



SAND DUNES

Dunes play an important role both to the beaches that front them and the land behind them. Dunes act as a sand reserve for beaches. Dune systems act as a buffer between the high energy of the ocean and the land. Dunes provide a barrier to salt intrusion from high tides and storm surges, and it protects the land behind the dunes from erosion.

The dunes in Florida are broken into five zones. These zones become more stable and are older as you move away from the beach. These zones are the pioneer dune zone, the fore dune zone, the dune field zone, the scrub zone, and the hammock zone.

The pioneer dune forms just above the highest tides. They are formed by windblown sand collecting around an obstruction. As organic matter is deposited by wind and waves, low herbs (e.g., sea-rockets, seaside evening-primrose) colonize the dune. As these plants collect more sand and organic matter, the dune increases in height becoming the fore dune.

As the fore dune grows it is colonized by sea-oats, railroad vine, sand spurs, beach croton, beach morning glory, and other plants. These low, tough plants have extensive root systems, which stabilize the dune.

Dune fields are formed as a series of older, stable fore dunes grow in height and organic content. The dune field will absorb much of the energy from storm surges, thereby protecting the land behind them.

When enough organic material has been collected, woody plants such as the palmetto, wax myrtle, cabbage palm, and sea grapes colonize the dunes. This creates a dense scrub zone. The oldest dunes may be colonized by trees such as the live oak and slash pine to create a maritime forest known as a hammock.

The plants found on the pioneer and fore dune must be particularly tough. These plants grow in sandy, salty soils with little water or nutrients. These plants must be able to withstand salt spray, burial, wind, heat, and drought. These plants have deep extensive root systems to anchor the plant and search for water. These plants, much like desert plants, have special adaptations to conserve water. Dune plants have a wide variety of methods for dealing with salt. Some plants limit salt penetration with methods such as thick, waxy cuticles or epidermal hairs. Other plants excrete the salt. Some can even detoxify the salt within their system. Without these hardy plants to hold the sand in place, so close to the high energy beach, there would be no dune system.

The pioneer and fore dune play an important part in controlling beach erosion. During the low wave energy summer months, sand is deposited on the beach and blown into the dune system for storage. During high wave energy periods when the beach is eroded, the pioneer and fore dunes erode giving their sand back to the beach to increase its profile. This keeps the beach from completely eroding away and washovers from occurring. As sand is deposited on the beaches the next summer the wind replenishes the dunes.

Beach erosion is a big problem in Florida. In 1989 the Florida Department of Natural Resources reported that 218 miles of beach were in a critical state of erosion. Along the barrier islands in Pinellas County they have started reforming the dune system that was destroyed when the islands were developed. All along the Florida coast you can see that areas that were built directly on the dune are more eroded than the areas where the dune system is still intact.