

Native Plants for Coastal Dune Restoration: What, When, and How for Florida



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Native Plants for Coastal Dune Restoration: What, When, and How for Florida

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Native Plants for Coastal Dune Restoration Sites in Florida¹

Common name	Scientific name	Most likely occurrence	
		Frontal Zone	Backdune Zone
Grasses			
Saltgrass	<i>Distichlis spicata</i>		X
Gulfhairawn muhly	<i>Muhlenbergia filipes</i>	X	
Bitter panicum, bitter panicgrass	<i>Panicum amarum</i>	X	
Seashore paspalum	<i>Paspalum vaginatum</i>	X	
Seacoast bluestem, coastal little bluestem	<i>Schizachyrium</i> spp.	X	
Saltmeadow cordgrass, marshhay cordgrass	<i>Spartina patens</i>	X	
Seashore dropseed	<i>Sporobolus virginicus</i>	X	
Seaoats	<i>Uniola paniculata</i>	X	
Other herbaceous plants			
Searocket	<i>Cakile</i> spp.	X	
Baybean, beachbean	<i>Canavalia rosea</i>	X	
Beach sunflower	<i>Helianthus debilis</i>	X	
Largeleaf pennywort	<i>Hydrocotyle bonariensis</i>		X
Beach morningglory, fiddle-leaf morningglory	<i>Ipomoea imperati</i>	X	
Railroad vine, bayhops	<i>Ipomoea pes-caprae</i>	X	
Seapurslane, shoreline purslane	<i>Sesuvium portulacastrum</i>	X	
Trees and shrubs			
Sea lavender, sea rosemary	<i>Argusia gnaphalodes</i>	X	
Florida rosemary, sandheath rosemary	<i>Ceratiola ericoides</i>		X
Cocoplum	<i>Chrysobalanus icaco</i>		X
Seagrape	<i>Coccoloba uvifera</i>	X	
Buttonwood, button mangrove	<i>Conocarpus erectus</i>		X
Silverleaf croton, gulf croton, beach tea	<i>Croton punctatus</i>		X
Coinvine	<i>Dalbergia ecastaphyllum</i>	X	
Yaupon holly	<i>Ilex vomitoria</i>		X
Seacoast marshelder, seashore elder	<i>Iva imbricata</i>	X	
Buttonsage, lantana	<i>Lantana involucrata</i>		X
Waxmyrtle, southern bayberry	<i>Morella cerifera</i>		X
Plum	<i>Prunus</i> spp.		X
Sand live oak	<i>Quercus geminata</i>		X
Cabbage palm, cabbage palmetto	<i>Sabal palmetto</i>		X
Gullfeed, inkberry	<i>Scaevola plumieri</i>	X	
Saw palmetto	<i>Serenoa repens</i>		X
Bay cedar	<i>Suriana maritima</i>		X
Spanish bayonet, aloe yucca	<i>Yucca aloifolia</i>	X	

¹Adapted from Craig, 1991.

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Introduction

This publication was developed to help people on Florida's coast select and use plants for coastal stabilization and habitat restoration. It is a revision and expansion of the United States Department of Agriculture, Natural Resources Conservation Service (USDA, NRCS) publication "Plants for Coastal Dunes of the Gulf and South Atlantic Coasts and Puerto Rico" by R.M. Craig, last published in 1991. The information presented in this publication is the result of the active selection and evaluation program of the USDA, NRCS, Brooksville Plant Materials Center as well as information from various state and federal sources. This information is intended for planners, landscapers, nursery operators, developers, and homeowners in Florida.

The plant species identified in this publication were selected based on their favorable characteristics for erosion control, frequency of occurrence, and dominance in their ecosystems. This publication describes the plants, their areas of occurrence, commercial availability, and special propagation or planting needs. Additionally, generalized information on coastal ecology and revegetation planning is provided.

Coastal Ecology

Influenced by both the ocean and terrestrial uplands, coastal areas are transitional areas or ecotones. Because the underlying geology of terrestrial ecosystems is stable, change in terrestrial systems is often measured in hundreds or thousands of human generations. In contrast, change in coastal ecosystems can be rapid occurring within a few generations or even within one human lifetime as the result of severe storms such as hurricanes (31, 33).

Wave action, the availability of offshore sand for beach formation, and its subsequent movement by wind are major factors influencing the development of coastal habitat (15). Consequently, coastal environments are characterized as low, moderate, or high energy depending on the wave and wind forces acting on the shoreline (2). In the south Atlantic and Gulf, high to moderate energy coastlines usually result in beach or dune habitat, while marshes or mangrove habitats occur on low energy coastlines. Of the more than 1300 miles of coastline in Florida, 800 miles are sandy beaches (2, 16).

Dune front at Ft. Walton Beach, FL, lost during Hurricane Ivan in 2005. The buildings were not damaged.



Starting north of Florida's eastern border, a strong longshore current flowing southward brings quartz sand sediments that originated in the Appalachian highlands (6, 16). This has resulted in an almost continuous line of barrier islands and beaches from north of the Florida border to Miami. Florida's east coast barrier island system, the largest barrier island system in the U.S., is thought to have originated over 11,000 years ago (15). The barrier islands are separated from the mainland by a series of lagoons. These shallow bodies of water are locally called rivers or lakes (6, 17).

From Miami southward around the tip of the peninsula and north to Naples, mangrove ecosystems dominate the coast due to low wave action. These tidal forests comprise the southern edge of Everglades National Park and Ten Thousand Island area of southwest Florida. The limited sandy beaches in this area are composed of mostly calcium carbonate sand (16). From Naples northward to Tarpon Springs, quartzite sand beaches and barrier islands become more prominent (16) although the dune systems are smaller than those on the Atlantic coast (17). On the west coast of Florida from

Tarpon Springs northward until Alligator Point in the panhandle, salt marshes dominate the coastline (6, 16). Few beaches exist in this region due to a lack of sand deposition, a shallow coastline with underlying limestone bedrock, and an absence of longshore currents and weak wind action (6, 16, 26).

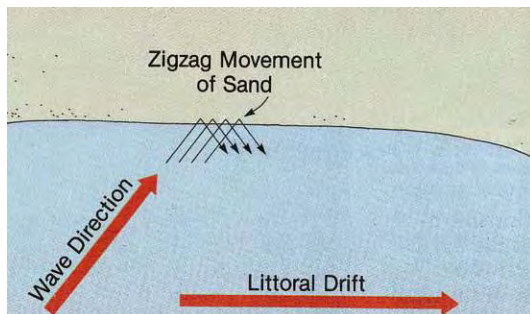
From Alligator Point westward across the remainder of the Florida panhandle, large quantities of sand have been deposited offshore. This accounts for the extensive beach and dune systems on both the mainland and the barrier islands in this region (6, 16). The coastline is characterized by embayments such as Pensacola Bay and Mobile Bay that are the remains of drowned river valleys. The islands that lie offshore in the Florida panhandle are long, low, and sandy. Coastal forests can occur on the larger islands, but are less common than on the sea islands of the east coast. In contrast to the east coast, few of the barrier islands in this region are flanked by salt marshes that extend to the mainland due to the frequent hurricane activity in the area (6).

Exposed roots show the severity of shoreline erosion along the Gulf Coast near Panama City, FL.



Beach and Dune Formation

Beaches form when offshore sand deposits are moved landward by wave action usually during the spring and summer. Sand, which is stirred up as the wave breaks on the shore, drops out of suspension as the water moves up the beach face. Thus, the beach becomes gradually higher, wider, and steeper. In the wintertime, larger, higher energy waves associated with winter storms overflow the beach area and stir up the sand deposited earlier in the year. The sand is pulled off the beach as the wave recedes and is deposited in an offshore sand bar (4, 21, 22). If these two forces are in equilibrium, the beach area will be stable from year to year. However, naturally occurring factors such as storm events (33), littoral drift (lateral movement of sand because waves approach the beach at an angle), and offshore winds, upset this equilibrium and result in the ever shifting nature of the beach environment.



Dunes form because of onshore wind action on beach sand. When wind speeds are sufficient (at least 10 - 12 mph), individual grains of sand start to roll and bounce along the surface. This windborne sand is transported landward until the wind speed drops below that needed to move the sand (22). Stems and leaves of coastal vegetation are critical for slowing wind speeds and causing sand to be deposited. Where limited development has occurred, well-vegetated foredune ridges can reach over 20 feet above sea level (4).

These newly formed dunes will be relatively stable under normal tidal conditions, but may be completely eroded away in storm events. Thus, one of the major functions of coastal dunes is to serve as a reservoir of sand for the beach (21, 22).

Another important characteristic of the beach and dune environment is dune migration (22). Wind, in addition to instigating dune formation, causes unstabilized dunes slowly to migrate downwind. Because onshore winds dominate in coastal areas, this generally results in a landward movement of the dune. The speed and direction of this movement is dependent upon the speed and direction of wind, sand supply, and the vegetative cover on the dune. In the case of barrier islands, dune migration and other factors actually result in the landward retreat of the entire



Hardy grasses struggle for a toehold in the hot, shifting surface of coastal dune sand.

island (16). Many of the problems associated with developing coastal areas for human use have arisen from the failure to allow for this natural process.

Dune Vegetation

Coastal dunes have three general vegetation zones based on soil salinity (4, 22) that can vary in width or may even be entirely absent. In addition, these zones can intergrade and sharp distinctions between zones are usually absent.

Landward of the highest tides, pioneer or frontal zone sites are stabilized by sand trapping action of various rhizomatous grasses and low growing forbs that are tolerant of salt spray. Trough areas and additional inland dunes may fall in the frontal zone area. Landward of the frontal zone area, the backdune zone (also often called the shrub or scrub zone) supports less salt tolerant grasses and forbs as well as shrubs and some trees. The forest zone is the vegetation zone farthest from the ocean, and the vegetation in this zone transition from maritime to non-maritime species. Marsh and grassy areas may occur between the backdune and forest zone areas.

Frontal Zone

Only a few plant species can tolerate the stresses of a dune environment, particularly frontal dune sites. Foredune plants must be able to survive being buried by blowing sand, sand blasting, salt spray, salt water flooding, drought, heat, and low nutrient supply (2, 4, 15, 22). Salt spray, by

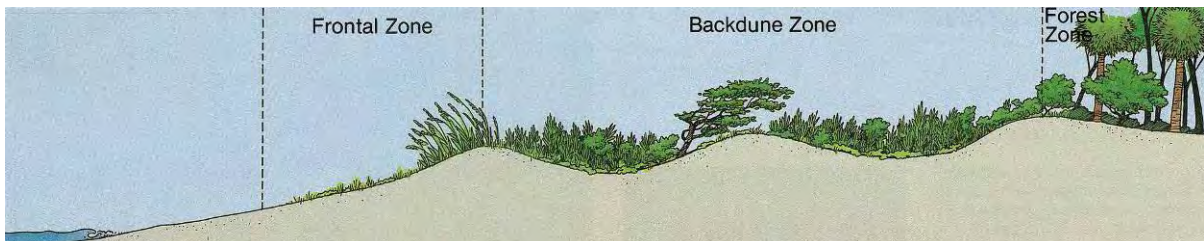


One season's growth of beach morningglory.



providing potassium, sodium, calcium, and magnesium (32), is a major source of plant nutrients in dune soils. In the absence of salt-bearing onshore winds, many coastal dune plants grow poorly or die (4).

Many plant species that occur on dune areas have developed specific attributes to help them survive these harsh environments. These include high growth rates, dense root systems, low profiles, and high flower and seed production rates (2, 15). In the south Atlantic and the Gulf (1, 2, 4, 22), the fore-dune grasses are usually sea oats (*Uniola paniculata*), bitter panicum (*Panicum amarum*), and marshhay cordgrass (*Spartina patens*). Forbs such as searocket (*Cakile* spp.), seapurslane (*Sesuvium portulacastrum*), and morningglory (*Ipomoea* spp.) are found on frontal dune sites (1, 2, 4).



This cross section is representative of many coastal dunes. There is much variation, however, in the shape and elevation of the dunes and width of the vegetation zone.

Backdune and Forest Zone

The backdune zone, a series of older dunes that are more stable and have higher organic matter, occur landward of the foredune area. When sufficient organic matter accumulates in dune fields on the mainland or barrier islands, colonizing woody vegetation becomes established (2, 15). Many of the woody species found in dune fields are low growing and shrubby due to low nutrient and droughty conditions of dune soils.

