APPENDIX 8

FNAI Natural Community Descriptions

NATURAL COMMUNITY DESCRIPTIONS

(1) BEACH DUNE - (Synonyms: sand dunes, pioneer zone, upper beach, sea oats zone, coastal strand). Beach Dune is characterized as a wind-deposited, foredune and wave-deposited upper beach that are sparsely too densely vegetated with pioneer species, especially sea oats. Other typical pioneer species include beach cordgrass, sand spur, dune or bitter panic grass, railroad vine, beach morning glory, seashore paspalum, beach elder, dune sunflower, sea purslane, and sea rocket. Typical animals include ghost crab, dune, especially along its ecotone with the unvegetated beach, is also the primary nesting habitat for numerous shorebirds and marine turtles, including many rare and endangered species.

Beach Dune communities are found along shorelines subject to high energy waves which deposit sand-sized grains to form the open beach. Onshore winds move the sand grains inland until slowed by an obstacle, usually plant stems, causing the grains to drop. As the plants grow upward and burial continues, a foredune is built. Dune height is largely determined by the strength and the directional constancy of winds and by the growth habits of dune-forming plants. As a cape or barrier island grows seaward, new beaches are deposited seaward of the old one and a characteristic ridge and swale topography develops.

Beach Dunes are very dynamic communities and mobile environments. The wind continually moves the sand inland from the beach until trapped by vegetation. Beach Dunes are subject to drastic topographic alterations during winter storms and hurricanes. Taking the brunt of storm surge, intact Beach Dunes are essential for protection of inland biological communities.

The soils of Beach Dunes are composed of sands that are similar to those washed onto the adjacent beach, except that the wind selectively lifts out the smaller sand particles, blows them inshore, and deposits them around plant stems. These deep siliceous or calcareous sands drain rapidly, creating decidedly xeric conditions.

Beach Dunes occur in an extremely harsh environment. The dune vegetation must be able to tolerate loose, dry, unstable, nutrient poor soils, as well as exposure to wind, salt spray, sand abrasion, intense sunlight, and storms. Thus, dune species have evolved several morphological adaptations to survive in this harsh environment. Many of them root easily from fragments washed ashore in storm debris, or they produce large floating seeds that can be transported by ocean currents. Some have thickened cuticles and succulent foliage to better retain water and to reduce the effects of salt spray and sand abrasion. Some spread by subterranean or surface runners that creep across the barren sands. Many readily reroot from higher up their stems when buried by blowing sand and consequently develop a matted or wiry root system. Some have become so dependent on the dune habitat that they lose vigor without shifting sands constantly stimulating them to send out new shoots and reroot. These characteristics are the primary reasons for their unique ability to stabilize aeoian sand into nearly static beach dunes.

In spite of their ability to withstand the harsh maritime environment, plants of the Beach Dunes are extremely vulnerable to human impacts. A foot path or off-road vehicle trail over the beach dunes can damage the vegetation, giving wind and water the leverage needed to begin

erosional processes. A gap, or blowout, forms and continually widens until it is slowly revegetated and stabilized. The sand from the gap moves inland, and rapidly buries vegetation, destabilizing the beach dunes and often disturbing adjacent communities. When a storm ensues, the unvegetated gap allows storm surges easy access to these communities for further disruption. Because of their vulnerability, Beach Dunes require protection from trampling (i.e., boardwalks for beach access) and off-road vehicles. Coastal developments which affect the sand sources that are necessary for Beach Dune replenishment should be strongly discouraged.

(5) COASTAL STRAND - (synonyms: shrub zone, maritime thicket, coastal scrub). Coastal Strand is characterized as stabilizer, wind-deposited coastal dunes that are vegetated with a dense thicket of salt-tolerant shrubs, especially saw palmetto. Other typical plants include sand live oak, cabbage palm, myrtle oak, yaupon, sea grape, cat's claw, nakedwood, lantana, green brier, buckthorn, cocoplum, nickerbean, coin vine, beach jacquemontia, pinweed, bay cedar, necklace pod, sea lavender, Spanish bayonet, woody goldenrod and Florida rosemary. Typical animals include gopher tortoise, six-lined racerunner, southern hognose snake, coachwhip snake, diamondback rattlesnake, and beach mouse.

Coastal Strand occurs on deep wind-deposited sands which have been wind-sorted and wavewashed. There is usually some shell admixed with quartz grains on the beach, but this is rapidly leached out in the course of only a few hundred years. Coastal Strand dunes are generally quite stable but are susceptible to severe damage if the vegetation is disturbed. Shrubs in the coastal Strand are frequently dwarfed and pruned as a result of the salt spray-laden winds that kill twigs on the seaward side, producing a smooth, dense upward-slanting canopy resembling a sheared hedge.

