succeed to maritime hammock, although it has been suggested that maritime influences alone are enough to prevent this succession (FNAI 1990).

Fire Frequency

Severity	Avg FI	Percent of All Fires	Min FI	Max FI
Replacement				
Moderate (Mixed)	242	6	100	500
Low (Surface)	15	94	10	50
All Fires	15	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

Most original stands of maritime hammock were <1000ac. They occurred as one element in a much more extensive coastal complex consisting of marshes, dune grasslands and coastal strand.

Adjacency or Identification Concerns

This BpS is closely related to southwest Florida maritime hammocks (BpS 1336) and may share some species overlap. LANDFIRE state-and-transition simulation models are very similar for both, although fire frequency values differ slightly.

Issues or Problems

This model assumes that the coastline is accreting over time; however, the time scale used in this model may not accurately represent the rate of accretion (which may occur much slower than modeled). Further revisions may be necessary to accommodate a more accurate timeline or a non-accreting coastline. Johnson (personal communication), suggests that it is the east coast of Florida that is mostly eroding with the exception of updrift (north) side of jetties.

Coastal strand and maritime hammock are some of, if not the most rapidly disappearing communities in Florida. The close proximity to the beach, as well as being slightly elevated and protected, makes these communities prime targets for development. In addition, they may be replaced by pure stands of the exotic Australian pine (*Casuarina equisetifolia*) which is a faster colonizer of beaches cleared by storm overwash than are the native species (Johnson, 1994)

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

Description

Class A	5	Early Development 1 - All Structures
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
IPPE	<i>Ipomoea pes-caprae</i>	Bayhops	All
PAVA	<i>Paspalum vaginatum</i>	Seashore paspalum	All
OKHY	<i>Okenia hypogaea</i>	Burrowing four o'clock	All
CALA2	<i>Cakile lanceolata</i>	Coastal searocket	All

Description

Class A represents the exposed upper beach and bare sand dunes with extensive areas of sparse vegetative cover. This stage primarily results from storm/hurricane events, as well as formation of new dunes by wind or wave driven sand accretion. This is an unstable environment that is often disturbed (and also maintained) by waves from storms and high tides. Early colonizers may include *Ipomoea pes-caprae* and *Paspalum distichum*.

Maximum Tree Size Class

None

Class B	13	Mid Development 1 - Open
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Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
UNPA	Uniola paniculata	Seaoats	All
SEPO2	Sesuvium portulacastrum	Shoreline seapurslane	All
PAAM2	Panicum amarum	Bitter panicgrass	All
IVIM	Iva imbricata	Seacoast marshelder	All

Description

Class B represents a foredune, created as plants colonize the exposed sand dunes and windblown sand accumulates around them. Plant species are continually growing upward as they are constantly buried by windblown sand from the beach. Plants include salt-tolerant herbs, succulents, and shrubs, and may include *Sesuvium portulacastrum*, *Scaevola plumieri*, *Sporobolus virginicus*, *Uniola paniculata*, *Iva imbricata*, *Distichlis spicata*, *Canavalia rosea*, and *Spartina patens*. Disturbances that affect this class include hurricanes and storms of varying severity and frequency. Fire is absent.

Maximum Tree Size Class

None

Class C 40 Mid Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
SERE2	<i>Serenoa repens</i>	Saw palmetto	All
QUVI	<i>Quercus virginiana</i>	Live oak	All
COUV	<i>Coccoloba uvifera</i>	Seagrape	All
MYFR	<i>Myrcianthes fragrans</i>	Twinberry	All

Description

Class C represents the early to mature coastal strand, which forms a transitional zone between the dunes and the maritime forest. The coastal strand will develop as the foredunes become more well developed and provide some protection for species less tolerant of sand burial to survive. This coastal strand community is influenced by salt spray, and it is possible that such maritime influences (in addition to fire) help prevent succession to a forest community. The coastal strand is dominated by dense shrubs, generally of a low stature, and common species include *Serenoa repens*, *Quercus virginiana* (shrub form), *Myrcianthes fragrans* (in the northern portion of this system's range), *Coccoloba uvifera*, and *Sideroxylon tenax*. Further to the south (south of Martin County), more tropical species are found, including *Eugenia foetida* and *Chicocca alba*. Herbs may or may not be present. "Closed" here refers to the nearly closed shrub layer, which is often very dense and sometimes nearly impenetrable. Disturbances that affect this class include hurricanes and storms of varying severity and frequency. Fire is relatively infrequent.