Additionally, high winds and salt spray often prune the terminal buds of the trees and shrubs growing on the dunes and result in salt-pruned, windswept canopies (15).

In Florida, waxmyrtle (*Morella cerifera*), sea grape (*Coccoloba uvifera*), and saw palmetto (*Serenoa repens*) form a dense scrub/shrub zone (4, 16). This scrub/shrub zone transitions on the larger barrier islands and mainland sites into the maritime forest and hammocks with pines (*Pinus* spp.), sand live oaks (*Quercus geminata*), and other species (4, 16).



Wind and salt spray can have a dramatic effect on the growth and appearance of sand live oak growing adjacent to the ocean.



Common scrub/shrub zone plants in Florida – seagrape (right) and saw palmetto (far right).



Dune Restoration

The basic principles for dune restoration are simple, but the process can involve many complicated steps. You will more likely be satisfied with the results of your project if you match the natural dune pattern of the area, allow room for the dune to adjust to prevailing energy regime naturally, minimize man-made damage whenever possible, and realize that you are helping nature not replacing it (22).



Loss of dunes leaves structures vulnerable to storm damage.

Dune restoration or reconstruction can be a very lengthy process, and the time requirements of humans and nature must be meshed (22). From the human side, permits, funding, and work plans need to be acquired or developed. For individual homeowner projects, this may take only a few minutes, but for major projects, months may be needed. From the natural side, sand gathering and planting need to mesh with the annual beach cycle. Often, this may mean waiting six months or more to catch the optimum time of the year.

Considerations Prior to Starting

Before starting any coastal project, permits for beach renourishment, sand fence installation, dune walkover structures, and planting are required from the Florida Department of Environmental Protection (FDEP) and possibly local governments. Contact FDEP for more information (<http://www.dep.state.fl.us/beaches/>).

Beach reshaping after a storm.



Mechanical renourishment and reshaping of the dune or beach area may be necessary after a severe storm event. Care should be taken to position the constructed “dune” landward of seasonal tidal fluctuations. When constructing dunes, care should also be taken to minimize the impact on any remaining vegetation. Piling sand up against eroded dune faces can impede the natural recovery of the dune face by burying existing vegetation. It is important to plant at least a few rows of plants to replace those destroyed in the shaping operation (21). Additionally, if dredged sand is used, you need to allow adequate time between dredging and planting for the salt content to leach out (22).

Considerations when placing dunes for storm protection¹.
Base dune placement on future not current shoreline conditions.
If you have dunes of equal size, the one furthest inland will offer the greatest protection.
Position the dune as close to the structure you want to protect and as far inland as practical to allow for greatest width and height development.
In overwash areas, start new dunes on top of newly deposited sand if possible.

¹From Rogers and Nash, 2003.

Sand Fencing

Sand trapping devices such as sand fences or brush matting can be included in the revegetation/stabilization plans when appropriate. A sand fence is an artificial barrier of evenly spaced wooden slats or approved fabric, erected perpendicular to the prevailing winds, and supported by posts (18). Like vegetation, it reduces the velocity of the wind at the ground surface and traps blowing sand.

Sand fences are used primarily to build frontal dunes. Use of sand fences is more effective than using vegetation alone to build the dune in width and/or height. Although sand fences are more expensive than using vegetation alone, they are much less expensive than using dozers and/or dredges.

Where turtles and pedestrians do not need access to the beach, one possible arrangement would be to:

- Erect two sand fences parallel to the water line, 30 feet apart, and a minimum of 100 feet (horizontal distance) inland from the mean high tide (MHT) line.
- As the fences fill with sand, place additional sets of fencing over the original ones until the coastal dune has reached the desired protective height.
- To widen an old dune, fencing should be set 15 feet seaward from the base of the old dune.

Where turtles and pedestrians require access to the beach, fence sections should be no longer than 10 feet and placed 7- to 10-feet



Primary and secondary sand fence.

Area of State	Direction
Northern Atlantic coast	NW-SE
Southern Atlantic coast	NE-SW
Eastern panhandle coast	NE-SW
Central panhandle coast	NE-SW
Western panhandle coast	NW-SE
Southern Gulf coast	NW-SE

apart. Angle each section to the recommended alignment for the different areas of Florida to take advantage of prevailing wind (see table above). For more information, consult FDEP, Bureau of Beaches and Coastal Systems (<http://www.dep.state.fl.us/beaches/>) and/or U.S. Fish and Wildlife Service (<http://southeast.fws.gov>).

Angled, open-ended sand fence arrangement used when turtles use the beach for nesting.



Plant Material and Planting – Herbaceous

Dune vegetation for many Floridians means sea oats. Sea oats may be the dominant species on the frontal dunes of Florida but even frontal dunes are far from monocultures. Dune restoration plantings should try to mirror species diversity found in adjacent natural areas to provide food and shelter for coastal wildlife in addition to dune stabilization. A good rule of thumb would be to include three or more frontal zone species in a revegetation project whenever possible (21).



Sea oats with railroad vine and other herbaceous plants.

Because seed is difficult to acquire and seed quality can be poor, most coastal sites are stabilized using vegetative transplants. Since special permits may be necessary to collect plant material and most people do not have access to facilities and equipment necessary to produce transplants, most transplants are purchased from commercial growers who specialize in coastal plants (see p. 48). Projects requiring more than a few thousand plants need to plan in adequate lead-time to contract with growers to produce transplants in the numbers needed for the project.



Commercial transplants packaged for shipping to coastal restoration site.

Plants in 2- to 4-inch pots are adequate for most stabilization and building work. Liners (1-inch pots) can be used during the rainy season, where irrigation is available, or hydrated polymer gel is used (see next page). Pots larger than 4 inches are necessary only where aesthetics or traffic control is important or erosion is severe.

A shovel, tree dibble, or spade can be used to hand plant vegetative materials. Large,

flat sites can be planted more economically using a tractor-drawn transplanter with planting plows that create furrows 8- to 15- inches deep.

Plantings should be a minimum of 10-feet wide, but wider areas may be required on more severely eroded sites. When replanting existing dunes damaged by storms, start planting on the unvegetated dune face if the scarp has collapsed. If the scarp has not collapsed, plant at the base of the dune. While on flat over-washed areas, plant as far land-ward as possible.

Plant spacing ranges from 1 to 3 feet in the row but are typically 18 inches for 1- to 4-inch-potted stock or bare root plugs and stolons of the same size. Spacing between rows varies from 1 to 3 feet. Closer rows provide more rapid cover but at a higher cost due to increased vegetation and labor needs.



CNPS, Inc., installation crew planting sea oats on an 18 X 18 inch spacing.

One suggested planting pattern (21) is to have the closest plant spacing, 12 x 12 inches, as far landward as possible, and after a few rows of this spacing, increase the spacing to 18 to 24 inches for several rows. Finally, the rows closest to the sea would be planted at the 3-foot spacing. This would allow more sand to blow toward the back where plants are densest and build the dune the highest and fastest toward the back. This type of arrangement can be beneficial, but will add to the labor requirements for large projects. Regardless of spacing, stagger plants in adjacent rows to prevent aisles (lined up spaces between plants), which may erode.

A water adsorbing polymer gel product (e.g., Terrasorb[®], Stock-osorb[®], etc.) that has been hydrated according to label directions can be placed in the hole prior to planting. Use between 8 and 12 oz of hydrated gel per transplant; use the higher rates during the dry season. Large quantities of gel can be mixed in water troughs or barrels and transported close to planting site with a four-wheel drive vehicle. Smaller quantities of gel can then be carried to planting crews using buckets.

In general, grasses should be planted with the rootball 8 inches below the soil surface (21). Forbs should be planted with the rootball just below the soil surface or down to a depth of 2 inches (2). Care should be taken to fill the hole completely with firmly packed soil to eliminate any air pockets around the roots.

For most of the species discussed in this publication, the planting window from Tampa Bay and Cape Canaveral southward is between March and November. For more northern locations, plant between April and October (2). Contact your local extension office for more specific information on planting dates in your area.

Planting Material and Planting – Woody

Trees and shrubs are most common on backdune and the forest zone sites of coastal dune communities (4, 16). Woody species such as saw palmetto and seagrapes can be dominant species in the frontal zone if the foredunes are tall enough to minimize salt spray. Even so, they will be smaller



Planting using hydrated polymer gel containing slow release fertilizer.



they will be smaller, especially the trees, on frontal sites than further inland (4, 16).

In this publication, the definition used for a tree is a perennial, woody plant having one erect trunk that reaches a height of greater than 12-feet tall (4). As mentioned before, many trees species on coastal sites might not reach 12-feet tall but will at inland sites. Shrubs are harder to define, because they can be more variable (4, 7, 19). For this publication, a shrub is defined as any perennial, woody plant that has single or multiple trunks and is normally <12-feet tall (19).

Most shrubs and trees used for coastal revegetation are nursery grown transplant stock. Woody species can be planted at any time during their dormant season. Follow planting instructions provided by the nursery, or minimally dig a hole deep enough to match the rootball height and twice the diameter of the rootball. Prior to planting, unwrap or disturb the rootball to encourage further root development. After placing the plant in the hole, fill the hole with topsoil or potting mix. Spread mulch around the plants to prevent wind and water erosion and help retain moisture.

Some woody plants can be vegetatively propagated while still attached to the plant by using air-layering or ground-layering techniques. When air-layering plants such

as seagrape or cocoplum (*Chrysobalanus icaco*), a ¼- to 1-inch diameter stem is selected and a slanting cut is made about one-third of the way through the stem below a node (point where leaf arises). This site is treated with rooting stimulant (available from most garden supply stores), wrapped with moist sphagnum moss, and enclosed with plastic wrap or aluminum foil secured at both ends of the moss ball with string or weather proof tape. Periodically check to see if roots have developed; when roots have developed, cut the rooted stem off and transplant to a pot.

Ground-layering duplicates what happens in nature with plants such as waxmyrtle and sea lavender (*Argusia gnaphalodes*). Bend a low-growing branch down to the soil, make a notch in the branch as described for air-layering, and mound moist soil over the cut. Make sure the branch remains covered with moist soil, using a weight or forked stick if necessary, and water often. When the roots are 3- to 4-inches long, cut the branch off and transplant into a pot or directly to a new site.

Fertilization

Initial fertilization is best done at planting with a complete, controlled-release fertilizer (e.g., Osmocote®, Multicote®, Sierra®, etc.) with a formulation such as 14-14-14, 18-6-12, or a similar analysis. Controlled-release fertilizer can be broadcast immediately after planting, it can be mixed with hydrated polymer gel (see figure on previous page) just prior to planting, or it can be placed at the rate of one teaspoon per non-woody plant or 1 oz per woody plant under each plant at planting. If mixing with gel, estimate the number of plants to be planted with a bucket of gel and then add appropriate amount of slow release fertilizer to the gel. If broadcast, use the rate specified on the fertilizer bag for the given planting area.

Initial fertilization may also be provided by broadcasting 200 to 300 pounds per acre (4 to 7 pounds per 1000 sq feet) of complete mineral fertilizer such as 10-10-10 six weeks after planting. A follow-up fertilization of 400 pounds of 10-10-10 per acre (8 pounds per 1000 sq feet) is recommended in June of the second year.

Apply maintenance fertilization twice annually during the growing season with up to 400 pounds of 10-10-10 per acre split into two applications and applied before September 1. Continue fertilizer application until the plants establish or spread enough to provide complete cover and stands retain good vigor after any storm damage. Fertilizer also can be used to increase stem density of existing herbaceous plants when stands have been damaged by storms but complete replanting is not warranted.



Beach planting with trickle irrigation and rope fence to discourage foot traffic.

Irrigation

Irrigation is advisable, where practical, on all dune plantings to insure adequate moisture during the initial establishment period. Excessive irrigation can favor weedy species to the detriment of dune vegetation, so irrigation should not be used after stands are established.