Coastal Strand is actually an ecotonal community that generally lies between Beach Dune and Maritime hammock. It may also grade into Scrub, and it often shares many of the same species that occur in Coastal Berm. Fire may reduce succession towards Maritime Hammock. However, maritime influences alone will often suffice to inhibit succession to forest.

Coastal Strand is probably the most rapidly disappearing community in Florida. It is most extensive along the Atlantic Coast where, being elevated and next to the coast, it is prime resort or residential property. Coastal Strand originally occurred as a nearly continuous band along the Atlantic shorelines. Now it occurs largely as broken and isolated small stretches. In south Florida, it has also been disturbed by invasions of exotic species, principally Brazilian pepper and Australian pine. Along with other coastal communities, Coastal Strand protects inland communities from the severe effects of storms.

(75) MARINE TIDAL MARSH - (synonyms: saltmarsh, brackish marsh, coastal wetlands, coastal marshes, tidal wetlands). Marine and Estuarine Tidal Marshes are floral Based Natural Communities generally characterized as expanses of grasses, rushes and sedges along coastlines of low eave-energy and river mouths. They are most abundant and most extensive in Florida north of the normal freeze line, being largely displaced by an interspersed among Tidal Swamps below this line. Black needlerush and smooth cordgrass are indictor species which usually form dense, uniform stands. The stands may be arranged in well-defined zones according

to tide levels or may grade subtly over a broad area, with elevation as the primary determining factor. In the upper reaches of river mouths, where Estuarine tidal Marsh begins to blend with Freshwater Tidal Swamp and Marsh, sawgrass may occur in dense stands. Saw grass is the least salt tolerant of these Tidal Marsh species. Other typical plants include saltgrass, saltmeadow cordgrass (marsh hay), gulf cordgrass, soft rush and other rushes, salt myrtle, marsh elder, saltwort, sea oxeye, cattail, big cordgrass, bulrushes, seashore dropseed, seashore paspalum, shoregrass, glassworts, seablight, seaside Heliotrope, saltmarsh boltonia, and marsh fleabane. Typical animals include marsh snail, periwinkle, mud snail spiders, fiddler crabs, marsh crab, green crab, isopods, amphipods, diamondback terrapin, saltmarsh snake, wading birds, waterfowl, osprey, rails, marsh wrens, seaside sparrows, muskrat and raccoon.

Fishes frequently found in this community include blacktip shark, lemon shark, bonnet-head shark, hammerhead shark, southern stingray, yellow spotted ray, tarpon, ladyfish, bonefish, menhaden, sardines, anchovy, catfish, needlefish, killifish, bluefish, blue runner, lookdown, permit, snapper, grunts, sheepshead, porgies, pinfish, seatrout, red drum, mullet, barracuda, blenny, goby, trigger fish, filefish, and puffers.

Tidal Marsh soils are generally very poorly drained muck or sandy clay loams with substantial organic components and often a high sulfur content. The elevation of Tidal Marshes range from just below sea level to slightly above sea level with vegetation occupying the intertidal and supratidal zones. The frequently high density of plant stems and roots effectively traps sediments derived from upland runoff or from littoral and storm currents. The decaying, dead marsh plants and the transported detritus which the living plants trap, accumulate to form peat deposits. Together, these accretion processes may build land.

Tidal Marsh plants live under conditions which would stress most plants. High salt content in the soil, poor soil aeration, frequent submersion and exposure intense sunlight, and occasional fires make the tidal Marsh community inhospitable to most plants and require a wide tolerance limit for its inhabitants. The landward extent of Tidal Marsh along the shore line is directly related to the degree of bottom slope; the more gradual the slope the broader the community band. Typical zonation of this community includes smooth cordgrass in the deeper edges, grading to salt tolerant plants such as black needlerush that withstand less inundation.

Tidal fluctuation is the most important ecological factor in Tidal Marsh communities, cycling nutrients and allowing marine and estuarine fauna access to the marsh. This exchange helps to make Tidal Marsh one of the most biologically productive Natural Communities in the world. In fact, primary productivity in Tidal Marshes surpasses that of most intensive agricultural practices. The former operates as no cost because of free energy subsidies from tides, while that latter requires costly energy subsidies in the form of fuels, chemicals, and labor. A myriad of invertebrates and fish, including most of the commercially and recreationally important species such as shrimp, blue crab, oysters, sharks, grouper, snapper and mullet, also use Tidal Marshes throughout part or all of their life cycles.

