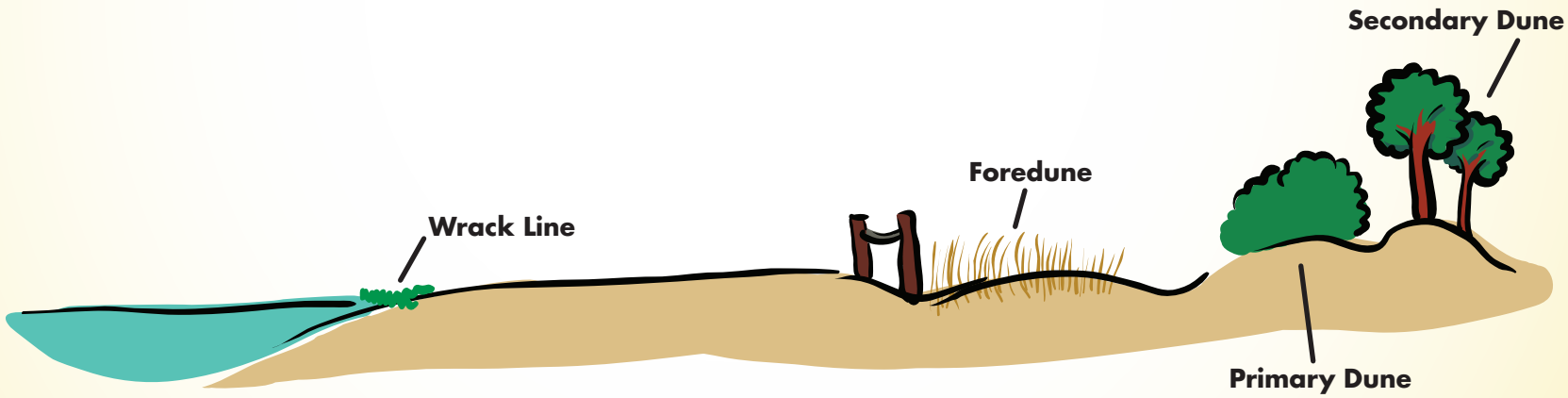
# Formation of Dunes

Native, salt-tolerant vegetation on beaches traps wind-blown sand and builds dunes through a process called accretion. The vegetation's dense root network further stabilizes the dune system and creates a sand reservoir for the entire beach-dune system.

*La vegetación nativa a las zonas costeras es tolerante a la sal y construye las dunas al atrapar la arena soplada por el viento. Esta vegetación también tiene una densa red de raíces que crea un depósito de arena y que estabiliza las playas.*

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# History of the Dunes

Between 1975 and 1980, the United States Army Corps of Engineers (USACE) and the Florida Department of Environmental Protection (FDEP) restored the City of Miami Beach's eroded eastern shoreline by pumping offshore sand to nourish the beaches and construct an elevated levee for erosion control and storm protection. In the mid-1980s, salt tolerant plants were added to the sand levee to improve its protective function, creating the vegetated dune that exists today.

*Entre los años 1975 y 1980, el Cuerpo de Ingenieros del Ejército de los Estados Unidos (USACE) y el departamento del medio ambiente estatal (FDEP) utilizaron arena de alta mar para restaurar la costa erosionada en el este de la Ciudad de Miami Beach y para construir un dique elevado como protección para las tormentas. Poco después, el dique fue vegetado con especies tolerantes a la sal para mejorar su función protectora, creando las dunas vegetadas que existen hoy.*

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# Benefits of Dunes

Dune vegetation, including fast-growing sea oats and deep-rooted shrubs, not only stabilize the accumulated sand and soil, but also protect the beach and coastal property from storm wave erosion by absorbing wave energy and blocking storm surge.

*La vegetación en las dunas, incluyendo el mar avena y las especies de arbustos con raíces profundas, estabiliza la arena y tierra acumulada en la playa y protege la infraestructura costera al absorber la energía de las olas y bloquear la marejada durante las tormentas tropicales.*

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# Sea Turtles

Every year between April 1 and October 31, three sea turtle species nest on the city's beaches: the Loggerhead, the Green, and the Leatherback. Disturbing sea turtle nests, hatchlings, or nesting females is prohibited by law.

*Cada año entre el 1ero de abril y el 31o de octubre, tres especies de tortugas marinas anidan en las playas de la Ciudad de Miami Beach: la tortuga boba, la tortuga marina verde, y la tortuga laúd. La ley prohíbe que se molesten los nidos, crías y las hembras anidadoras de estas especies.*

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# Dunes and Turtles

Hatchlings are instinctively attracted to bright lights and naturally travel toward the light created by the reflection of the moon or stars off the surf along dark beaches. Dune vegetation blocks artificial lighting visible on the beach, which prevents the disorientation of both adult sea turtles and hatchlings.