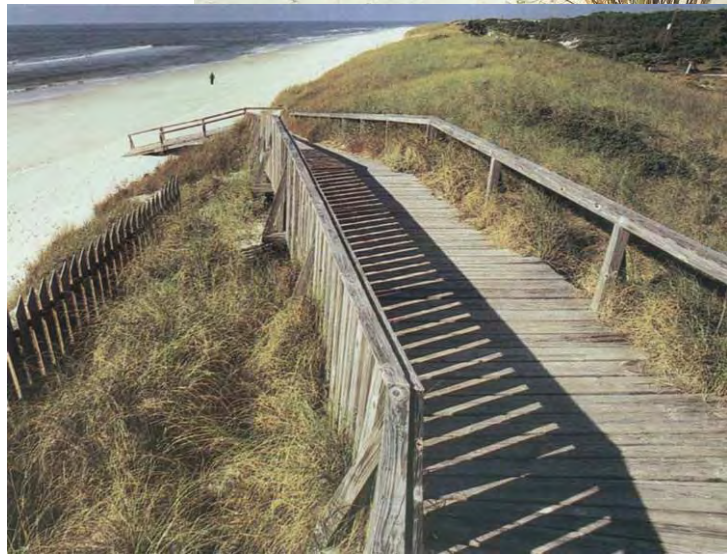
If an overhead irrigation system is used, it needs to be capable of applying ½ inch of water over the entire zone in an 8-hour period, and irrigation lines need to be located on the windward edge of the planting to compensate for the effect of the wind. Low pressure irrigation systems such as those with pressures similar to that found in houses (20 to 50 pounds per square inch) need to have sprinkler heads and irrigation lines spaced no farther than 20 feet apart to minimize wind drift. Field test designs at higher pressures in the wind to plan the spacing. Trickle irrigation can also be used. Contact your local NRCS district office for information on irrigation system recommendations and design.

Maintenance

Native dune species should require little maintenance after establishment. Sites should be monitored for establishment of invasive species (see p. 49) and weeded as necessary. Additionally, all sites should be protected as much as possible from foot and vehicular traffic. A combination of signs, people fencing, and dune crossover structures should be used.

Information on Specific Coastal Plants

Detailed information regarding each of the plants listed in the table in the front of this publication can be found on pages 13 to 47. The plants are grouped as grasses, other herbaceous plants, and trees and shrubs. Within each section, the plants are organized alphabetically by scientific names. Distribution maps shown for each plant come from the USDA, NRCS PLANTS database (28), except where noted. In these maps, counties in Florida where vouchered specimen plants have been found are shown in green. All plant populations in the state have not been documented, and populations of the listed plants may exist in counties not indicated on the maps. In addition to distribution maps and pictures, information regarding their habitat, growth habit, availability of planting material, and any special considerations related to propagation of planting are included.



Preventing newly planted and established stands from damage by vehicular and people traffic is critical to preserving the function of coastal dunes.

Grasses

Saltgrass

Gulfhairawn muhly

Bitter panicum, bitter panicgrass

Seashore paspalum

Seacoast bluestem, coastal little bluestem

Saltmeadow cordgrass, marshhay cordgrass

Seashore dropseed

Seoats

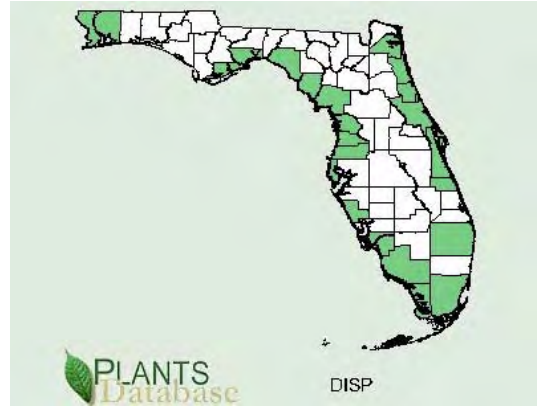


Saltgrass

Distichlis spicata (L.) Greene

Saltgrass is a widely distributed perennial grass found in saline areas, brackish marshes, and in salt flats along the Atlantic and Gulf coasts of Florida (2, 29). It also can dominate the many low dunes in southwest Florida (4).

This low growing grass has stems that are between 6- and 18-inches tall. The leaf blades are numerous, sharp pointed, between 2- to 4-inch long, and conspicuously two-ranked. In pure stands, it can resemble bermudagrass (*Cynodon dactylon*). The grass has scaly rhizomes, which are its main method of spread since seed quality is usually poor. Potential growth rate of transplants is high resulting in dense cover by the second year on some sites.



Plant distribution.

Plant Availability

Available from native plant nurseries as rooted rhizome cuttings. Vegetative material can be confused with seashore dropseed (*Sporobolus virginicus*) and seashore paspalum (*Paspalum vaginatum*), both native grasses, and with common bermudagrass, an introduced species.

Special Considerations

Use only on low dune sites where moisture conditions are favorable. Rhizomes can be planted at any time of the year but sprout better when temperatures are between 77 and 86 °F.



Saltgrass stand showing spread by rhizomes and saltgrass seed head.



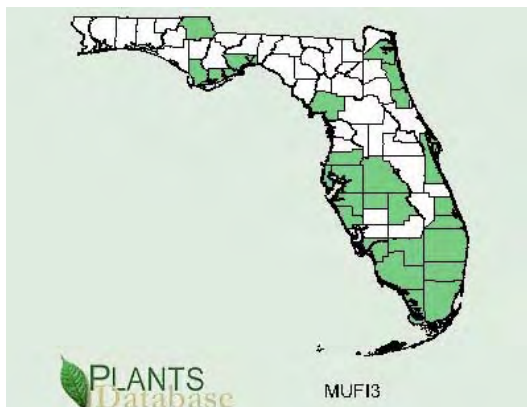
Gulfhairawn muhly *Muhlenbergia filipes* M.A. Curtis [syn. *M. sericea* (Michx.) P.M. Peterson]

Some taxonomists consider this grass to be a separate species, either *Muhlenbergia filipes* or *M. sericea*, while others consider it simply a variety of *M. capillaris* (34). As with many plants, it has several common names. Besides gulfhairawn muhly, another common name for this muhly is "sweetgrass". Sweetgrass leaves are the principle foundation material for African-coiled basketry in the Southeast, particularly in the area around Charleston, South Carolina (5). Regardless of its name, gulfhairawn muhly is a colorful component of many coastal communities in Florida starting back of the first dune front.

The grass grows in small to large clumps and has long narrow leaves about 2- to 2 ½- feet long. Starting in September, loose, limber, pinkish (rarely white) seedheads may be present, and these seedheads are often one-third to one-half the size of the entire plant. Each floret has a delicate, hair-like awn (terminal bristle) that can be over 1-inch long and give the plant one of its common names. When in full flower, the plants are extremely attractive, especially when many plants occur close together. This species or its more inland relative (*M. capillaris*) is now being widely planted in Florida as a low maintenance ornamental in road medians, golf courses, parks, etc.



Gulfhairawn muhly plants in flower and close up of the seed head of hairawn muhly showing the fine, hair-like awns (terminal bristle) that give the plant its common name.



Plant distribution.

Plant Availability

Because the different hairawn species (or varieties) are difficult to differentiate, ensuring you get the plant you want may be difficult even if you specify the species. Common hairawn muhly is readily available from native plant nurseries in the state, and a few specify they carry gulfhairawn muhly (*M. filipes*).

Special Considerations

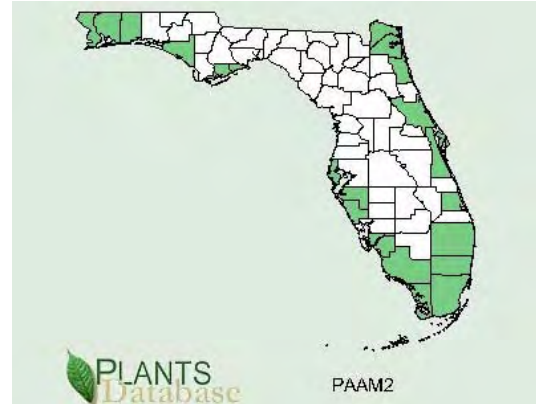
Seed quality of hairawn muhlys is variable. Most material is propagated vegetatively by divisions.

Bitter panicum, bitter panicgrass

Panicum amarum Ell.

Bitter panicum is a widely adapted perennial grass that is ideally suited for stabilizing the frontal zone areas of coastal beaches and barrier islands (2, 4, 6, 16, 29). Its tall, erect stems and leaves reduce wind velocity allowing sand to accumulate, and its extensive fibrous root and rhizome system stabilizes and holds the sand in place. Where heavy sand accumulation occurs, only a small portion of the entire plant may be exposed.

This warm season grass grows to a height of 4 to 8 feet with a growth habit that ranges from prostrate to erect. Leaves are from ¼- to ½-inch wide and 7- to 20-inches long. They are smooth (lacking hairs) and generally bluish in color. The plant forms loose, open clumps by rooting at the lower nodes (points where leaves emerge) of the stems or by rhizomes (underground stems). The seedhead is a narrow panicle (a branched inflorescence) which reaches a length of 12 to 15 inches at maturity. Only small amounts of poor quality seed are produced because the plant is a hexaploid (has six sets of chromosomes). The closely related coastal panicgrass (*Panicum amarum* var. *amarulum*) is a tetraploid species (four sets of chromosomes), has a more erect growth habit, and produces abundant fertile seed, but is thought to rarely occur in Florida.



Plant distribution.

Plant Availability

Two cultivars of bitter panicum, Northpa and Southpa (pronounced 'North pā' and 'South pā', respectively) have been released by the Brooksville Plant Materials Center and are commercially available. Northpa is from a collection from North Carolina and is adapted to the more northern coastal counties in Florida, while Southpa is from Palm Beach County, Florida, and is adapted throughout the state.

Special Considerations

This species establishes more easily than sea oats. Plants can be planted up to 10-inches deep as long as some leaf area is left exposed.



Bitter panicum seedheads and typical habitat.



Seashore paspalum *Paspalum vaginatum* Sw.

Seashore paspalum is low creeping perennial grass native to tropical and subtropical areas worldwide. It grows naturally in coastal environments, tolerates brackish water conditions, and can come to dominate low dunes or wetter area between dunes. It is found on both the Atlantic and Gulf coasts. Selections of this grass have been used as turf species in coastal areas because it has a low fertility requirement, tolerates salt spray, and can make a very dense, uniform sod when mowed (2, 4, 6, 27).

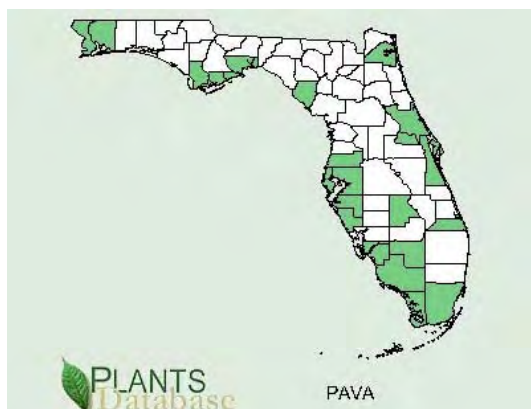
Seashore paspalum rarely reaches a height of 12 inches. It has an extensive rhizome system, which accounts for the dense mats that the plant can form. It can spread rapidly and responds to fertilizer application. Vegetatively, seashore paspalum can resemble common bermudagrass (*Cynodon dactylon*). It is easily distinguished in flower because its flower consists of two racemes (unbranched inflorescence), similar to its non-native relative, bahiagrass (*Paspalum notatum*). It can be distinguished from bahiagrass because the flowering stems of seashore paspalum are leafy and bahiagrass is not.

Plant Availability

Does not produce viable seed; must be vegetatively propagated. It is available from native plant nurseries. Avoid material that



Seashore paspalum showing leafy stem and two racemes in seedhead.



Plant distribution.

has been released from turf breeding programs. Vegetatively this material can be confused with the native grasses, seashore dropseed (*Sporobolus virginicus*) and saltgrass (*Distichlis spicata*), and common bermudagrass, a non-native species.

Special Considerations

On drier sites, pieces of sod or rooted transplants should be used. Bare-rooted rhizomes can be used on wetter sites.

Seacoast bluestem, coastal little bluestem, maritime bluestem

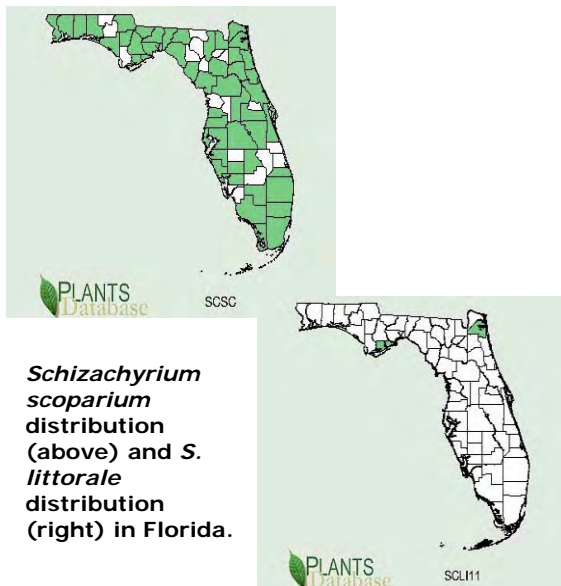
Schizachyrium spp. Nees

Bluestems are present as a minor component of the coastal ecosystem throughout Florida. Depending upon the taxonomist you talk to, there are between one and three species and/or varieties of bluestem (*Schizachyrium scoparium*, *S. maritimum*, or *S. littorale*) found in the coastal areas of the state. Regardless of the exact number, seacoast bluestems are suited for use on the backside of frontal dunes, anywhere on secondary dunes, and in home landscapes of the Florida Gulf coast (4, 6, 16, 24, 29).