Tidal Marshes are also extremely important because of their storm buffering capacity and three pollutant filtering actions. The dense roots and stems hold the unstabilzed soils together,

reducing the impact of storm wave surge. The plants, animals, and soils filter, absorb, and neutralize many pollutants before they can reach adjacent marine and estuarine communities. These factors make Tidal Marshes extremely valuable as a Natural Community.

Adverse impacts of urban development of Tidal Marshes include degradation of water quality, filling of marshes, increased erosion, and other alterations such as bulkheading and beach renourishment. The most attractive coastal areas for development activities frequently are the most ecologically fragile and are extremely vulnerable to development of any kind. Off shore pollution in the form of oil spills and various forms of letter jettisoned from shipping traffic also impact Tidal Marsh terminal stage of succession in coastal areas.

(76) MARINE TIDAL SWAMP - (synonyms: mangrove forest, mangrove swamp, mangrove islands). Marine and estuarine Tidal Swamps are Floral Based Natural Communities characterized as dense, low forests occurring along relatively flat, intertidal and supratidal shorelines of low wave energy along southern Florida. The dominant plants of Tidal Swamp Natural Communities are red mangrove, black mangrove, white mangrove and buttonwood. These four species occasionally occur in zones which are defined by varying water levels, with red mangrove occupying the lowest zone, black mangrove the intermediate zone, and white mangrove and buttonbush the highest zone. Other vascular plants associated with Tidal Swamps include salt grass, black needlerush, spike rush, glasswort, Gulf Cordgrass, sea purslane, saltwort and sea oxeye. Typical animals of the Tidal Swamp include mangrove water snake, brown pelican, white ibis, osprey, bald eagle, and a variety of shorebirds, herons, egrets, and raccoon. Also included are sponges, oysters, marine worms, barnacles, mangrove tree crabs, fiddler crabs, mosquitoes, and numerous other invertebrates. Fishes are likewise diverse in this community. Those most frequently occurring include black-tipped shark, lemon shark, nurse shark, bonnet-head shark, rays, tarpon, ladyfish, bonefish, menhaden, sardines, lookdown, permit, snapper, sheepshead, porgies, pinfish, and mullet.

Several variations of Tidal Swamps are generally recognized. These include (1) overwash swamps found on islands which are frequently inundated by the tides; (2) narrow fringe swamps located along waterways; (3) riverine swamps found in floodplains; (4) basin swamps growing in depressions slightly inland from the water; (5) hammock swamps, similar to basin swamps but growing at a slightly higher elevation; and (6) scrub swamps growing over hard substrates such as limestone marl.

Tidal Swamps occur in flat coastal areas. The soils are generally saturated with brackish water at all times, and at high tides these same soils are usually inundated with standing water. Mangroves grow on a wide variety of soils ranging from sands to muds. In older Tidal Swamps the sands and muds are usually covered by a layer of peat which has built up from detritus (decaying plant material).

The prop roots of red mangroves, the extensive pneumatophores (aerial roots) of black mangroves and the dense root mats of the white mangrove serve to entrap sediments and recycle nutrients from upland areas and from tidal import. This process serves in "island formation" and is a part of the successional process involved in land formation in south Florida. These root

structures also provide substrate for the attachment of and shelter for numerous marine and estuarine organisms.

Temperature, salinity, tidal fluctuation, substrate and wave energy are five physical factors influencing the size and extent of Tidal Swamps. Mangroves require an annual average water temperature above 19'C (66'F) to survive. They do not tolerate temperatures below freezing or temperatures which fluctuate widely over the course of a year. Salt water is a key element in reducing competition from other plants and allowing mangroves to flourish. In addition, mangroves have adapted to the salt water environment by either excluding or excreting salt from plant tissues. Mangroves can survive in freshwater but are usually not found in large stands under such conditions in nature because they succumb to competition.

Tidal Swamps are closely associated with an often grade into Seagrass beds, Unconsolidated Substrates, Tidal Marshes, Shell Mounds, Coastal Berms, Maritime Hammocks, and other coastal communities. Seagrass Beds and Unconsolidated Substrates are usually found in the subtidal regions surrounding Tidal Swamps. Tidal Marshes are often found along the inland boundary of the Tidal Swamps. Tropical hardwood species occupy Coastal Berm and Shell Mound communities which are often surrounded by mangroves. In Florida, Tidal Swamps occur along both coasts, buffered by barrier island formations. Tidal Swamps are most extensive from Cedar Key southward along the Gulf Coast and from Ponce de Leon Inlet southward along the east coast. The most luxuriant growth occurs in the Ten-Thousand Island areas of southwest Florida.