If you see someone harassing a sea turtle, please contact the Florida Fish and Wildlife Conservation Commission at (888) 404-FWCC (3922), or *FWC or #FWC from your cell phone.

*Las crías de las tortugas marinas son instintivamente atraídas por las luces brillantes porque naturalmente se guían hacia el mar por el reflejo de la luna y las estrellas en el mar. Las dunas son importantes para su protección porque la vegetación bloquea las luces artificiales que son visibles desde la playa y previenen su desorientación.*

*Si usted ve a alguien molestando a una tortuga, por favor marque al (888) 404-FWCC (3922) o *FWC o #FWC desde su teléfono celular.*

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# Restoration of Dunes

The municipality works with local volunteers to improve species diversity and restore the structural integrity of the dunes, by removing non-native, invasive vegetation and replanting with native species.

To participate in future dune restoration events, please contact the Environmental Resources Management Division at 305.673.7080.

*La Ciudad de Miami Beach trabaja con voluntarios locales para mejorar la diversidad de especies y restaurar la integridad estructural de las dunas. Los voluntarios ayudan a remover vegetación invasiva que no es nativa y a remplazarla con especies nativas.*

*Si gusta participar en una restauración en el futuro, por favor llame a la División de Recursos Ambientales al 305.673.7080.*

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# Invasive Plants


The Hawaiian half-flower *(Scaevola frutescens)* is not native to Florida and it grows aggressively, crowding out native plants. Its shallow roots and fragile stems are easily destroyed in high winds or storms, which can leave the dunes more prone to erosion and destruction.

*Scaevola frutescens es una especie que no es nativa al estado de Florida y que crece en una manera agresiva que desplaza a las especies nativas. Sus raíces y sus tallos frágiles se destruyen facilmente durante tormentas tropicales ya que no pueden sobrevivir vientos fuertes. Esto crea problemas de erosión acelerada que puede destruir las dunas.*

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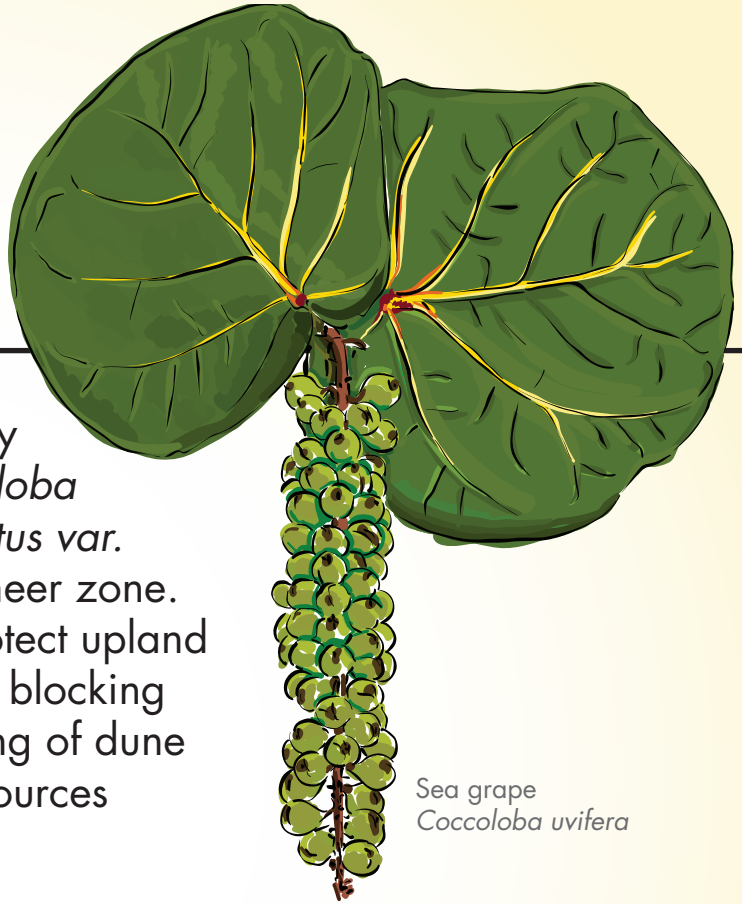
# The Coastal Strand Zone



Sea grape
*Coccoloba uvifera*

The strand zone is a dense, flat-topped community of evergreen shrubs, including sea grape *(Coccoloba uvifera)* and silver buttonwood *(Conocarpus erectus var. sericeus)*, that occurs behind the herbaceous pioneer zone. Strand zone vegetation helps stabilize dunes, protect upland structures from erosion, and protect sea turtles by blocking artificial light. If you witness unauthorized trimming of dune vegetation, please contact the Environmental Resources Management Division at 305.673.7080.