Seacoast bluestems are a short bunch grass about 1- to 2-feet tall with coarse blue-green stems and basal leaves that often appear purplish and tend to fold with maturity. Short rhizomes are often present on the plant. Seedhead clusters are about 3-inches long and have a number of short, silvery hairs (awns) when the seed is ripe. This gives the plant a frosty appearance in the late summer and fall. After frost, the plant has a reddish appearance. It has some salt tolerance but poor flood tolerance, and it is best suited for backdune areas of the frontal dune system.



Close up of the seed head of a seacoast bluestem in the late summer.



Plant Availability

Bluestems for coastal plantings are becoming more available from native plant nurseries. Additionally, the Golden Meadow Plant Materials Center, Golden Meadow, Louisiana, released Timbalier tested germplasm, a gulf bluestem (*S. maritimum*), in 2007. This material is adapted from Louisiana through the Florida panhandle.

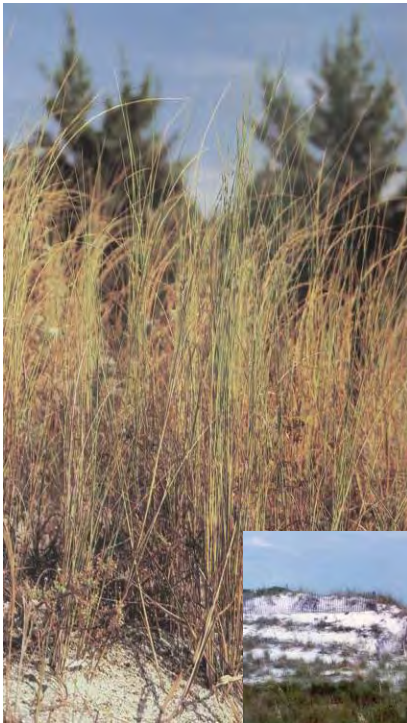
Special Considerations

Although many of the bluestems produce viable seed, seacoast bluestems in Florida currently are available as vegetative transplants only. Container grown or bare rooted plants can be used. Basal portions of stems root more successfully than upper stem segments (24).

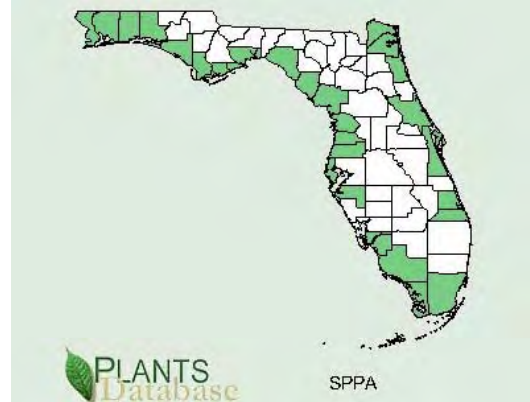
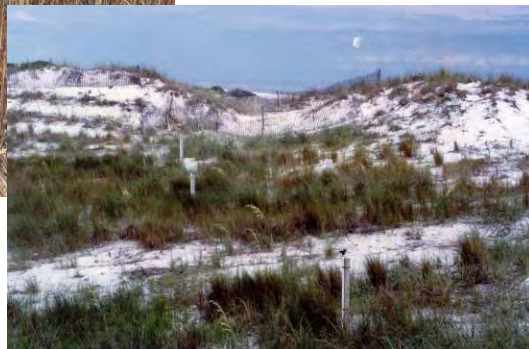
Saltmeadow cordgrass, marshhay cordgrass *Spartina patens* (Ait.) Muhl.

This cordgrass is one of the most drought tolerant cordgrasses and occurs in both coastal high marsh and dune environments. Saltmeadow cordgrass is not as drought tolerant as seaoats and bitter panicum and is more sensitive to sand burial. Consequently, it tends to be found in swale areas back of the foredune crest (2, 4, 6, 16, 29).

A creeping perennial grass, it can form extensive grassy meadows, but it tends to have a more clumpy growth habit in wetter sites. The species can be found in soils ranging from coarse sands to silty clay and tolerates irregular inundation with salt water (35 parts per thousand salinity). Plants can reach 3-feet tall and have extensive rhizome



Saltmeadow cordgrass and restored stand in back swale location.



Plant distribution.

systems. The droopy leaves have a rolled, wiry appearance and are typically ½- to 1-foot long and < ¼-inches wide. Flower spikes (unbranched seedheads) can be present from late June through October. Seed production is sparse, and the plant is vegetatively propagated.

Plant Availability

Two cultivars have been developed for use in Florida. 'Flageo' is a joint release of the Jimmy Carter Plant Materials Center in Americus, Georgia, and the Brooksville Plant Materials Center. This release was collected in North Carolina and is suited only for regularly flooded sites in the more northern Atlantic coastal counties of the state. 'Sharp', a selection from Louisiana, is a later release from the Brooksville Plant Materials Center and is adapted to both marsh and coastal dune sites throughout the state.

Special Considerations

In marsh sites, bareroot plants can be used, but for coastal dune plantings, containerized plants should be used. Plants respond well to fertilization.

Seashore dropseed *Sporobolus virginicus* (L.) Kunth

Without seedheads present, seashore dropseed and saltgrass are hard to differentiate. Both are relatively low growing, rhizomatous, perennial grasses that can occur on low dunes, high marshes, and transitional areas. Seashore dropseed is capable of rapid spread, and dense stands resemble bermudagrass (*Cynodon dactylon*). Seashore dropseed is a somewhat smaller species than saltgrass and is not as tolerant of regular inundation (2, 4, 6, 29).

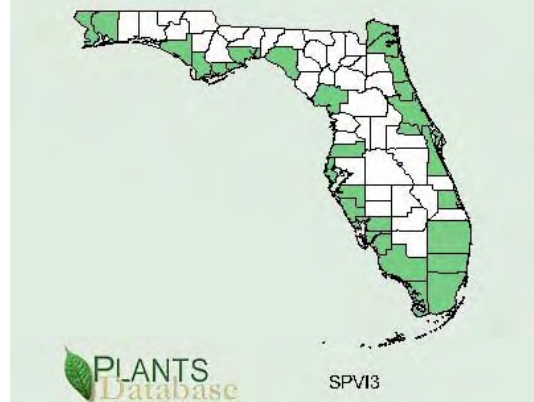
Plant height usually ranges between 4 to 8 inches with the leaf blades ranging between 1- to 4-inches long. Some authorities (6) recognize two forms of this grass, a smaller type with leaves usually less than 2-inches long and a more robust type with leaves up to 6-inches long. The more robust type also has larger rhizomes (underground stems) and seedheads and is more common on beaches and dunes. Salt crystals commonly can be seen on both leaves and stems. The inflorescence is a tight spike-like panicle (branched inflorescence that appears not to be branched).

Plant Availability

This species is available from native plant nurseries in the state. Rhizomes from natural stands transplant well. Vegetatively this grass can be confused with the other coastal native grasses, saltgrass (*Distichlis spicata*) and seashore paspalum (*Paspalum vaginatum*), as well as common bermudagrass, a non-native species.

Special Considerations

Limit use to moister dune sites. Place rootball about 2 inches below soil surface on moist sites, deeper in drier sites or when larger transplants are used. Clipping or mowing will stimulate growth and help control exotics.



Plant distribution.

Seashore dropseed spreading by rhizomes and close up of spike-like panicle.



Seaoats

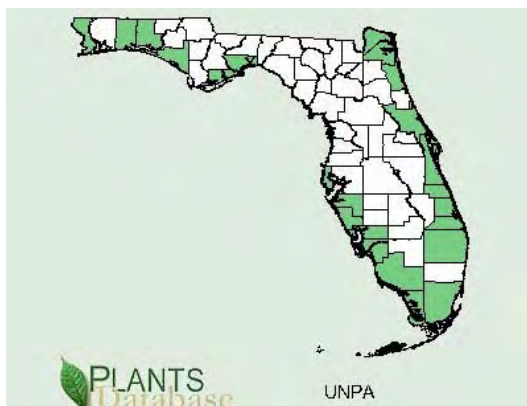
Uniola paniculata L.

Seaoats is the most widely recognized plant on the coastal dunes throughout the Gulf and the southern Atlantic coastal region. It is a perennial grass and is one of the most important species for pioneer and frontal dune sites (2, 4, 6, 9).

The plant has narrow pale green leaves that die back to the ground each winter in the more northern areas of its range. Mature seedheads, which are borne on stiff, erect stems that 3-feet or more tall, are present in the fall. The plant's common name comes from the fact that the individual seeds resemble oats (*Avena sativa*). The plant has relatively few coarse rhizomes (underground stem) but possesses an extensive root system that accounts for its ability to stabilize shifting sand. In addition to its importance in stabilizing frontal dune sites, it serves as a food source and cover for various shore birds and small animals. Due to the importance of this plant for stabilizing coastal dune sites, various state and local ordinances have been enacted that prohibit disturbing the plant or picking the seedheads without permit. Seed germination is not high under natural conditions, and seedling survival is low.



Mature plants and closeup of seed head.



Plant distribution.

Plant Availability

Vegetatively propagated material is readily available. Recent advances in nursery technology have also made seed-propagated local ecotypes of seaoats readily available from commercial coastal plant nurseries throughout the state.

Special Considerations

The biggest problem with planting seaoats is planting the transplant too shallow. The top of the rootball needs to be at least 4 inches below the surface, preferably in contact with moist soil.

Other Herbaceous Plants

Searocket

Baybean, beachbean

Beach sunflower

Largeleaf pennywort

Beach morningglory, fiddle-leaf morningglory

Railroad vine, bayhops

Seapurslane, shoreline purslane



Searocket

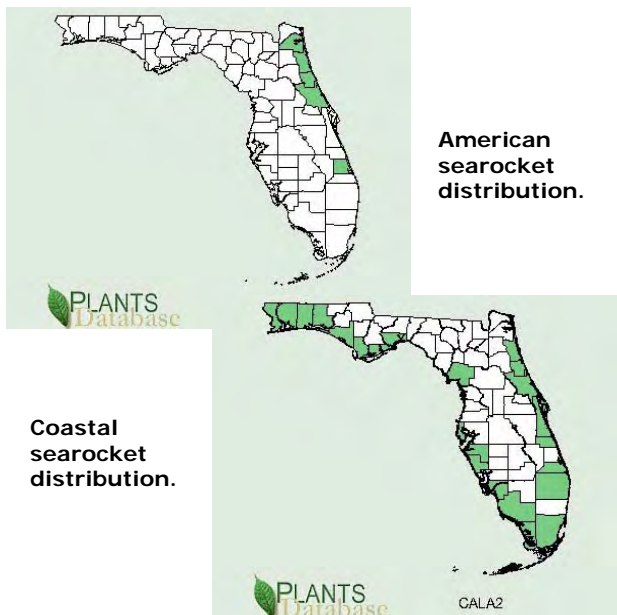
Cakile spp. P. Mill.

There are three species of searocket found in Florida, but the most common species are coastal searocket (*Cakile lanceolata*) and American searocket (*C. edentula*). American searocket is limited to Florida's northern Atlantic coast, while coastal searocket can be found throughout the state (see distribution maps below). Both species have a similar appearance and function as pioneering species in the frontal dune area (6, 16).

Members of the mustard family, searockets are annual, biannual, or perennial forbs with fleshy leaves. They have clusters of white to pink or purple flowers. The seedpods are spindle shaped, fleshy, and divided into two segments. The terminal segment of the seedpod is usually one seeded and becomes dry and corky when mature. This segment can float great distances after it falls. The lower segment may not contain a seed and usually does not detach from the plant.



American searocket plant and close up of coastal searocket seed head. Note the seedpods have two segments.