The Marine and Estuarine Tidal Swamp communities are significant because they function as nursery grounds for most of the state's commercially and recreationally important fish and shellfish. These Natural Communities are also the breeding grounds for substantial populations of wading birds, shorebirds, and other animals. The continuous shedding of mangrove leaves and other plant components produce as much as 80% of the total organic material available in the aquatic food web. Additionally, Tidal swamps help protect other inland communities by absorbing the brunt of tropical storms and hurricanes.

Tidal Swamps have been and continue to be areas of environmental concern because many acres were destroyed through diking and flooding, ditching for mosquito control, and dredging and filling activities. Fortunately, specific legal protection for mangrove swamps was adopted by the state in 1985. Today, mangroves continue to face such problems as destruction from oil spills and changes in the quantity, quality and timing of the fresh water input as the adjacent uplands are developed or otherwise altered. Reducing estuarine salinity and flushing chemical pollutants from adjacent uplands have resulted in the destruction of some Tidal Swamp areas and the invasion of non-mangrove species.

The combination of these factors has resulted in a decrease in the number of acres of Tidal Swamps and a reduction in available nursery grounds and valuable habitat for native wildlife. Mangrove swamps can be replanted by man; however, long term monitoring has not been conducted to determine if restored sites function as the original community did. The best management practice is to prevent further destruction of existing Tidal Swamps and maintain a natural flow of fresh water into these areas.

(77) MARINE UNCONSOLIDATED SUBSTRATE - (synonyms: beach, shore, sand bottom, shell bottom, sand bar, mud flat, tidal flat, soft bottom, coralgal substrate, marl, gravel, pebble, calcareous clay). Marine and Estuarine Unconsolidated Substrates are Mineral Based Natural Communities generally characterized as expansive, relatively open areas of subtidal, intertidal, and supratidal zones which lack dense populations of sensible plant and animal species. Unconsolidated Substrates are unsolidified material and include coralgal, marl, mud, mus/sand, sand or shell. This community may support a large population of infaunal organisms as well as a variety of transient planktonic and pelagic organisms (e.g., tube worms, sand dollars, mollusks, isopods, amphipods, burrowing shrimp, and an assortment of crabs).

In general Marine and Estuarine Unconsolidated Substrate Communities are the most widespread communities in the world. However, Unconsolidated Substrates vary greatly throughout Florida, based on surrounding parent material. Unconsolidated sediments can originate from organic sources, such as decaying plant tissues (e.g., mud) or from calcium carbonate depositions of plants or animals (e.g., coralgal, marl and shell substrates). Marl and coralgal substrates are primarily restricted to the southern portion of the state. The remaining four kinds of Unconsolidated Substrate, mud, mud/sand, sand, and shell, are found throughout the coastal areas of Florida. While these areas may seem relatively barren, the densities of infaunal organisms in subtidal zones can reach the tens of thousands per meter square, making these areas important feeding grounds for many bottom feeding fish, such as redfish, flounder, spot and sheepshead. The intertidal and supratidal zones are extremely important feeding grounds for many shorebirds and invertebrates.

Unconsolidated Substrate Communities which are composed chiefly of sand (e.g., sand beaches) are the most important recreational areas in Florida, attracting millions of residents and tourists annually. This community is resilient and may recover from recreational disturbances. However, this community is vulnerable to compaction associated with vehicular traffic on beaches and disturbances from dredging activities and low dissolved oxygen levels, all of which can cause in faunal organisms to be destroyed or to migrate out of the area. Generally these areas are easily recolonized either by the same organisms or a series or organisms which eventually results in the community returning to its original state once the disturbance has ceased. In extreme examples, such as significant alterations of elevation, there is potential for serious long-term impacts from this type of disturbance.

(81/82) RUDERAL AND DEVELOPED - Ruderal areas are characterized by having the natural substrate or the natural community overwhelmingly altered as a result of human activity. Native vegetation is sparse and is often replaced by weedy or exotic species. These areas require a long-term restoration effort.

Developed areas consist of natural biological communities that have been replaced or nearly replaced by structures or permanently cleared areas such as roads, visitor facilities, campgrounds, recreation areas, parking lots or concessions.