*En el área oeste de nuestras dunas existe una comunidad de vegetación densa con especies típicamente enanas como la uva de playa (Coccoloba uvifera) y el mangle botón (Conocarpus erectus var. sericeus). La vegetación en esta zona ayuda a estabilizar las dunas, a proteger la infraestructura de la erosión, y a bloquear la luz artificial de la playa. Si usted ve a alguien podando esta vegetación, por favor llame a la División de Recursos Ambientales al 305.673.7080.*

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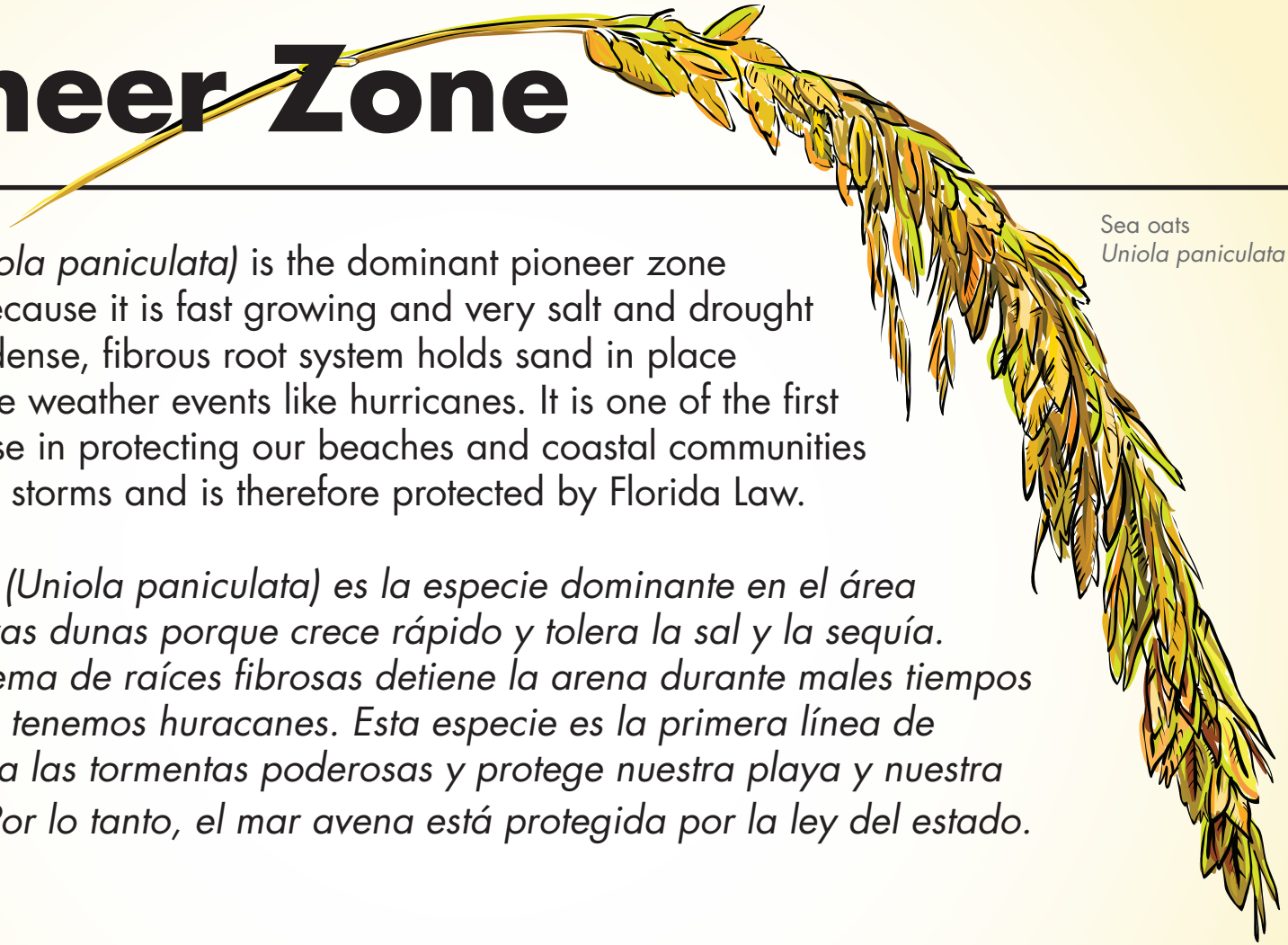
# Sea Oats and the Pioneer Zone



Sea oats
*Uniola paniculata*

Sea oats *(Uniola paniculata)* is the dominant pioneer zone dune grass because it is fast growing and very salt and drought tolerant. The dense, fibrous root system holds sand in place during extreme weather events like hurricanes. It is one of the first lines of defense in protecting our beaches and coastal communities from powerful storms and is therefore protected by Florida Law.