Plant Availability

Plants are not readily available from native plant nurseries.

Special Considerations

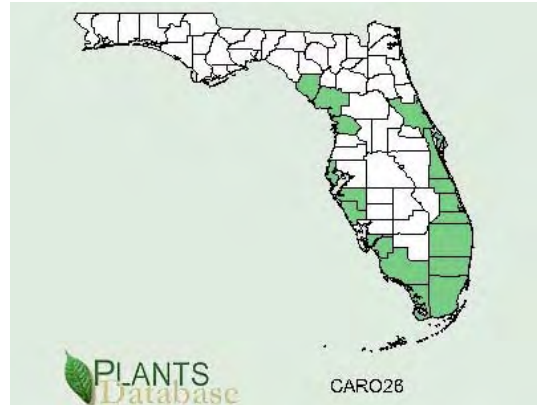
This species has only recently been added to coastal revegetation programs in Florida. Propagation information for searocket was provided by Dr. John Hovanesian, CNPS, Inc., Milton, Florida.

Seeds germinate readily; plant in well-drained potting mix, maintain in warm conditions, and keep moist. Seeds usually germinate in 4 to 7 days. Cuttings can be rooted hydroponically or by planting in well-drained potting mix and placing on a mist bench. Adjust mist frequency based on greenhouse temperature.

Baybean, beachbean *Canavalia rosea* (SW.) DC.

Baybean is a creeping, perennial vine and, as the name suggests, is a member of the bean family (Fabaceae). This species occurs worldwide in the tropics and subtropics because its seeds float. It is a pioneering species in the coastal dune areas and can form a dense mat on the soil surface (4, 12, 22).

The thick, fleshy stems of baybean can reach a length of 50 feet. The plant has compound leaves consisting of three, fleshy round to elliptic leaflets about 2- to 3-inches long. The pinkish purple flowers, individually between 1- and 2-inches long, are arranged singly on a stout flower stalk (raceme). A thick, flat seedpod nearly 6-inches long can develop from each flower and turns brown and woody when mature. Seed production per individual pod can be low due to the low nutritional environment of dune sites, but nearly year round flowering results in a significant seed bank in the soil. A relative of the jackbean (*Canavalia virosa*), immature baybean pods and seed are edible (**after cooking**). Baybean was first reported in European literature as a food source by Captain James Cook during his Australian expedition in 1768. There is



Plant distribution.

some evidence to suggest that baybean has become locally rare in parts of its historical range in Australia because of its use as a vegetable (14).

Plant Availability

Limited availability from native plant nurseries.

Special Considerations

Seed germinate readily after soaking for several hours in warm water. Plants can be vegetatively propagated by transplanting rooted runners.



Baybean plant (note immature seedpod) and close up of flowers.



Beach sunflower, cumberleaf sunflower

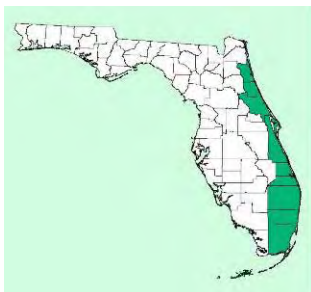
Helianthus debilis
Nutt.

Beach sunflower is one of the most beautiful coastal dune plants that grow in Florida. It can be found in stabilized foredune areas just back of the dune crest. Several subspecies occur in Florida (2, 4, 29), but *Helianthus debilis* ssp. *debilis* is the most common subspecies and is found on the east coast of the state. Another species, *H. debilis* ssp. *vestitus* is classified as a Florida endemic (occurs only in Florida) and is found on the west coast (see map).

This low-growing herbaceous perennial has broad, wedge- to heart-shaped leaves, which are 2- to 3-inches long and arranged alternately on the stem. The plant has broadly branched decumbent stems that root readily. The flowers are a bright yellow daisy-like composite about 2 ¾-inches across. Flowers are present from March through November. The plant produces fertile seed, which is important for its persistence in the northern parts of the state where it is subject to cold damage.



'Flora Sun' beach sunflower plants interplanted with sea oats and close up of flower.



Distribution map of *H. debilis* spp. *debilis* (left) based on Wunderlin (34) and *H. debilis* spp. *vestitus* (bottom).



Plant Availability

Generic beach sunflower is readily available in the nursery trade from seedlings or from cuttings. In 1991, the Brooksville Plant Materials Center released 'Flora Sun' a selection of *H. debilis* ssp. *debilis* collected in Martin County, Florida (29). This cultivar was rated as superior for ease of establishment and propagation, low water requirement, foliage density, plant spread, and aesthetic value. 'Flora Sun' is recommended all along the east coast of the state and along the panhandle Gulf coast. **Do not plant any *H. debilis* material not specifically identified as *H. debilis* ssp. *vestitus* in any of the southwestern Florida counties.**

Special Considerations

In south Florida, beach sunflower can be planted between December and February in addition to the general coastal planting window. Rootballs of the plants should be ½ to 1 inch below the prevailing soil surface.

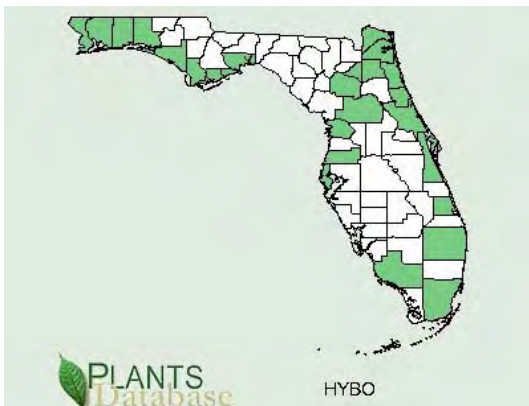
Largeleaf pennywort, marsh pennywort *Hydrocotyle bonariensis* Lam.

Largeleaf pennywort is a creeping, succulent perennial that occurs throughout the south Atlantic and Gulf coasts but is more common in the more northerly locations of the state. It can be found on frontal and back dune areas, dune swales, sandy marshes, swamps, and sand flats (4, 6).

This plant is quite distinctive, appearing to be a line of solitary leaves because the slender stem is underground. The round leaves are up to 4-inches in diameter, have scalloped edges, and arise from a center stalk to a height of up to 6 inches. The flowers are clustered on top of a vertical stem about 3-inches tall; fruit and flowers often are present at the same time. Although seed are produced, spread appears to be mostly vegetative by the rhizome system.



Largeleaf pennywort leaves showing leaves stalked from the center (peltate) and close up of flower cluster.



Plant distribution.

Plant Availability

It is not available in the nursery trade. Perhaps this is because this plant is so common in nature, is not particularly showy, and resembles dollarweed (*Hydrocotyle umbellata*), a common weed in Florida lawns.

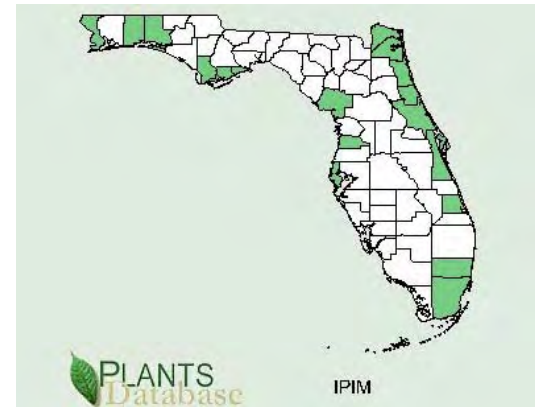
Special Considerations

The plant is easily propagated by digging up the rhizomes (underground stems) and transplanting to a new site. This plant is listed (3) as a food source for the endangered beach mouse, *Peromyscus polionotus* spp.

Beach morningglory, fiddle-leaf morningglory *Ipomoea imperati* (Vahl) Griseb.

Beach morningglory is one of the colonizer species found on the frontal dunes (2, 4, 16). In nature, it spreads by seed and is capable of making rapid growth with vines that spread up to 30 feet. These vines serve to bind shifting sand, and dense cover is possible in two to three seasons.

Formerly called *Ipomoea stolonifera*, beach morningglory roots at the nodes (points on stem where leaves arise). Its rather succulent leaves are stalked and can be up to 4-inches long. Leaf shape varies from unlobed, elliptic, to deeply lobed. The leaves often can be fiddle shaped, hence its other common name "fiddle-leaf" morningglory. Flowers are white with a yellow throat. It can be found on the high marsh to upper dune areas and can withstand infrequent inundations.



Plant distribution.

Plant Availability

Seed or rooted cuttings are available from various native plant nurseries.

Special Considerations

Plants can be shaded out by dense stands of grass. Responds to low rates of timed-release fertilizer. Tolerates close mowing which makes it suitable for coastal landscaping purposes.

Beach morningglory
flower and habitat.

Railroad vine, bayhops

Ipomoea pes-caprae (L.)

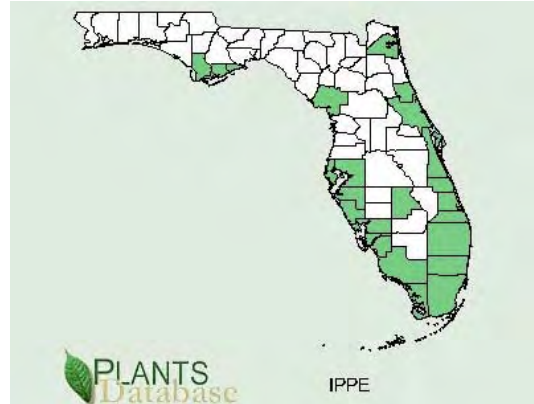
R. Br.

Another morningglory, railroad vine likes somewhat moister sites than the beach morningglory. This species is found on dune swales, high beaches, and coastal wetlands (2, 4, 6).

The vines have very long, strong stems up to 75-feet long. Plants form a thick starchy taproot, but can root at the nodes, like beach morningglory. They can form a thick mat on the open beach. The leaves are smooth, thick, and two-lobed; the shape resembles a goat's footprint. The flowers are pinkish lavender with a darker colored throat; opening in the early morning and closing before noon. Flowering occurs throughout the year in south Florida but is limited to late summer and fall in north Florida.

Plant Availability

Seed or rooted cuttings are available from various native plant nurseries.



Plant distribution.

Special Considerations

This species of morningglory is closer to a true tropical species than beach morningglory and is more sensitive to freezing temperatures. Plant between April and October south of Tampa Bay/Cape Canaveral. Even though this species occurs north of the Tampa Bay/Cape Canaveral line, its use in coastal revegetation is not recommended in the northern end of its range. Plant rootball just slightly below soil surface (2).

Railroad vine flowers and habitat.



Seapurslane, shoreline purslane

Sesuvium portulacastrum
(L.) L.

Seapurslane is a perennial member of the carpetweed family that somewhat resembles the common horticultural purslane (*Portulaca oleracea*). It occurs on the dunes throughout Florida and along the whole Gulf of Mexico region. It colonizes beach areas, drift and overwash areas, brackish swales, and upper elevations of salt marshes. A related species, slender seapurslane (*Sesuvium maritimum*), also occurs in Florida, but it is an annual plant (4, 6, 16).

Seapurslane is a sprawling, succulent, multibranched perennial that can form mats because it roots at the nodes (points on stems where leaves arise). Slender seapurslane, the annual, tends to be upright or, if sprawling, does not root at the nodes. The succulent leaves of seapurslane range from ½- to 2-inches long and occur as pairs on opposite sides of the stem, with one of the leaves of the pair usually larger than the other. The plant produces solitary flowers in the axils of the leaf pairs. The flowers lack petals but have sepals that are pink on the



Plant distribution.

inside and green on the outside. Flowers can be present anytime during the frost-free period of the year. The single seed is borne in a capsule that splits horizontally at the base to release the seed.

Plant Availability

Limited availability from the native plant nursery trade.

Special Considerations

Vegetatively propagated, divisions root easily.



Sea purslane plant and close up of flower opened to reveal pink interior of the sepals.



Trees and Shrubs

Sea lavender, sea rosemary

Florida rosemary, sandheath rosemary

Cocoplum

Seagrape

Buttonwood, button mangrove

Silverleaf croton, gulf croton, beach tea

Coinvine

Yaupon holly

Seacoast marshelder, seashore elder

Buttonsage, lantana

Waxmyrtle, southern bayberry

Plum

Sand live oak

Cabbage palm, cabbage palmetto

Gullweed, inkberry

Saw palmetto

Bay cedar

Spanish bayonet, aloe yucca



Sea lavender, sea rosemary

Argusia gnaphalodes (L.)
Heine

Sea lavender is one of the most attractive coastal dune shrubs that occur in Florida. It is native to the Bermuda, West Indies, Mexico, and south Florida. In south Florida, it used to occur on the Atlantic coast from Brevard County south to Monroe County. Coastal development in this area of Florida has destroyed many of the natural stands, and this is why the plant is listed as an endangered species by the state of Florida (4, 9, 19).