Maximum Tree Size Class

Seedling <4.5ft

Class D 19 Late Development 1 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
COUV	<i>Coccoloba uvifera</i>	Seagrape	All
SAPA	<i>Sabal palmetto</i>	Cabbage palmetto	All
EUFO3	<i>Eugenia foetida</i>	Boxleaf stopper	All

Description

Class D represents a mid to late-succession coastal strand, characterized by a dense shrub layer with scattered seedlings, saplings and small trees. Although there may be saplings or small trees, the shrub layer is still the dominant lifeform. Canopy closure of the shrub layer would be ~50-100%, with occasional gaps due to storm events or patches of severe fire. The height of the shrub layer would be ~1-3 m. Openings in the shrub layer, due to storm or major fire events, allow for tree species to become established. Interdunal areas with a higher moisture content may also allow for tree species to become established. Plant species include a mix of coastal strand and

hammock species, with temperate species occurring in the extreme northern portion of this range and more tropical species to the south (south of St. Lucie County). Disturbances that affect this class include hurricanes and storms of varying severity and frequency.

Maximum Tree Size Class

Pole 5-9" DBH

Class E 23 Late Development 2 - Closed

Indicator Species

Symbol	Scientific Name	Common Name	Canopy Position
QUVI	<i>Quercus virginiana</i>	Live oak	All
SAPA	<i>Sabal palmetto</i>	Cabbage palmetto	All
GUDI	<i>Guapira discolor</i>	Beefree	All
EXPA	<i>Exothea paniculata</i>	Butterbough	All

Description

Class E represents the old-growth maritime hammock community, characterized by a closed canopy of temperate and tropical tree species and an open-to-dense understory of shrubs, tree saplings, and vines. In the northern range of this system, typical canopy species include *Quercus virginiana*, *Sabal palmetto*, and *Persea borbonia*, whereas in the southern range of this system, the canopy is dominated by tropical species such as *Bursera simarouba*, *Ficus aurea*, *Guapira discolor*, *Exothea paniculata*, *Simarouba glauca*, *Coccoloba diversifolia*, and *Mastichodendron foetidissimum*. Other species include *Ardisia escallonioides*, *Rapanea punctata*, *Zanthoxylum fagara*, *Zanthoxylum clava-herculis*, *Eugenia axillaris*, *Psychotria nervosa*, and *Myrcianthes fragrans* (north of St. Lucie County). *Serenoa repens* is also a dominant understory component of the maritime hammock.

Maritime hammocks form on old coastal dunes that have become stabilized over time, and have allowed for the establishment of tree seedlings. Maritime hammocks generally start as isolated strips of trees that gradually join together to become a continuous forest. Natural fire is rare in the maritime hammock, probably occurring no more than once every 26-100yrs. However, maritime hammocks are relatively stable, and as long as the canopy remains intact and the underlying landform is not disturbed, fire will not severely impact the hammock. The main disturbances that affect this community are hurricanes and storms of varying severity and frequency.

Maximum Tree Size Class

Very Large >33"DBH

Model Parameters

Deterministic Transitions

From Class	Begins at (yr)	Succeeds to	After (years)
Early1:ALL	0	Mid1:OPN	7
Mid1:OPN	8	Mid1:CLS	19

Mid1:CLS	20	Late1:CLS	59
Late1:CLS	60	Late2:CLS	99
Late2:CLS	100	Late2: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
Wind or Weather or Stress	Early1:ALL	Early1:ALL	0.1	10	Yes	0
Wind or Weather or Stress	Mid1:OPN	Early1:ALL	0.01	100	Yes	0
Wind or Weather or Stress	Mid1:OPN	Mid1:OPN	0.05	20	No	0
Mixed Fire	Mid1:CLS	Mid1:OPN	0.005	200	Yes	0
Wind or Weather or Stress	Mid1:CLS	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Mid1:CLS	Mid1:OPN	0.01	100	Yes	0
Wind or Weather or Stress	Mid1:CLS	Mid1:CLS	0.1	10	No	0
Surface Fire	Mid1:CLS	Mid1:CLS	0.1	10	No	0
Wind or Weather or Stress	Late1:CLS	Mid1:OPN	0.005	200	Yes	0
Mixed Fire	Late1:CLS	Mid1:CLS	0.005	200	Yes	0
Wind or Weather or Stress	Late1:CLS	Early1:ALL	0.005	200	Yes	0
Wind or Weather or Stress	Late1:CLS	Mid1:CLS	0.01	100	Yes	0
Surface Fire	Late1:CLS	Late1:CLS	0.1	10	No	0
Wind or Weather or Stress	Late2:CLS	Early1:ALL	0.002	500	Yes	0
Mixed Fire	Late2:CLS	Mid1:CLS	0.005	200	Yes	0
Wind or Weather or Stress	Late2:CLS	Late1:CLS	0.005	200	Yes	0
Surface Fire	Late2:CLS	Late2:CLS	0.02	50	No	0

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