*El mar avena (Uniola paniculata) es la especie dominante en el área este de nuestras dunas porque crece rápido y tolera la sal y la sequía. Su denso sistema de raíces fibrosas detiene la arena durante males tiempos como cuando tenemos huracanes. Esta especie es la primera línea de defensa contra las tormentas poderosas y protege nuestra playa y nuestra comunidad. Por lo tanto, el mar avena está protegida por la ley del estado.*

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# Saw Palmetto and the Strand Zone

Saw palmetto (Serenoa repens) is the dominant plant in the coastal strand zone because it grows further upland through succession once the shoreline is stabilized by the grasses and vines. Coastal strand plants have roots as deep as 6 feet and are resistant to extreme conditions like drought, fires, and freezing temperatures.

*La palmera enana (Serenoa repens) es la especie dominante en el área oeste de nuestras dunas porque crece hacia tierra alta que ha sido estabilizada por los panículos y los vides en el proceso de sucesión. La vegetación en esta zona tiene raíces profundas que pueden llegar hasta 6 pies bajo la tierra y es resistente a las condiciones extremas como la sequía, incendios, y temperaturas frígidas.*

Saw palmetto
*Serenoa repens*

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# Dunes and the Beach System

Dunes trap sand and keep it from being blown away or washed back into the ocean, reducing the need for costly repeated beach renourishment. The dunes help stabilize the space between the ocean and upland property, providing better protection from storm surges and high tides. This creates a stable sand reservoir within the beach-dune system which helps to combat erosion.

*Las dunas atrapan arena y la detienen para que no se la lleve el viento o la marea, reduciendo la necesidad para los proyectos de recuperación de playa. Las dunas estabilizan el área entre el mar y la infraestructura de nuestra comunidad, proporcionando mejor protección contra las tormentas y la marea alta. Esto crea un depósito de arena estable dentro del sistema costero que ayuda a combatir la erosión.*

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# The Miami Beach Dune System

**Wrack Line:** The line of dried seaweed left behind by the most recent high tide stabilizes the sand and is an important source of nutrients for the coastal ecosystem. *Zona de alga marina seca dejada atrás por la marea alta más reciente que estabiliza la arena y es una fuente de nutrientes para el ecosistema costero.*

**Pioneer Zone:** The herbaceous, fast-growing, salt-tolerant dune grasses and vines, like sea oats, help to build the dunes. The plants in this zone trap and stabilize sand that is constantly blown off the beach. *Zona en el área este de nuestras dunas que consiste de panículos y de vides herbáceos, como el mar avena que crecen rápido y son tolerantes a la sal. Ayudan a construir la duna porque atrapan y estabilizan la arena que el viento vuela de la playa.*

**Coastal Strand Zone:** The dense, flat-topped community of evergreen shrubs stabilizes the dunes, protects upland structures from erosion caused by storms, and protects sea turtles by blocking artificial light. *Zona en el área oeste de nuestras dunas que consiste de una comunidad densa de arbustos enanos que estabilizan las dunas, protegen la infraestructura de la erosión causada por las tormentas, y protegen a las tortugas marinas de la luz artificial.*

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# Seaweed

The wrack line, or tidal wrack, is the line of dried seaweed and other debris left behind by the most recent high tide. The seaweed in the wrack line acts as a sand stabilizer and is a valuable source of nutrients for coastal flora and fauna, including migratory birds.

*La marea alta deja atrás una línea de alga marina seca a lo largo del mar. Esta alga estabiliza la arena y es una fuente de nutrientes para el ecosistema costero, incluyendo especies de aves migratorias.*

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# Beach Renourishment

Over 200 miles of beaches in Florida, including Miami Beach, have been restored to date. Past USACE, Miami-Dade County, and City beach renourishment projects have been estimated to generate a $7 return for every $1 invested due to the recreational and ecological value provided by a healthy beach. Restoring beaches also improves marine turtle nesting success and allows reconstruction of the entire coastal habitat, supporting more than 200 plant and animal species.

*Más de 200 millas de playas en Florida, incluyendo Miami Beach, han sido restauradas. Se ha estimado que pasados proyectos de recuperación de playa coordinados por el USACE, el condado de Miami-Dade, y la Ciudad de Miami Beach generan $7 de valor recreacional y ecológico por cada $1 invertidos porque mejoran la salud de la playa. La recuperación de las playas también mejora el éxito de las tortugas marinas anidadoras y contribuye a la restauración del ecosistema costero, que es el hogar de más de 200 especies de plantas y animales.*

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