Sea lavender is a multibranched shrub with dark grey or black stems. It grows up to about 6-feet tall, but many are smaller and wider (up to 20-feet wide) when exposed to direct salt spray. The leaves are narrow and fleshy to succulent. Although blue-green in color, the leaves appear whitish to grey due to a dense pubescent cover. They are arranged in dense rosettes or whorls, especially on the end of the stem. The abundant, small bell-shaped white (turning lavender) flowers are present nearly year round. The plant produces a single-seeded fruit that has a corky covering that allows



Plant distribution.

it to float. The shrub is well suited to oceanfront plantings but is slow growing and can have issues with root rot if planted inland.

Plant Availability

Limited availability at native plant nurseries in south Florida.

Special Considerations

Low branches that touch the ground root naturally and transplant well when detached. Mature stem cuttings can be rooted or seed can also be used to produce new plants.



Sea lavender plant and close up of flowers and leaves.



**Florida rosemary,
sandheath rosemary**
Ceratiola ericoides
Michx.

Florida rosemary is well adapted to droughty coastal and inland scrub sites where it can become the dominant species. This species can be long lived, with some plants in coastal populations estimated to be between 40- and 60-years old. In spite of its longevity potential, the plants are very intolerant of disturbance such as fire or human activity (6, 8, 19).

Typically, the plant is a bushy evergreen shrub with numerous branches arising from the base and exhibiting a distinctly rounded form. The small, needle-like leaves arise on opposite sides of the stem, but appear whorled. The flowers are borne in the leaf axils and are small, brownish to yellowish, with male and female flowers occurring on separate plants. The plant flowers in the spring through the fall with fruit most typically present late in the year. The fruit are eaten by birds, mice, and harvester ants.



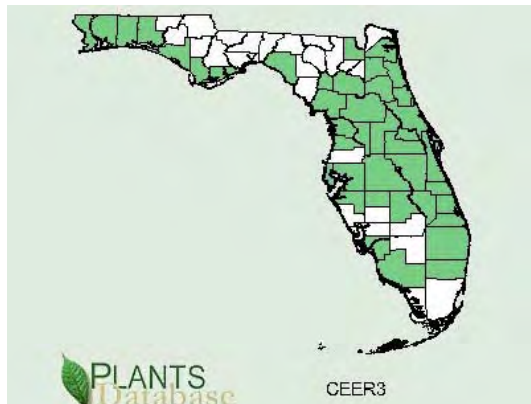
**Florida heather plant
and close up of
leaves.**

Plant Availability

Not generally available from commercial nurseries.

Special Considerations

The main method of reproduction for Florida rosemary is from seed. Scarification of the seed is thought to be necessary to stimulate germination (8). In coastal populations, seedlings are usually present around female plants, but their tolerance to transplanting is unknown. Natural air layering has been observed in mature populations where fire and sand disturbance has been excluded for a number of years and suggest this method might be used as a means to propagate the plant.



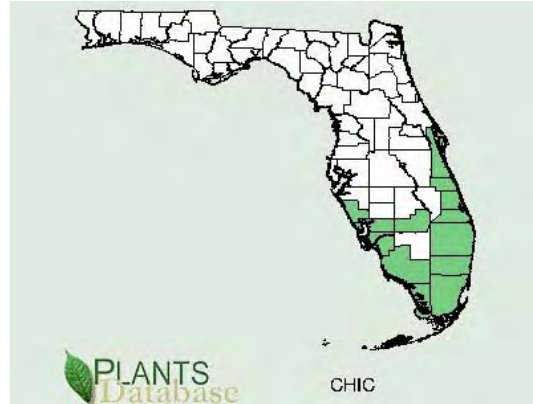
Plant distribution.

Cocoplum

Chrysobalanus icaco L.

Cocoplum is a small evergreen tree or more commonly a multiple-stemmed shrub. It is native to the coastal areas of south Florida, the Bahamas, and throughout the Caribbean. It can be commonly found as isolated plants or as thickets on beaches and coastal dunes and is known to be tolerant of salt spray and flooding (4, 6, 7, 19).

Cocoplum can reach a height of about 15 feet but is usually smaller. The leaves are leathery, dark green, shiny, and either oval or almost round, 1 ½- to 3-inches long and 1- to 2-inches wide. They are arranged in two ranks on the stem but are often borne erect so they appear to be arising from the same side of the stem. Small, bell-shaped, white flowers are borne in clusters, usually near the ends of the branches, and can be present at any time of the year. The fruit, which can be purple to whitish, resembles a plum and can be eaten raw or made into preserves. The plant is an important source of nectar for bees and food source for wildlife. It is an excellent ornamental plant for coastal areas in south Florida.



Plant distribution.

Plant Availability

Available from native plant nurseries in the state.

Special Considerations

Reproduction is usually from seeds. No scarification or other treatment is needed, but germination is slow, taking at least 30 days. Semi-hardwood, leafy stem cuttings can be rooted using hormone treatments and a mist bed (7).



Cocoplum in a landscape situation and close up of fruit.



Seagrape

Coccoloba uvifera (L.) L.

Seagrape is a native shrub or small tree that is widely distributed along the Atlantic, Caribbean, and Pacific coasts of the American tropics. It is native to Florida and can dominate the dunes south of Volusia County on the east coast and Pinellas County on the west coast. It is one of the first species to colonize coastal dune sites within its native range, because it is extremely drought hardy and salt tolerant (4, 7).

On frontal dunes, seagrape usually has a shrubby growth form; at sites further inland, it can reach a height of 15 to 20 feet. It has large, thick nearly circular leaves about 5-inches long and 5- to 6-inches wide. The tree first flowers when it is about 6- to 8-years old, and clusters of male and female flowers are borne on separate trees. Flowering and fruiting occurs year round. Both male and female flowers are small (< ¼ inch across), greenish-white, and fragrant. Female flowers produce clusters of fruit that turn purple when mature and account for this plant's common name. The fruit are readily consumed by birds, which help disperse the seed.



Plant distribution.

Plant Availability

Readily available in the nursery trade.

Special Considerations

Seagrape is easily propagated from seed, no pretreatment necessary. Sow seed at or near the soil surface. It also is vegetatively propagated from hardwood cuttings. The species has a high light requirement and does not do well when shaded, so plan on weeding new plantings if necessary.



Seagrape plant and cluster of fruit.

Buttonwood, button mangrove

Conocarpus erectus L.

Buttonwood is native to Florida and the Caribbean with its range extending down into Central and South America. It is also known as button mangrove, but it is not considered a true mangrove. This is because it lacks vivipary (the seed/progagule begins germination and growth while still attached to the parent) and any modifications to tolerate saturated, saline soils found in true mangroves. Buttonwood is frequently found inland of the mangrove fringe, but in Florida, it is also associated with seagrape (*Coccoloba uvifera*) and cabbage palm (*Sabal palmetto*) in back-dune areas (6, 7, 11, 19, 20).

Buttonwood is an evergreen shrub, usually 4- to 12-feet tall, but it can be found as a tree-form up to 60-feet tall. It has simple, leathery leaves, approximately 1- to 4-inches long and ½- 1-inch wide. The small green flowers are borne in a small compact head any time from March through September. The tiny, scale-like fruit are borne in cone-like collections, about ½ to 1 inch in diameter and may be seen at any time of the year. It has been widely planted in the tropics as an ornamental



Buttonwood flowers and fruit.

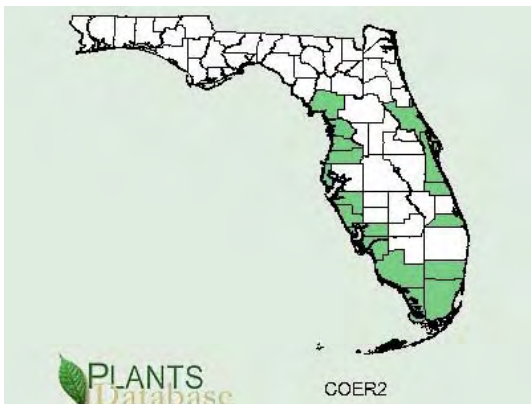
because it tolerates compacted soil, poor drainage, and drought. Buttonwood helps stabilize dune sites, protects the soil during storm surges, and provides habitat for wildlife.

Plant Availability

Common buttonwood and several named ornamental selections are available from native plant nurseries in the state.

Special Considerations

Seed are viable, but germination has been found to be low. Under moist conditions, cut stems will root, and propagation from cuttings is recommended.



Plant distribution.

Gulf croton, silverleaf croton, beach tea

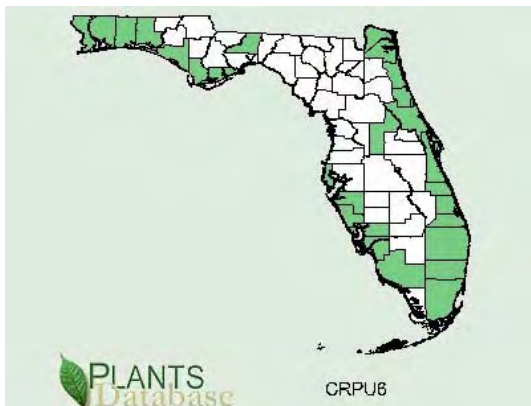
Croton punctatus
Jacq.

Silverleaf croton is a short-lived perennial shrub that is an important component of the foredune zone of both the Atlantic and Gulf coasts (4, 6, 16, 19).

This plant can reach a height of about 6 feet. Its leaves are elliptic in shape, ½- to 2 ½-inches long. The leaf margins are smooth, but they may appear undulating. The undersides of the leaves and most other surfaces of the plant are covered with star-shaped hairs that are arranged in dense clusters and have a red dot in the middle of them. This makes the plant an attractive ornamental for coastal landscape plantings. Small clusters of light-green flowers appear in the early summer through fall in northern counties and year round in southern counties. Seeds are dark gray with mottles and are a choice food of birds.



Silverleaf croton plant on beach and close up of leaf arrangement.



Plant distribution.

Plant Availability

Not readily available from commercial nurseries.

Special considerations

Plant seed collected in late fall to mid-March
1- to 1 ½-inches deep in dune sand.

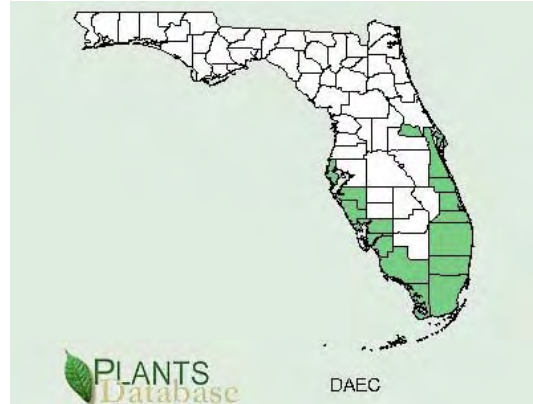
Coin vine

Dalbergia ecastaphyllum (L.)

Taubert

A scrambling and climbing shrub, coin vine sometimes resembles a small tree with limbs that extend outward for 30 feet. It is native throughout the Caribbean and in south Florida. It can be found on coastal dunes, landward of mangrove swamps, and on shell mounds within mangroves of south Florida. Coin vine likes sandy soils and tolerates constant salt spray (4, 7, 19).

A member of the bean family (Fabaceae), coin vine has leathery, glossy green leaves that are oval or elliptic in shape, between 2- to 6-inches long, and usually pointed at the tip. The small white flowers occur in groups in the leaf axils and develop into groups of copper-colored to grey-brown, flat seedpods that contain a single flattened seed about ½- to 1-inch wide. The flattened seed give the plant its common name.



Plant distribution.

Plant Availability

Not readily available in the nursery trade.

Special Considerations

Seedpods can be harvested directly off the plants when mature or gathered from under the plant after they fall off or when washed up on shore. Plant seedpods in commercial potting mix. Extraction of the seed is difficult and unnecessary as the seedling readily germinates through the seedpod. The plant also can be vegetatively propagated by air layering.



Coin vine plant, leaves and flowers, and seedpods on the beach.

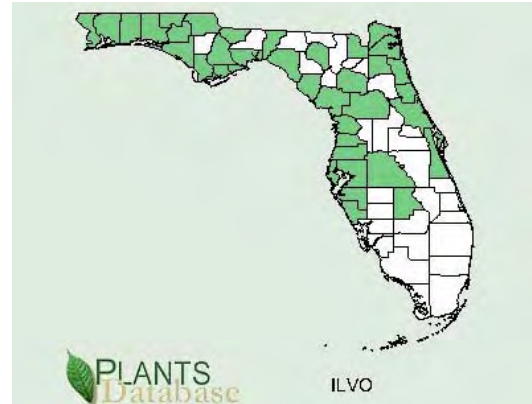


Yaupon holly

Ilex vomitoria Ait.

Yaupon occurs almost everywhere in Florida except in the southern part of the peninsula. In coastal areas of Florida, it is most commonly found in the western panhandle. Although tolerant of salt spray, it is primarily a backdune species growing in well-drained, sandy soils. Yaupon also tolerates wet soil conditions and can be found on the edge of brackish and salt marshes (4, 6, 10, 19, 29).

This species grows as a shrub or small bushy tree, up to 30-feet tall. The stiff dark green leaves with scalloped toothed edges are elliptic or oval in shape usually about ½- to 1-inch wide and up to 1 ½-inch long. Male and female flowers occur on separate plants. The small yellowish-white female flowers are borne solitary or in pairs in the leaf axils in the spring and produce round, bright red fruit during the fall and winter. This fruit is not edible by people but is an important food for many birds and small mammals. This plant is the only native North American plant to contain caffeine. Dried leaves and small stems of this plant were used to brew a drink consumed by the Native Americans. In large or strong doses, this drink would induce vomiting, hence its species name.



Plant distribution.

Plant Availability

Plants of various sizes are readily available from native plant nurseries.

Special Considerations

Seed take two years to germinate and seedlings must be cultivated for another two years prior to transplanting. Propagation is usually by rooting mature hardwood cuttings.

Yaupon holly plant and close up of fruit and leaves.



Seacoast marshelder, seashore elder, beach elder
Iva imbricata Walt.

This plant occurs on dunes throughout the south Atlantic and Gulf region. It can be the dominant plant in many locations and is particularly well adapted to the Atlantic coast of the state. It is noted for accumulating sand and making low, rounded dunes (2, 4, 25).

The plant has sparse, woody upright stems that grow between 1- to 4-feet high. It has fleshy, narrow lance-shaped leaves that emerge on opposite sides on the lower stem and on alternate sides on mid- and upper-stem sections. Small lavender flowers are borne in terminal racemes (seedhead where the flowers arranged singly on an elongated stalk) starting in late summer and into the fall. When buried by sand, the stem develops a strong root/rhizome (underground stem) system.

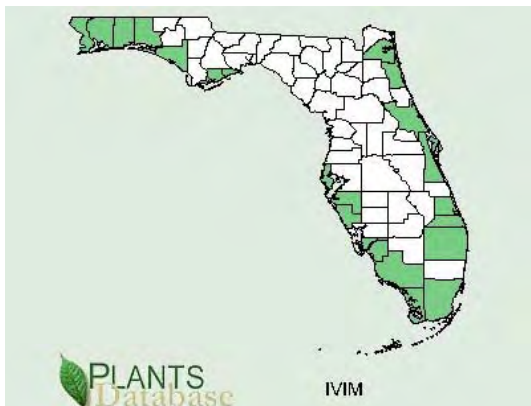


Seacoast marshelder exhibiting typical low, rounded sand dune formation and close up of fruiting stem.



Plant Availability

Rooted stem cuttings are available from native plant nurseries.



Plant distribution.

Special Considerations

Can be propagated from seed; if seed is to be used, collect and plant seed in the fall. Naturally occurring, small first-year seedlings can be easily transplanted in the spring. Plant top of rootball 4 inches below soil surface in dunes or at soil surface in heavier soils. Can be useful in certain situations as a landscaping plant, but the plant does not tolerate severe pruning.

Buttonsage, lantana *Lantana involucrata* L.

Buttonsage is a native lantana found on the dunes, coastal scrub, and tropical hammocks of southern Florida from about Hillsborough County on the west coast to Brevard County on the Atlantic coast. Lantanas are commonly planted in coastal areas of Florida but most of the plants have been *Lantana camara*, a species native to the West Indies but not Florida. *Lantana camara* is listed as a Florida Exotic Pest Plant Council Category 1 (<http://www.fleppc.org>) invasive species because it has spread into natural areas and impacts many native plants. It has been particularly harmful to *L. depressa*, an endangered Florida native *Lantana* species with which it hybridizes (13; see distribution map below). For this reason, only sterile selections of *L. camara* or *L. involucrata*, where adapted, should be used in Florida.

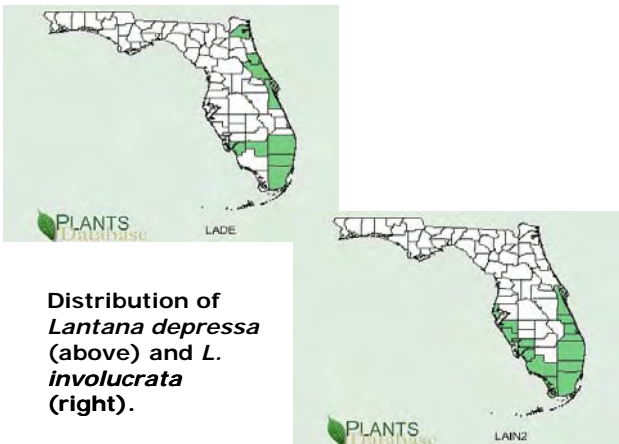
Buttonsage is a small to medium shrub that grows to about 6-feet tall. Leaves are smaller (½- to 2-inches long) than those of *L. camara* (1- to 6-inches long), and are rounded or oval shaped. The flowers are white sometimes with a bluish or lavender tint and have yellow centers, are borne in small, dense clusters, and may be present



Buttonsage (note white flowers and rounded leaves) and close up of the flowers of *Lantana camara*, the introduced invasive species.



at any time of the year. The plant is considered one of the best nectar plants for butterflies in south Florida. Fruit are small purple drupes and are reported not to be as poisonous as the fruit of *L. camara* (7, 19).



Distribution of *Lantana depressa* (above) and *L. involucrata* (right).

Plant Availability

Buttonsage is readily available from native plant nurseries in the state. White selections of *L. camara* have been developed, so be sure to check which species you are working with when looking at white-flowered plants.

Special Considerations

Plant is easily propagated by seed, rooting of softwood cuttings, or by transplanting wild seedlings. Transplant survival is improved if about one-third of the plant top is pruned off when moving freshly dug transplants (7).

Waxmyrtle, southern bayberry

Morella cerifera (L.)

Small (syn. *Myrica cerifera* L.)

This species is a common rhizomatous seaside shrub on both the Atlantic and Gulf coasts as well as most inland areas in the state. It can be found on frontal dune areas back of the dune crest, but it is most common on stabilized backdune areas particularly around marsh and pond edges (4, 6, 29).

On dune areas, the plant usually does not reach a height of more than 10 feet. Some authorities (29) consider the coastal version to be a separate dwarf species (*Morella pusilla*). Regardless of the taxonomy, other than size, the two species are very similar in appearance. Waxmyrtle is an evergreen plant with leathery yellow-green leaves, 1- to 4-inches long and up to ¾-inches wide. The leaves have small golden-colored dots on the underside, and when crushed, the leaves have an aromatic scent. Male and female flowers usually occur on separate plants. The fruit are small grey-white berries that are covered with waxy granules. Early settlers used to boil the berries to extract the wax for candles. The dense branches



Waxmyrtle bush and close up of fruit.



of waxmyrtle make excellent nesting habitat, and the berries are choice food for many birds.

Plant Availability

Potted plants are readily available at native plant nurseries.

Special Considerations

Plants can be started from seed, but the waxy coat should be removed by rubbing between the hands or by soaking in a lye solution (1 tsp per gallon of water). Seed require exposure to cold temperatures for 60 to 90 days to stimulate germination, so fall planting is best.



Plant distribution.

Plum

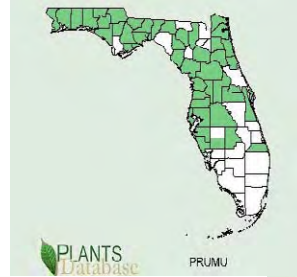
Prunus spp. L.

Two types of plums can be found on backdune sites in Florida. The hog plum (*Prunus umbellata*) is the most common plum species in Florida and is frequent from the northern counties into central Florida. The Chickasaw plum (*P. angustifolia*) is widely distributed across the Southeast but is less common in Florida, mainly occurring in the panhandle counties. Unlike the hog plum, the Chickasaw plum has only been found on backdune sites in western Florida and Alabama (6, 19, 34).

In dune situations, plums tend to be smaller than on inland sites regardless of the species. Plants are usually less than 8-feet tall in the dunes. The hog plum occurs as a solitary shrub or small tree, while the Chickasaw plum roots sucker readily and it tends to occur in dense thickets. Both species have white flower clusters that are present before the leaves emerge in the spring. One way to differentiate between the species is fruit color. At maturity, the Chickasaw plum has fruit that are yellow to red, while the fruit of the hog plum is light purple to black. The fruit of both species is readily eaten by wildlife, especially birds.

Plant Availability

Both species are available from native plant nurseries in the state.



Hog plum distribution (top) and Chickasaw plum distribution (right).

Special Considerations

Small plants from natural stands are best transplanted during the winter dormant season.



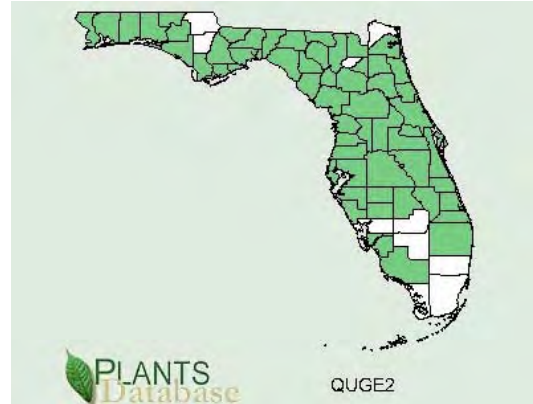
Hog plum tree in flower and ripening Chickasaw plum fruit.

Sand live oak

Quercus geminata Small

Sand live oak is a shrub or small semi-evergreen tree that is an important component of coastal dune scrub habitat in all coastal counties of Florida southward to Dade and Collier Counties. Some authorities consider sand live oak to an environmentally induced variant of live oak (*Quercus virginiana*), because the two species are hard to differentiate. Most taxonomists classify them as two separate species. Sand live oak is recognized as the only shrub-sized oak in the state with rolled boat-shaped leaves (4, 6, 8).

Size and shape of sand live oak trees is dependent on its environment. Near the shore, under the direct influence of salt spray and wind, the sand live oaks are quite short and shrublike. They often form dense impenetrable thickets of root-suckered clones. Further inland, they can form small- to medium-sized trees. The leaves are thick and leathery, dark green on top and dull grey underneath, and between $\frac{3}{4}$ - to 4-inches long and $\frac{1}{2}$ - to 1 $\frac{1}{2}$ -inches wide. The leaf edges roll under to such an extreme that when a leaf is upside down it resembles an elongated bowl.



Plant distribution.

Plant Availability

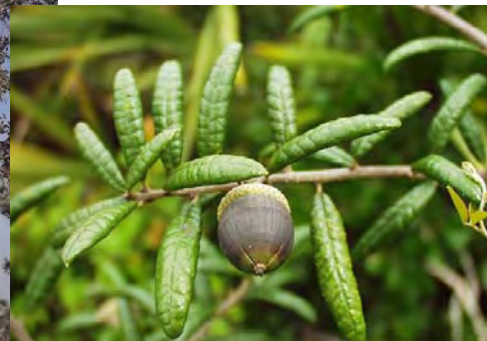
Sand live oak is readily available throughout the state from native plant nurseries.

Special Considerations

Collect acorns in the fall and place in water; non-viable seed will float (30). Plant acorns in containers filled with well drained germination media with caps up and half exposed. Transplant seedlings to gallon pots when they are 4- to 5-inches tall. Acorns can also be planted about 1 $\frac{1}{2}$ -inches deep directly on to backdune sites (5).



Sand live oak trees and close up of leaves and acorn. Notice rolled under leaf edges, a characteristic of this species.



Cabbage palm, cabbage palmetto, sabal palm

Sabal palmetto (Walt.) Lodd ex J.A. & J.H. Schultes

Florida's state tree, the cabbage palm, naturally occurs in backdune areas all over Florida but is most common along the south Florida coast. It grows in a wide range of habitats where the water table is fairly close to the surface, including saltwater marshes, wet hammocks, seasonally wet prairies, maritime forests, and coastal plains (4, 6, 29).

It is an evergreen palm tree that can reach up to 70-feet tall with a crown of fan-like leaves. The trunk is unbranched with grayish to brownish bark, which in young trees may be encircled by persistent petiole (leaf stalk) bases. The leaves are medium green in color, fan shaped, and palmately compound (leaflets arise from a single point in the center of the fan). The fans can be between 6- and 9-feet wide and are often wider than they are long. The plant's common name is derived from the fact that the palm heart (bud), which can be eaten raw or cooked by boiling or steaming, tastes somewhat like cabbage (*Brassica oleracea*). Drooping branched clusters of whitish-green flowers are present in June or July, which produce small berry-like fruit. This tree is recommended for landscaping purposes because of its long life, hardiness, and salt tolerance.



Cabbage palm tree and close up of persistent leaf stalk (petioles) bases that are often present on young trees.



Plant distribution.

Plant Availability

Readily available as potted seedlings or transplants in the state.

Special Considerations

Seeds readily germinate and seedlings are commonly present at the base of older trees. Wait until the seedlings are at least one year old to transplant. Older trees with trunks can be transplanted with proper equipment. Trim off most of the leaves of older trees, and tie up remainder with sisal or cotton cord prior to transplanting to reduce water use and minimize damage to bud. Do not remove cord; allow it to rot naturally.

Gullfeed, inkberry

Scaevola plumieri (L.) Vahl

Gullfeed is an attractive shrub that is found on the coastal dunes south from about Tampa Bay and Cape Canaveral. In a few coastal locations, the plant can be dominant (4, 19). This endangered Florida native plant should not be confused with its non-native relative, beach naupaka (*Scaevola sericea* also known as *S. frutescens* or *S. taccada*). This introduced species has been planted as an ornamental in south Florida and was even recommended at one time as a plant for coastal restoration. Beach naupaka has escaped and become naturalized on beaches in south Florida where it is displacing its native relative. Beach naupaka is listed as a Category 1 plant by the Florida Exotic Pest Plant Council (<http://www.fleppc.org>).

Gullfeed has trailing and spreading stems that form dense clumps. The foliage often forms dark green rosettes at the stem tips. Small white flowers are borne in clusters along the terminal leaves. The flowers have five petals that are fused at the base in a shape that resembles a fan, hence the common name, half-flower, given to the genus. Fruit are black when mature



Plant distribution.

Plant Availability

Available from native plant nurseries. To avoid getting information on the other native plant that also is called "inkberry" (*Ilex glabra*), be sure to specify *S. plumieri* when asking for the plant.

Special Considerations

Forms roots on the stems in contact with soil surface. These can be detached to make transplants, or it can be propagated from seed.



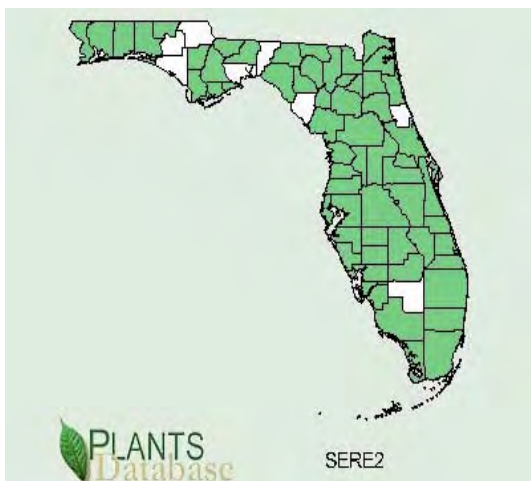
Gullfeed plant and close up of fruit. Note mature fruit is black.



Saw palmetto *Serenoa repens* (Bartr.) Small

This shrub is common throughout Florida from the coastal dunes inland. It can be a major component of the shrub areas of the backdunes on some areas of the coast. In the north and central part of the state, the dwarf palmetto (*Sabal minor*), a relative of the cabbage palm, also occurs. It resembles the saw palmetto, but does not possess the toothed petioles (stems that bear the leaves) that are characteristic of saw palmetto. Since the dwarf palmetto is not as drought tolerant as saw palmetto, it is unlikely to occur in dune habitat (4, 6, 29).

Saw palmetto has fan-shaped leaves that are green to gray-green and up to 3-feet wide. As previously mentioned, the leaves are borne on petioles that have spines on the edge. The stems of this plant usually run along the ground surface, but sometimes they turn up and become erect, reaching a height of 20 feet when protected from fire. White flowers are borne on branched stalks from March through July, which produce bluish to black oblong fruit, ½- to ¾-inch in diameter.



Plant distribution.



Saw palmetto flowers and in coastal habitat.



Plant Availability

Readily available from the native plant nurseries in the state. When purchasing plants, make sure they originated from coastal ecotypes.

Special Considerations

Saw palmetto does not transplant well. Small seedlings can be transplanted, but need to be watered well until established. Seeds germinate readily.

Bay cedar

Suriana maritima L.

Bay cedar is another tropical species whose northern range extends only into south Florida, where it is listed as an endangered plant. It is strictly a coastal species and can be found growing on beaches and dunes, tolerating storm-surge overwash, salt spray, blowing sand, and drought. It is one of the first plants to colonize newly stabilized beaches (4, 7, 9, 19).

Bay cedar is typically a small evergreen shrub, but it can have a tree form and reach up to 20-feet tall. The plant is usually multi-stemmed with numerous branches and a spreading crown (5- to 8-feet wide). Its bark is dark brown, rough, and flakey. The succulent leaves are gray-green in color and covered with minute, downy hairs. They are usually less than 2-inches long and borne alternately at the end of the upturned branches in such a dense manner as to appear whorled. The leaves have a salty taste and a cedar-like fragrance when crushed. Single or short clusters of yellow flowers, hidden in the leaves, can be present any time of the year. Each flower produces up to five seed that dry and become hard.



Bay cedar shrub and close up of flower.



Plant distribution.

This seed is buoyant and remains viable for long times in seawater. This has allowed the plant to colonize tropical beaches throughout the world, where it helps stabilize beaches and coastal dunes and furnishes food and cover for wildlife.

Plant Availability

Available from native plant nurseries in south Florida.

Special Considerations

Propagated from seed. Grows well in well drained sites once established; irrigate only during establishment.

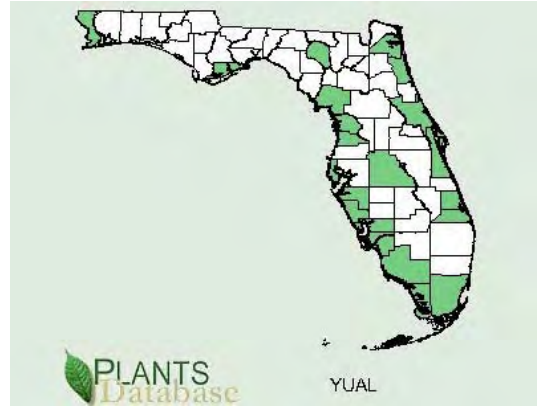
Spanish bayonet, aloe yucca

Yucca aloifolia L.

Spanish bayonet is a very distinctive woody plant that occurs frequently in both active and stable dune fields and on the edges of salt marshes throughout the state. The Florida endangered mound lily yucca (*Yucca gloriosa*) can also be found in coastal areas, but it is a much rarer species and has been found only in Leon and Franklin Counties. Adam's needle or beargrass (*Y. filamentosa*) is another native yucca that is quite common in Florida, but it is not adapted to coastal environments (4, 6, 9, 19, 34).



Spanish bayonet flowers and plant.



Plant distribution.

Spanish bayonet is a clump-forming shrub with thick, inclining to erect trunks. The plant can reach a height of 10 to 15 feet and have a spread of 3 to 5 feet. The stiff, erect leaves are dark green, 1- to 2-inches wide, and up to 2-feet long. The leaves have rough edges and sharp needle like tips. Dense terminal clusters of white flowers up to 18-inches long are usually produced in the late spring or early summer. The fruit is a fleshy, leathery berry about 4-inches long and 1-inch wide that turns black when mature. The mound lily yucca has leaves that are not rough on the edge, are less stiff, and more bluish green. Additionally, the flower stalk of the mound lily is usually raised clear of the leaves, not partially covered by the leaves as in Spanish bayonet.

Plant Availability

Available from native plant nurseries in the state but not common. Because *Y. filamentosa* is also available, be sure to specify *Y. aloifolia* when requesting this plant.

Special Considerations

Propagate by dividing suckers or rooting trunk cuttings. To make rooted trunk cuttings, take 2- to 3-foot lengths of stem and plant butt end about 1-foot deep. Plants can also be started from seed.

Sources of Coastal Plants for Florida

Association of Florida Native Nurseries
(<http://www.afnn.org>)

Commercial Suppliers of Sea Oats in Florida
(2003) DGEF 150
(<http://nsgl.gso.uri.edu/flsgp/flsgpg03002.pdf>)

List of Native Plant Nurseries in Florida and Alabama
(<http://www.aces.edu/waterquality/streams/Vegetation/native%20nuser%20list%20florida.doc>)

For sources of the named plant materials developed by the Brooksville Plant Materials Center, please contact the Brooksville Plant Materials Center staff (352-796-3385).

Additional sources of coastal plants can be found in "Seed & Plant Vendors Guide of Conservation Plants for the Mid & Southeast U.S."
(<http://www.ms.nrcs.usda.gov/technical/2006SeedandPlanVendorsof.pdf>)

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p. 13 Saltgrass plants
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©Shirley Denton @ <http://www.shirleydenton.com>
p. 14 Hairawn muhly seedhead
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p. 41 Hog plum tree and Chickasaw plum fruit
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p. 43 Cabbage palmetto trunk
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©Dr. Charles Gresham, Clemson Univ.
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©Ann Murray @ Univ. Florida Center for Aquatic and Invasive Plants
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Forest and Kim Starr @ <http://www.hear.org>
p. 14 Gulfhairawn muhly plants
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©Thomas Socha, US Army COE, Charleston, SC
p. 8 Bitter panicum transplants

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p. 20 Seoats seedhead

Coastal Exotic Invasives – Species to Avoid

Non-native, invasive plant species are all too common throughout Florida. Coastal dunes and their associated ecosystems are not immune to invasive species becoming established. The species can severely impact the integrity of coastal sites as they displace native plants, degrade wildlife habitat, and disrupt the ecological functioning of the community. Therefore, avoid use of non-native, invasive species at all times, and quickly remove such species as soon as possible when they are discovered. More information on the species listed here can be found at <http://www.fleppc.org> or <http://www.beachvitex.org>.



Australian pine
(*Casuarina glauca*
or *C. equisetifolia*).



Beach naupaka (*Scaevola sericea*). Note white fruit; the native species fruit is black.



Seaside mahoe or portia tree
(*Thespesia populnea*).



Beach vitex (*Vitex rotundifolia*). This species has been introduced to the Carolinas, but has not been reported in Florida.



Schefflera or umbrella tree
(*Schefflera actinophylla*).



Santa Maria
(*Calophyllum antillanum*).

Lantana (*Lantana camara*).



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 Cabbage palmetto [*Sabal palmetto* (Walt.) Lodd. ex J.A. & J.H. Schultes]
 Coastal bluestem [*Schizachyrium littorale* (Michx.) Nash]
 Cucumberleaf sunflower (*Helianthus debilis* var. *debilis* (Nutt.)
 Dwarf palmetto [*Sabal minor* (Jacq.) Pers.]
 Dwarf wax myrtle (*Myrica pusilla* Raf.)
 Gulf bluestem [*Schizachyrium maritimum* (Chapman) Nash]
 Saltgrass [*Distichlis spicata* (L.) Greene]
 Saltmeadow cordgrass [*Spartina patens* (Ait.) Muhl.]
 Seashore dropseed [*Sporobolus virginicus* (L.) Kunth]
 Yaupon (*Ilex vomitoria* Ail.)
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